

tains the main points of the theory of relativity, including the four-dimensional representation for particle dynamics and electromagnetic field laws, and a short but clear report on general relativity. I should like to mention the very good quality of the diagrams illustrating those topics, and the nice analysis of the clock paradox, as well as a few useful critical remarks. On the other hand it may not be a good idea to have exchanged the common use of subscripts and superscripts for tensors and unit vectors, and I definitely cannot agree with the author when he infers from Minkowski's diagram that "an object with no velocity in the ordinary sense . . . is moving into the future with speed c ", and relates Lorentz' time dilatation to some "slowing down of the motion into the future"; I am afraid such a picturesque way of speaking can be very misleading. The last chapter briefly introduces the wave-particle duality, Schrödinger's equation, the principle of superposition, the uncertainty principle (put forth in a simple but rigorous way), and ends with a few words on relativistic quantum mechanics and some philosophical implications. There is no exposition of group theory and quantum statistics. Spinors are just mentioned.

Each section is followed by numerous exercises (without answers), extending over a wide range of difficulty; many are of real interest. A sufficient number of references is given after each chapter. There are numerous diagrams, most of which are very good.

Lectures on the Theory of Elliptic Functions Analysis (498 pp., paperbound \$2.55) and **Elliptic Integrals** (104 pp., paperbound \$1.25). Reprints of 1st Editions. By Harris Hancock. Dover Publications, Inc., New York, 1958. *Reviewed by George Weiss, Institute for Fluid Dynamics and Applied Mathematics, University of Maryland.*

THERE are few among us who can claim a real enthusiasm for the theory of elliptic functions. In point of fact the subject is of rare occurrence in an American curriculum, and the easing of the Math Tripos examinations in England seems to have imparted a musty and Victorian flavor to the theory on the Continent. Nevertheless elliptic functions are useful in physics and one does occasionally need more than a cookbook for their manipulation.

I could not very well claim that these books by Hancock are a painless way to acquire a knowledge of the theory, but they are certainly as painless as any of the other texts on the subject. The larger volume is a fairly encyclopedic account of the theory of doubly periodic functions, including an interesting study of the general properties of functions with algebraic addition theorems. There is in addition the usual discussion of the analytic properties of elliptic functions and integrals, theta functions, sigma functions, and so on. There are no physical applications given; they were scheduled to appear in a later volume which was never published.

The smaller of the two books is a rather valuable

summary of the properties of elliptic integrals of the first and second kinds. This includes both methods for transforming elliptic integrals into canonical form and for the numerical computation of these integrals.

The two books are to be recommended, if not for the liveliness of their contents, then at least for their convenience as inexpensive reference books.

Radiation Biology and Cancer: 12th Annual Symposium on Fundamental Cancer Research (Houston, Tex., 1958). Edited by and published for the U. of Tex. M. D. Anderson Hospital & Tumor Inst. 493 pp. U. of Tex. Press, Austin, Tex., 1959. \$8.50. *Reviewed by Joseph G. Hoffman, University of Buffalo.*

THIRTY-THREE chapters deal with different aspects of the effects of radiation on living systems, particularly mammalian systems. Since radiation enters into men's lives in many new and artificial ways, the topics are of timely interest to the general scientist. However, the contributors use the technical language of their subject matter. This fact may, in some instances, prevent the general reader's having an understanding of some parts of the excellent material presented, particularly since the great scope of radiation biology and cancer covers many special fields far removed from one another in theory and practice. Moreover, the specialist may not always have more advantage than the general scientist in perusing this kind of text.

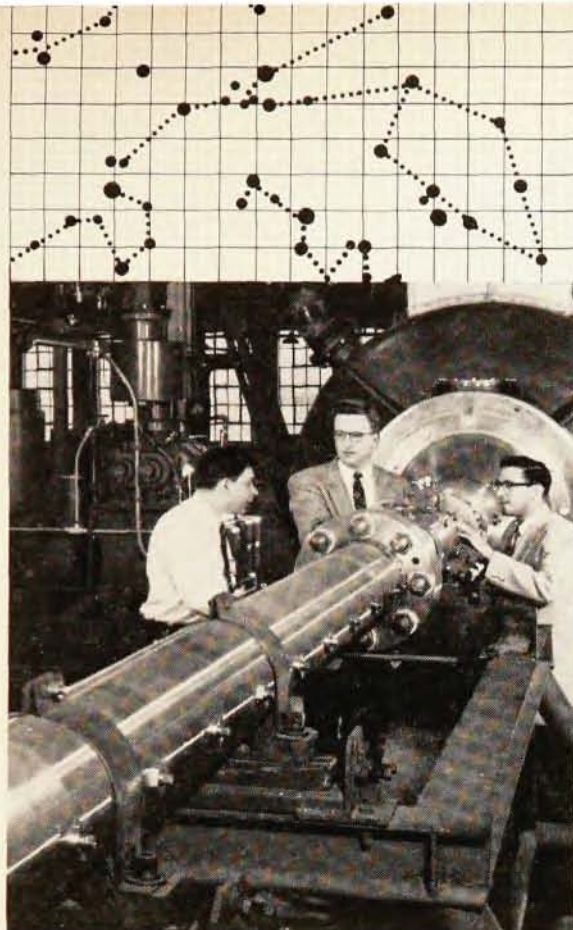
The first chapter, the Bertner Lecture by Jacob Furth, is one of many highlights. It deals with Radiation Neoplasia and Endocrine Systems in a technical manner which conveys the facts, draws conclusions, and projects future research with remarkable clarity. It is a model of conciseness of presentation of a theory of well-known types of cancer in mice (but not necessarily in men).

The high level of excellence in the first chapter is pretty much maintained by contributors of following chapters which range in subject from viruses, tissue cultured cells, *Drosophila*, mutations, genetics, radiation cancer in man, to clinical radiation therapy, to mention but a few. For example, some problems of radiation dosimetry are described and clarified by the work of W. K. Sinclair and collaborators in four chapters. From these and seven chapters on fundamental radiobiology the reader gets a good picture of the intricacies of dosage measurement in tissues and the complexities of assessing the response of a living system to the energy of the dose.

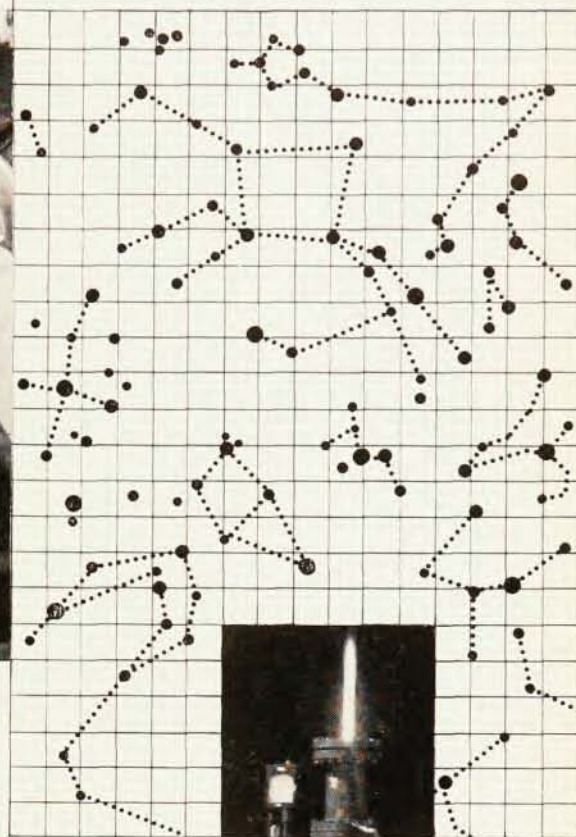
The classic problem of cancer and ionizing radiation is discussed from many angles in fourteen chapters all of which command broad interest. The findings of C. L. Simpson of tumors induced by therapeutic doses of x rays present a practical aspect of the radiation problem. In the other extreme the more obscure relationship between mutations and cancer are reviewed briefly by W. J. Burdette. The physicist reading these

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Advanced Structural Research Research in the fields of dynamic buckling, radiation shielding, high speed particle impact, etc. A doctoral degree in engineering, applied mechanics or applied mathematics is required.

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chapters will come to an appreciation of the nature of living systems as revealed by their response to ionizing radiations.

The format is excellent; the table of contents supplemented by a good index guides the reader. Generous illustrations, data, and graphs make this a highly commendable presentation of an extensive subject.

The Thirteen Steps to the Atom: A Photographic Exploration. By Charles-Noël Martin. Translated from French by B. B. Rafter. 256 pp. Franklin Watts, Inc., New York, 1959. \$4.95. Reviewed by Cyril Stanley Smith, *Institute for the Study of Metals, University of Chicago*.

THIS is a pleasant book, containing 117 excellent photographs showing structural details of organic and inorganic matter at scales from a tenth of a millimeter down to a few angstroms. It is meant for the general public, which will be filled with wonder at the beauty and significance of invisible structure, but many scientists will find it a good antidote to the effects of intensive preoccupation with structure on a single scale. The book has its faults. The author missed a good opportunity to give depth to his treatment by a discussion of ions and crystals; the implication that a NaCl crystal is composed of molecules is old fashioned to say the least. Metallurgists will be surprised to read that metal crystals range in size from 0.7 to 3 microns. There is almost nothing on interatomic forces of any sort and surface energy is barely mentioned. Likewise the rudimentary mathematics of space-filling, which surely is central to a proper treatment of the author's theme, is ignored. It is an enjoyable book nevertheless.

Books Received

THEORY OF UNIMOLECULAR REACTIONS. By Noel B. Slater. 230 pp. Cornell U. Press, Ithaca, N. Y., 1959. \$4.75.

THE TRANSITS OF VENUS: A Study of Eighteenth-Century Science. By Harry Woolf. 258 pp. Princeton U. Press, Princeton, N. J., 1959. \$6.00.

EYE, FILM, AND CAMERA IN COLOR PHOTOGRAPHY. By Ralph M. Evans. 410 pp. John Wiley & Sons, Inc., New York, 1959. \$8.95.

NOMOGRAPHY (2nd Revised Ed.). By A. S. Levens. 296 pp. John Wiley & Sons, Inc., New York, 1959. \$8.50.

UNIVERSITY MATHEMATICS: A Textbook for Students of Science & Engineering (2nd Revised Ed.). By Joseph Blakey. 581 pp. Philosophical Library, Inc., New York, 1959. \$10.00.

THE OCEAN OF AIR. By David I. Blumenstock. 457 pp. Rutgers U. Press, New Brunswick, N. J., 1959. \$6.75.

HANDBOOK OF AUTOMATION, COMPUTATION, AND CONTROL. Vol. 2, Computers and Data Processing. Edited by Eugene M. Grabbe, Simon Ramo, Dean E. Wooldridge. 31 chapters. John Wiley & Sons, Inc., New York, 1959. \$17.50.

REPORT OF THE FLUID FUEL REACTORS TASK FORCE: to the Div. of Reactor Development, AEC. TID-8507. 188 pp. OTS, Dept. of Commerce, Washington, D. C. Paperbound \$1.75.

TASK FORCE EVALUATION REPORT—SMALL-SIZED NUCLEAR POWER PLANT PROGRAM. Atomic Energy Comm. TID-8508. 59 pp. OTS, Dept. of Commerce, Washington, D. C. Paperbound \$1.75.

DOVER REPRINTS. *A Treatise on Algebraic Plane Curves* (Reprint of 1st Ed.), by Julian Lowell Coolidge, 513 pp., \$2.45. *The Theory of Numbers and Diophantine Analysis* (Reprints of 1914 & 1915 Eds.), by Robert D. Carmichael, 118 pp., \$1.35. *An Elementary Treatise on Fourier's Series and Spherical, Cylindrical, and Ellipsoidal Harmonics: with Applications to Problems in Mathematical Physics* (Reprint of 1893 Ed.), by William Elwood Byerly, 287 pp., \$1.75. *Algebraic Theories* (Reprint of 1926 Ed.), by Leonard E. Dickson, 276 pp., \$1.50. Dover Publications, Inc., New York, 1959. All paperbound.

HARPER SCIENCE LIBRARY REPRINTS. *On Understanding Physics* (Reprint of 1938 Ed.), by W. H. Watson, 146 pp., \$1.25. *Space, Time and Gravitation: An Outline of the General Relativity Theory* (Reprint of 1920 Ed.), by Sir Arthur Eddington, 216 pp., \$1.35. *Readings in the Literature of Science* (Reprint), edited by William C. & Margaret Dampier, 275 pp., \$1.50. *Introduction to Mathematical Thinking: The Formation of Concepts in Modern Mathematics* (Reprint of 1951 Ed.), by Friedrich Waismann, translated from German by Theodore J. Benac, 260 pp., \$1.40. *A History of Science Technology and Philosophy in the 16th and 17th Centuries* (Reprint of 2nd Ed.), by A. Wolf, Vol. 1, 349 pp., Vol. 2, 338 pp., \$1.95 each. Harper & Brothers, New York, 1959. All paperbound.

ELEKTRONENBEUGUNG: Theorie, Praxis und industrielle Anwendungen. By Ernst Bauer. 233 pp. Verlag Moderne Industrie, Munich, Germany, 1958. DM 32.00.

ATOMIC ENERGY IN THE SOVIET UNION. By Arnold Kramish. 232 pp. Stanford U. Press, Stanford, Calif., 1959. \$4.75.

FONCTIONS SPHÉRIQUES DE LEGENDRE ET FONCTIONS SPHÉROÏDALES, Vol. 3. By Louis Robin. 289 pp. Gauthier-Villars, Paris, France, 1959. Clothbound \$12.42; paperbound \$11.40.

AN INTRODUCTION TO DIFFERENTIAL GEOMETRY. By T. J. Willmore. 317 pp. Oxford U. Press, New York, 1959. \$5.60.

LA MENACE RADIOACTIVE: Danger des retombées radioactives provenant des explosions nucléaires. By A. Pirie, et al. 128 pp. Dunod, Paris, France, 1959. Paperbound 950 fr.

FLUID DYNAMICS. By D. E. Rutherford. 226 pp. (Oliver & Boyd, England) Interscience Publishers, Inc., New York, 1959. \$1.95.

AMERICAN UNIVERSITIES AND FEDERAL RESEARCH. By Charles V. Kidd. 272 pp. The Belknap Press of Harvard U. Press, Cambridge, Mass., 1959. \$6.00.

FERRITES: Physical Properties of Ferrimagnetic Oxides in Relation to Their Technical Applications. By J. Smit and H. P. J. Wijn. 369 pp. John Wiley & Sons, Inc., New York, 1959. \$10.00.

MATHEMATICS AND THE PHYSICAL WORLD. By Morris Kline. 482 pp. Thomas Y. Crowell Co., New York, 1959. \$6.00.

PHYSIKALISCHE KERNCHEMIE. By Ulrich Schindewolf. 194 pp. Friedr. Vieweg & Sohn, Braunschweig, Germany, 1959. DM 19.80.

ENERGY DISSIPATION BY FAST ELECTRONS. By L. V. Spencer. 70 pp. NBS Monograph 1. US Govt. Printing Office, Washington, D. C. Paperbound \$4.45.

READING GERMAN FOR SCIENTISTS. By Hans Eichner and Hans Hein. 207 pp. John Wiley & Sons, Inc., New York, 1959. \$5.25.