

It is the soundly speculative discussion of this kind which makes the Symposium unique. In all directions the essayists take apart the fundamental notions of radiobiology and then proceed to indicate problems for solution or to point out directions in which work could be done profitably. Platzman's description of the possible role of Auger disruptions shows that the basic physical processes of radiation absorption in cells are by no means clearly understood yet. Indeed, his two chapters outlining the details of energy absorption emphasize how meager the experimental data as well as the physical theory are as regards energy transfer into aqueous tissue. Zirkle's chapter on "Speculations on Cellular Actions of Radiations" is a frankly speculative attempt to account for the shapes of mortality curves. In another direction, Brues and Sacher, dealing with "Radiation Injury and Lethality," heuristically apply the concept of the Gompertz force of mortality to explain some of the data. It should be noted in passing that Brues and Sacher present ideas that will appeal to cancer researchers.

There is one more feature which must be described at least briefly, not only because of its scientific interest but also for its social and forensic aspects. In the atomic age people will become more and more exposed to penetrating radiations, both in war and in peace. The question arises as to how much the physical gene system can tolerate in the way of exposure; in other words, will there be a degradation of the genes in man?

The discussion of "Mammalian Radiation Genetics" by W. L. Russell along with Muller's remarks on "The Way in Which an Increase in Mutation Rate Will Affect a Population" give a good summary of current thoughts on the genetic hazard of chronic radiation dosage. The implications seem dire and are not mitigated by the quantitative estimates given by Russell wherein he concludes: "There are, then, various reasons for thinking that the number of roentgens required to double the natural rate of mutation per generation in man is not as high as the 300 r estimated by Evans, and there is at least one argument, that advanced by Wright, for thinking that it may be as low as 3 r."

It is not feasible to list here all of the many highlights in this book. Briefly stated, there is a uniformly high degree of excellence maintained in the twenty-three papers throughout the Symposium.

The purpose as stated in the foreword is admirably achieved, namely: "... the objective would be a thorough examination of the fundamental concepts that exist in radiobiology." The thoroughness with which the subject is examined will appeal to many different specialists in the basic sciences as well as to cancer research workers in general. Each will find here vitally interesting material. There are six chapters in which the dominant role of radiation chemistry in the reactions of cells is well delineated. Along with the chapters on primary physical absorption processes they form a solid foundation to the subject which will please expert and novice

alike. As for the concepts of radiobiology, the essayists have tempered theory nicely with experimental data.

The last four chapters contain much material of an empirical nature on the reactions of organisms to radiation. These will be of interest, for example, to radiologists for whom basic radiobiology in its present nebulous state cannot provide answers to their numerous questions on tissue reactions.

It seems too bad that a book of this magnitude and stature was published without an index.

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Color Measurement

Those concerned in one way or another with colorimetry and its applications will be interested in the recent publication of a readable book on the subject by Deane B. Judd, physicist in the photometry and colorimetry section of the National Bureau of Standards. The volume (*Color in Business, Science, and Industry*, 400 pp., John Wiley & Sons, Inc., New York, 1952, \$6.50) is written, as the title would suggest, primarily for the edification of the principal users of color in contemporary America, the business man and the industrialist, but it should also prove helpful to the practicing color technologist as a working guide for use in approaching problems dealing with color measurement.

Short-Wave Radiation

The late August Hund was a pioneer in the use of high frequency radiation. In the two volumes appearing under the title, *Short-Wave Radiation Phenomena* (McGraw-Hill Book Co., New York, 1952; 1382 pp.; \$20.00), he has displayed a wealth of data, formulas, and figures reflecting the experiences of a technical radio consultant and practical engineer who spent more than thirty-seven years in the field. These books present a rather detailed but somewhat uneven treatment of electromagnetic theory stressing the practical applications of the frequencies over thirty megacycles. Various numerical examples are treated in very great detail, the work being no doubt intended as a self-study aid to introduce to the nonmathematical worker the complexities of the subject. Fourteen pages of bibliography and an eighty-page index increase its usefulness as a reference.

Atoms, Molecules, and Solids

The *Quantum Theory of Matter* by John C. Slater (McGraw-Hill, 1951, pp. 528, \$7.50) is an intermediate treatment of the structure of atoms, molecules, and solids; only a moderate knowledge of atomic and mathematical physics is presupposed. Atomic spectra, intermolecular forces, band theory of solids, electrical conductivity, semiconductors, and dielectric and magnetic effects are considered in some detail. The more difficult material is included in twenty-two Appendices at the end of the book. The presentation is simple and

straightforward: the reader is led directly from fundamentals to the applications of quantum mechanics to the properties of matter. The text is very readable and will be useful to specialists in other fields as well as to physics students. This book and the three volumes *Mechanics*, *Electromagnetism*, and *Introduction to Chemical Physics* (the first two co-authored with N. H. Frank) constitute a fairly complete treatment of theoretical physics (except for nuclear theory) on the intermediate level.

Tensor Mathematics

Tensor Analysis, Theory and Application by I. S. Sokolnikoff (John Wiley and Sons, 1951, pp. 335, \$6.00) begins with a discussion of linear vector spaces and matrices which stresses geometrical and physical interpretations. It then presents a self-contained treatment of tensor algebra and calculus which is independent of special disciplines such as geometry or relativity. The remainder of the book deals with applications of tensors to geometry, analytical mechanics, relativistic mechanics, and mechanics of continuous media.

Maintenance of Standards

An interesting addition to the existing literature on standards of measurement is the volume of published proceedings of a symposium on recent developments and techniques held at the British National Physical Laboratory at Teddington in May 1951. A total of twelve papers were presented during the six sessions of the symposium, and the publication provides not only the texts of these, but also a summary of the informal discussions which followed each session. Bruce L. Wilson (National Bureau of Standards in Washington) and F. Aughtie (National Physical Laboratory) discuss matters concerning the primary load standards; the lightwave standard of length is reviewed by E. Engelhard (Physikalisch-Technische Bundesanstalt, Brunswick, Germany) and by H. Barrell (NPL); Standards of Radioactive Isotopes are considered by R. C. Hawkings, W. F. Merritt, and J. H. Craven (National Research Council of Canada) and by W. E. Perry (NPL); recent improvements in temperature measurement are discussed by H. van Dijk (Kamerlingh-Onnes Laboratory, University of Leiden, Holland) and C. R. Barber (NPL); the standard of light, in connection with the photometric scale and the coordination of the photometric units, is dealt with by J. W. T. Walsh (NPL) and J. Terrien (Bureau International des Poids et Mesures, Sevres, France); and standards of frequency are treated by Erik Bergstrand (Kartverket, Stockholm, Sweden), who spoke on the precision of optical methods for the determination of the velocity of light, and by L. Essen (NPL) who discussed the measurement of time, frequency, and velocity. (*Recent Developments and Techniques in the Maintenance of Standards*; 100 pp.; Her Majesty's Stationery Office; London; 1952; 4s 6d.)

Books Received

DESIGN FOR A BRAIN. By W. Ross Ashby. 260 pp. John Wiley and Sons, Inc., New York, 1952. \$6.00.

CLOUD CHAMBER PHOTOGRAPHS OF THE COSMIC RADIATION. By G. D. Rochester and J. G. Wilson. 128 pp. (Pergamon Press Ltd., London) Academic Press Inc., New York, 1952. \$10.80.

COMETS AND METEOR STREAMS. Volume II. By J. G. Porter. 123 pp. John Wiley and Sons, Inc., New York, 1952. \$5.25.

FUNDAMENTAL PRINCIPLES OF POLYMERIZATION. By G. F. D'Alelio. 517 pp. (Chapman and Hall Ltd., London) John Wiley and Sons, Inc., New York, 1952. \$10.00.

STARS IN THE MAKING. By Cecilia Payne-Gaposchkin. 160 pp., 67 plates. Harvard University Press, Cambridge, Massachusetts, 1952. \$4.25.

INTERCHANGEABILITY OF OIL, GAS, AND NATURAL GAS. Interim Report. By D. L. Nicol, R. A. Brown, and H. R. Linden. 28 pp. Institute of Gas Technology, Chicago, Illinois, 1952. \$2.50.

ACTES DU COLLOQUE INTERNATIONAL DE MÉCANIQUE—Poitiers 1950. Tome IV, Etudes sur la Mécanique des Solides Etudes sur la Mécanique Générale, (No. 261). 338 pp. Tome V, Etudes sur la Mécanique Générale, (No. 263). 263 pp. Au Service de Documentation et d'Information Technique de l'Aéronautique, Paris, France, 1952.

SUPERCONDUCTIVITY. By D. Shoenberg. 256 pp. Cambridge University Press, New York, 1952. \$6.00.

SIR JAMES JEANS. A Biography. By E. A. Milne. 171 pp. Cambridge University Press, New York, 1952. \$4.00.

POLAROGRAPHY (Second Revised Edition). Volume II. By I. M. Kolthoff and James J. Lingane. 567 pp. Interscience Publishers, New York, 1952. \$11.00.

MODERN PHYSICS. By F. W. Van Name, Jr. 360 pp. Prentice-Hall, Inc., New York, 1952. \$5.50.

LIGHT. The Student's Physics. Volume I. By R. W. Ditchburn. 680 pp. Blackie and Son Ltd., London, 1952. 45s.

THEORY OF ELASTICITY AND PLASTICITY. By H. M. Westergaard. 176 pp. Harvard University Press, Cambridge, Massachusetts and John Wiley and Sons, Inc., New York, 1952. \$5.00.

RADIO ASTRONOMY. By Bernard Lovell and J. A. Clegg. 238 pp. John Wiley and Sons, Inc., New York, 1952. \$4.00.

THE ELECTROMAGNETIC FIELD. By Max Mason and Warren Weaver. 389 pp. Dover Publications, Inc., New York, 1929. Paper-bound, \$1.85.

SCIENCE AND HYPOTHESIS. By Henri Poincaré. 244 pp. Dover Publications, Inc., New York, 1952. Paper-bound, \$1.25.

SCIENCE AND METHOD. By Henri Poincaré. Translated by F. Maitland. 288 pp. Dover Publications, Inc., New York, 1952. Paper-bound, \$1.25.

ORGANIC SYNTHESIS. An Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals. Volume 32. Editor-in-Chief Richard T. Arnold. 119 pp. John Wiley and Sons, Inc., New York, 1952. \$3.50.

PHYSICS. For Science and Engineering Students. By W. H. Furry, E. M. Purcell, and J. C. Street. 694 pp. The Blakiston Company, New York, 1952. \$6.50.