

Book Reviews

Electrical engineering: essential theory and typical applications. Fred H. Pumphrey. New York: Prentice-Hall, 1946. Pp. xiv + 369. (Illustrated.) \$5.35.

This is a textbook in electrical engineering for students specializing in other fields. The wide range of topics treated in the volume makes it impossible for all of them to be covered in sufficient detail for the beginner, and the reader will find that many phenomena are not adequately explained. However, the bibliography at the end of each chapter is well selected and will help to solve this difficulty.

The limited material included in the chapters on direct-current machinery and circuits and alternating-current machinery and circuits is well chosen.

The relatively large space given to electron tubes and circuits is amply justified by the great importance of the electron tube as a control device in all branches of electrical engineering. The three short chapters, covering a total of 45 pages, give one of the most satisfactory introductions to the theory of electron tubes and circuits which it has been this reviewer's privilege to see.

The applications of electric energy for heating and welding and in a number of electrochemical processes are covered in a very interesting and informative manner.

In the chapter on electric motor applications the various types of loads are discussed, and the characteristics of the available motors are compared to enable the engineer to make the most satisfactory selection.

Throughout the book the drawings are particularly well made and leave no uncertainty in the mind of the reader. The photographs of details of apparatus are uniformly clear and easily understood.

This is a valuable book for the electrical engineer as well as for engineers in other branches who must make use of electricity as motive power or for control of manufacturing processes.

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Atomic and free radical reactions: the kinetics of gas-phase reactions involving atoms and organic radicals. E. W. R. Steacie. New York: Reinhold, 1946. Pp. vii + 548. \$8.00.

"Information concerning elementary reactions is widely spread through the literature of chemical kinetics, photochemistry, pyrolysis, etc., and it is usually very difficult to assemble the existing data on any given reaction. This book is an attempt to bring together such data, and to treat the reactions of atoms and radicals in their own right, rather than as an incidental part of the mechanism of more complex changes." The discussion is confined to elementary reactions involving organic substances.

The book is divided into two parts. After a brief introductory chapter dealing with the elementary theory of reaction rates there are four chapters of a general character. Chapter 2 deals very fully with experimental methods (about

60 pp.). This is followed by three chapters dealing, respectively, with thermal decomposition reactions, polymerization reactions, and photochemical reactions. The material in these chapters is classified, to a large extent, according to the compound being studied. The author has given a very full account of the various proposed reaction mechanisms and has freely given his own judgment as to the extent to which the evidence should be considered conclusive in each case. This critical approach on the part of the author will make the book particularly useful to those who are not expert in this field.

The last half of the book (Chaps. 6-14) classifies reactions according to the elements, starting with carbon and hydrogen compounds, and following with chapters on compounds containing oxygen, nitrogen, chlorine, bromine, iodine, sodium, other metals, and sulfur, respectively.

Two notable features of this book are the extensive bibliography and a reaction index which includes activation energies. The latter will make this volume extremely useful in looking up all the free radical mechanisms involving a given free radical.

In the opinion of this reviewer the author is more successful in "bringing together" reactions of a given atom or radical than he is in "treating them in their own right." While it is true that Chapter 3 begins with an excellent discussion of the strength of bonds in organic molecules, little use is made of this when specific reactions are being considered.

Both the presentation of the material by the author and the format are excellent.

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Photography by infrared: its principles and applications. (2nd ed.) Walter Clark. New York: John Wiley; London: Chapman & Hall, 1946. Pp. xvii + 472. (Illustrated.) \$6.00.

The pages of this book, written by Dr. Walter Clark, of the Eastman Kodak Research Laboratories, are filled with information on the general principles of photography, photography by the infrared, infrared radiation sources, value of infrared photography for various kinds of investigations, and some of the general characteristics of infrared radiation and its interaction with various materials.

The first chapter gives a general outline of the book, which is followed in the remaining 15 chapters.

In the second chapter the difference between infrared and ordinary photography is discussed. It is pointed out, with many examples, that many substances that are opaque to light are transparent to infrared radiation. Some of the necessary precautions for taking and developing pictures are then outlined, the extra care entailed by the use of infrared radiation being pointed out. There is a very complete discussion of the extension of the sensitivity of the photographic plate to longer and longer wave lengths, giving the various steps by which this has been accomplished. Plates sensitive out to 12,000 Å. are now on the market. The present wave-

length limit to the sensitivity of photographic materials is at about 13,500 Å. Some of the many difficulties that seem to make further progress difficult are pointed out.

There are five methods of photography in the infrared, two direct and three indirect. The first direct method is the sensitive plate; the second makes use of the Herschel effect, which is that exposure to infrared radiation destroys the effect of previous exposures to shorter wave lengths. The first indirect method depends upon the heating and vaporizing of specially prepared materials; the second makes use of the quenching of the phosphorescence of certain phosphors by infrared radiation; and the basis of the third method is the electron image tube. Probably the present-day limit to the photographic recording by infrared is at about 20,000 Å.

Sources of infrared radiation, with characteristic data, are well taken care of in Chapter 7.

The next three chapters are devoted to an examination and differentiation of different materials by infrared photography. This material covers textiles, documents, art works, biological specimens, wood, coal, and botanical specimens.

Chapter 11 is devoted, with many illustrations, to infrared photomicrography. The advantages of the use of the longer wave length are many.

The special applications of this kind of photography are given, again with many illustrations. Pictures taken by the radiation from a hot electric iron are shown, as well as those of audiences taken by infrared radiation without the subjects' knowledge.

Advantage can be taken of the different properties of materials to detect camouflage by the use of infrared photography. Chapters 14, 15, and 16 are devoted to the general characteristics of infrared radiation with respect to its penetration of the atmosphere, dust, smoke, haze, and fog. The optical characteristics of materials with respect to infrared radiation differ in many instances from like characteristics for the shorter-wave-length radiation of the visible spectrum.

The book contains a very complete bibliography and index. The only criticism that can be offered is to express regret that the established nomenclature of the American Standards Association has not been followed.

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Scientific Book Register

BARTSCH, PAUL. *The operculate land mollusks of the family Annulariidae of the island of Hispaniola and the Bahama Archipelago.* (U. S. National Museum Bull. 192.) Washington, D. C.: Government Printing Office, 1946. Pp. iv + 264. (Illustrated.) \$7.50.

DANIELS, LUCILLE, WILLIAMS, MARIAN, and WORTHINGHAM, CATHERINE. *Muscle testing: techniques of manual examination.* Philadelphia-London: W. B. Saunders, 1946. Pp. 189. (Illustrated.) \$2.50.

FLEXNER, ABRAHAM. *Daniel Coit Gilman: creator of the American type of university.* New York: Harcourt, Brace, 1946. Pp. ix + 173. \$2.00.

GLIDDEN, HORACE K., LAW, HERVEY, F., and COWLES, JOHN E. *Airports: design, construction, and management.* New

York-London: McGraw-Hill, 1946. Pp. xii + 583. (Illustrated.) \$7.00.

HAMILTON, LEICESTER, F., and SIMPSON, STEPHEN G. *Talbot's quantitative chemical analysis.* New York: Macmillan, 1946. Pp. xiv + 439. (Illustrated.) \$4.00.

LANDIS, CARNEY, and BOLLES, M. MARJORIE. *Textbook of abnormal psychology.* New York: Macmillan, 1946. Pp. xii + 576. (Illustrated.) \$4.50.

MEMBERS OF THE STAFF OF THE RADAR SCHOOL, MASSACHUSETTS INSTITUTE OF TECHNOLOGY. *Principles of radar.* (2nd ed.) New York-London: McGraw-Hill, 1946. (Illustrated.) \$5.00.

PEARL, RAYMOND. *Man the animal.* Bloomington, Ind.: Principia Press, 1946. Pp. 128. (Illustrated.)

PETERS, JOHN P., and VAN SLYKE, DONALD D. *Quantitative clinical chemistry: interpretations.* (Vol. I.) (2nd ed.) Baltimore, Md.: Williams & Wilkins, 1946. Pp. vii + 1041. \$7.00.

RAND, WINIFRED, SWEENEY, MARY E., and VINCENT, E. LEE. *Growth and development of the young child.* (4th ed.) Philadelphia-London: W. B. Saunders, 1946. Pp. vii + 481. (Illustrated.) \$3.00.

RANDOLPH, JOHN F., and KAC, MARK. *Analytic geometry and calculus.* New York: Macmillan, 1946. Pp. ix + 642. (Illustrated.) \$4.75.

SHERINGTON, SIR CHARLES. *The endeavour of Jean Fernel* (with a list of the editions of his writings). Cambridge, Engl.: at the Univ. Press; New York, Macmillan, 1946. Pp. x + 223. (Illustrated.) \$3.50.

STILES, KARL A. *Handbook of microscopic characteristics of tissues and organs.* (3rd ed.) Philadelphia: Blakiston, 1946. Pp. x + 214. (Illustrated.) \$1.75.

STILL, ALFRED. *Communication through the ages: from sign language to television.* New York-Toronto: Murray Hill Books, 1946. Pp. 201. (Illustrated.) \$2.75.

TROENSEGAARD, N. *On the structure of the protein molecule.* New York: G. E. Stechert; Copenhagen: Einar Munksgaard; London: Humphrey Millford, 1944. Pp. 126. (Illustrated.) \$4.50.

VOGEL, WERNER F. *Involutometry and trigonometry: seven place tables of natural functions.* Detroit, Mich.; Michigan Tool Co., 1946. Pp. xii + 321. \$20.00.

WILSON, G. S., and MILES, A. A. *Topley and Wilson's principles of bacteriology and immunity.* (Vols. I and II.) (3rd ed.) Baltimore, Md.: Williams & Wilkins, 1946. Vol. I: Pp. xi + xlv + 970; Vol. II: Pp. viii + xlv + 971-2054. (Illustrated.) \$12.00.

WILSON, MILDRED STRATTON. *The species of Platycopia sars (Copepoda, Calanoida).* (Smithsonian Miscellaneous Collections, Vol. 106, No. 9.) Washington, D. C.: Smithsonian Institution, 1946. Pp. 16.

WOLDA, G. *Nieuwe biologische principes.* 'S-Gravenhage: A. A. M. Stols, Uitgeverij, 1946. Pp. 178. (Illustrated.)

—. *Annual report of the Board of Regents of the Smithsonian Institution showing the operations, expenditures, and condition of the Institution for the year ended June 30, 1946.* (Publication 3817.) Washington, D. C.: Government Printing Office, 1946. Pp. iv + 484. (Illustrated.) \$1.75.

—. *Oifig thaighde eolaiochta re na prainme.* (Emergency Scientific Research Bureau Report.) Dublin: Stationery Office, 1946. Pp. 96. 2/-.