

is "to analyze the capabilities and limitations of modern air power; to examine the effects of the new modes of scientific warfare and particularly ABC [i.e., atomic, bacterial and chemical] weapons; and to discuss the various defensive measures that should be taken to cope with this danger, including an outline of the civil defense organization that will be required for this purpose."

Much of the material presented is not new; however, its collection into a convenient volume is certain to be of great assistance in its utilization. This book is not in any sense a manual for civilian defense workers, and makes no such pretension. Rather, it is designed as a reference for national, state, and local government and volunteer officials concerned with civil defense and for others such as building and plant managers whose work involves only incidentally the protection of personnel in the event of an attack. For this reason over a third of the book is devoted to a description of modern air warfare and the various destructive agents (chemical, incendiary, bacterial, and atomic) that it can employ. The remainder consists of a discussion of the principles of protection against these agents and an outline of an adequate civil defense organization. Not the least of the good features of *Civil Defense in Modern War* is the extensive bibliography that is appended, which, although not complete, includes almost all the significant works on the subject and supplements the text admirably.

While there is an enormous amount of detail provided on a variety of pertinent topics (for instance, shelter specifications and organization of the various emergency services) there seems to be surprisingly little information on radiological defense techniques. Although it is true that the importance of this subject was greatly overestimated at one time, it still remains of great concern. However, the reviewer is probably prejudiced on this point, and Prentiss' book can certainly be recommended as an able and comprehensive study of modern civil defense and its practical application in the United States.

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Radio Spectrum Conservation. A Report of the Joint Technical Advisory Committee of the Institute of Radio Engineers and the Radio-Television Manufacturers Association. 221 pp. McGraw-Hill Book Company, New York, 1952. \$5.00.

No parallel has been drawn in this volume, although there might have been, to compare the present congestion of the radio-frequency spectrum with the form of congestion marked by skyrocketing urban population increases and by the constant adaptation of new technological requirements within makeshift city structures inherited from a horse-drawn society. The expansion of cities, and of the radio spectrum as well, has been a step-by-step process of satisfying new needs as they arise. The cities have grown taller and have burrowed

underground and the radio spectrum has been lengthened, but the demands placed on both are increasing at an alarming rate. Whatever fate may be in store for cities, it is apparent that careful attention is at least being accorded the dangers threatening radio communication.

Formed almost five years ago by joint action of the boards of directors of the Institute of Radio Engineers and the Radio-Television Manufacturers Association, the technical advisory committee responsible for the present report has assembled and digested a large amount of information relating to the development of radio communications and to the very difficult international problem of radio spectrum allocations. The report itself includes a survey of the pertinent historical facts, summaries of the present state of knowledge of the several regions of the spectrum, specific suggestions aimed at ensuring better use and regulation of radio facilities, and an extensive bibliography of the material in the field.

Since 1903, when the first International Radiotelegraph Conference was held in Berlin, numerous domestic and international conferences have taken place and a large number of regulatory provisions have been adopted. The limiting factor in any long-range planning attempts, however, has always been that certain frequencies were already in use and therefore were unavailable for new services. Additional frequency allocations thus had to be fitted in as conveniently as possible somewhere along the remaining portions of the usable spectrum. This procedure has prohibited the establishment of an idealized allocation pattern. Needs arising from the vast and varied technological developments of the past several decades have seldom been anticipated, and in any case, allocations at each stage have had to conform to the performance characteristics of available equipment. The resulting situation of confusion is further complicated by economic and political considerations which limit the possibility of altering the established pattern of allocations.

While extensions of the upper-frequency limit of the radio spectrum have provided room for the expansion of established services and the introduction of new ones, the report observes, the end of such extensions now seems to be in sight. In this connection it is pointed out that certain of the more recently available bands either are technically unsuitable for many existing services or require considerable investments in new equipment before they will become usable.

The thesis of the present report is that the radio spectrum is a public domain of limited extent which differs from water power, forests, and certain mineral resources in that it cannot be conserved under a static policy based on extrapolation from past demands. What is really needed, says the advisory committee, is a technically and economically sound program of "dynamic conservation" which will set up a procedure for changing allocations as new services of great value appear and as older ones lessen in value. The broad implications of this proposal are explored with some pa-

tience in the report and a number of specific examples are cited to show that for some services allocation shifts are both feasible and desirable.

Titanium Handbook

The latest volume of the Gmelin Handbuch der Anorganischen Chemie (System No. 41, *Titan*, 481 pp.; Gmelin Institute; Weinheim, Germany, 1951; available in U. S. from Walter J. Johnson, Inc., and Stechert-Hafner, Inc., New York, \$27.20) is a comprehensive review of the pertinent world literature through 1949 on the chemistry, physics, metallurgy, geology, and technology of the element titanium, including its alloys and compounds. A concise and carefully prepared reference work, the handbook has a detailed index at the beginning to permit the rapid location of information.

Sun and Stars

As its title indicates, *Physics of the Sun and Stars* (by W. H. McCrea; 192 pp.; Hutchinson's University Library; London; 1950; \$2.00) deals with the individual study of these bodies and does not consider such other astrophysical phenomena as galaxies. Neither historical nor particularly mathematical, this book is an exposition of those physical ideas made use of by astronomy, such as the structure of matter and atomic spectra, and their application in explaining the behavior of the sun and the stars.

Cosmology

Information obtained from the new 200-inch telescope at Mt. Palomar is certain to profoundly affect our knowledge of the universe, its past and its future. In the 100 text pages of *Cosmological Theory* (by G. C. McVittie; Methuen & Co.; London; 1949; \$1.50) Professor McVittie has included the basic observational and theoretical information on this subject that was available before results could be obtained from Palomar, including compact treatments of tensor calculus and general relativity. The expanding universe of relativity and Milne's kinematical theory of the universe are considered in some detail.

Microscopic Photos

Equipment and conventional techniques for making photomicrographs with a compound microscope at low, medium, and high magnifications up to 2500 diameters are described in a new Kodak Industrial Data Book (*Photography Through the Microscope*, 68 pp. Eastman Kodak Co., Rochester 4, N. Y., 1952. \$0.50.) Also discussed are such specialized techniques as photomacrography, cine photomicrography, electron microscopy, and ultraviolet, infrared, and phase contrast photomicrography. Numerous tables, charts, and illustrations are provided, and a bibliography lists references to leading books and articles on the subject. The data book is to be included as a standard section in the *Kodak Industrial Handbook*.

Books Received

X-RAY CRYSTALLOGRAPHIC TECHNOLOGY. By André Guinier (Translated by T. L. Tipler). 330 pp. Hilger and Watts Ltd., London, England, 1952. U. S. distributor: Jarrell-Ash Company, Boston, Massachusetts. \$9.50.

EXERCISES IN EXPERIMENTAL PHYSICS. Edited by N. C. B. Allen and L. H. Martin. 237 pp. (Melbourne University Press, Melbourne, Australia) Cambridge University Press, New York, 1952. \$5.50.

PROBLEMS OF LIFE. An Evaluation of Modern Biological Thought. By Ludwig von Bertalanffy. 216 pp. John Wiley and Sons, Inc., New York, 1952. \$4.00.

LOW TEMPERATURE PHYSICS. Four Lectures. By F. E. Simon, N. Kurti, J. F. Allen, and K. Mendelssohn. 132 pp. Academic Press Inc., New York, 1952. \$3.50.

HARWELL—THE BRITISH ATOMIC ENERGY RESEARCH ESTABLISHMENT 1946-1951. Prepared by the Ministry of Supply and the Central Office of Information (England). 128 pp. Philosophical Library, Inc., New York, 1952. Paperbound, \$3.75.

INTRODUCTION TO CONCEPTS AND THEORIES IN PHYSICAL SCIENCE. By Gerald Holton. 650 pp. Addison-Wesley Press, Inc., Cambridge, Massachusetts, 1952. \$6.50.

LITTLE SHIP ASTRO-NAVIGATION. By M. J. Rantzen. 160 pp. Philosophical Library, New York, 1952. \$4.75.

VECTOR ANALYSIS. By Earl C. Rex. 88 pp. Wm. C. Brown Company, Dubuque, Iowa, 1952. Paperbound, \$3.25.

DESCRIPTION OF A MAGNETIC DRUM CALCULATOR. The Annals of the Computation Laboratory of Harvard University. Volume XXV. By the Staff of the Computation Laboratory. 318 pp. Harvard University Press, Cambridge, Massachusetts, 1952. \$8.00.

ADVANCES IN ELECTRONICS. Volume IV. Edited by L. Marton. 344 pp. Academic Press Inc., New York, 1952. \$7.80.

GEOGRAPHY OF LIVING THINGS. By M. S. Anderson. 202 pp. Philosophical Library, New York, 1952. \$2.75.

HIGH-ENERGY PARTICLES. By Bruno Rossi. 569 pp. Prentice-Hall, Inc., New York, 1952. \$12.50.

STORAGE TUBES AND THEIR BASIC PRINCIPLES. By M. Knoll and B. Kazan. 143 pp. John Wiley and Sons, Inc., New York, 1952. \$3.00.

I.R.S.I.A. RAPPORT ANNUEL. Exercice 1951. 193 pp. Institut pour l'Encouragement de la Recherche Scientifique dans l'Industrie et l'Agriculture. Brussels, Belgium, 1952.

REVIEW OF ELECTRONIC DIGITAL COMPUTERS. Papers and Discussions Presented at the Joint AIEE-IRE Computer Conference, December, 1951. 114 pp. American Institute of Electrical Engineers, New York, 1952. \$3.50.

UHF PRACTICES AND PRINCIPLES. By Allan Lytel. 390 pp. John F. Rider Publishers, Inc., New York, 1952. \$6.60.

MECHANICS. Part I: Statics; Part II: Dynamics. By J. L. Meriam. 671 pp. John Wiley and Sons, Inc., New York, 1952. Each Volume \$4.00.

INORGANIC CHEMISTRY. An Advanced Textbook. By Therald Moeller. 966 pp. John Wiley and Sons, Inc., New York, 1952. \$10.00.

28 SCIENCE FICTION STORIES OF H. G. WELLS. 915 pp. Dover Publications, Inc., New York, 1952. \$3.95.

ANNUAL REVIEW OF PHYSICAL CHEMISTRY. Volume III. Edited by G. K. Rollefson and R. E. Powell. 416 pp. Annual Reviews, Inc., Stanford, California, 1952. \$6.00.