Book Reviews

Surface chemistry for industrial research. J. J. Bikerman. New York: Academic Press, 1948. Pp. ix + 464. (Illustrated.) $8.00.

The writing of this book was an ambitious undertaking in which the author sought to show the applications of the fundamental theories pertaining to surfaces, to natural phenomena, and to industrial processes. The scope of the work is nearly as broad as that covered in Volumes I, III, IV, and VI of Alexander's *Colloid chemistry.*

The book is divided into 6 chapters. The chapter headings, number of pages, and number of references in the extensive bibliographies at the end of each chapter, are listed here in that order: "Liquid-Gas," 114, 297; "Liquid-Liquid," 39, 122; "Solid-Gas," 76, 193; "Solid-Liquid," 72, 187; "Solid-Liquid-Gas. Solid-Liquid-Liquid," 47, 134; and "Electric Surface Phenomena," 54, 111.

Fundamental theory for the liquid-gas and liquid-liquid interfaces and brief reviews of 12 or more methods of experimental study and measurement are given in 22 pages, most of which are at the beginning of Chapter I. Although the treatments are not as rigorous or as thorough as those given in such books as N. K. Adam's *Physics and chemistry of surfaces,* they will probably be satisfactory for the great majority of readers, and the many references make it easy for any reader to find more detailed and comprehensive treatments of any subject in which he may be particularly interested.

In pointing out the industrial applications, little or no space is used in explaining or describing the industrial procedures as such. The applications will therefore be best understood and appreciated by those who either are already familiar with the various steps in the procedures in which they are interested or who will make use of some other work to obtain the required details of procedure. This, of course, makes possible the covering of a wide range of subjects on relatively few pages, but it also means that a person interested in one particular industry will find relatively few pages concerned with his particular field. It does not follow, however, that the value which such a reader will receive is small because the number of pages is small. There is a decided advantage in having the application discussed clearly and briefly instead of being scattered through many pages of descriptive material.

One of the most valuable features of the book is the very extensive bibliography to which numerous references are made throughout the text. The treatment of the characteristics of solid surfaces, especially in regard to their smoothness and other factors which determine the contact angles which liquids make with the solids, is unusually thorough.

The work, in common with most works, has some faults. Most of these are the result of too great a condensation of material in the development of equations and concepts. Early in the book (pp. 3–4), in presenting an aid for remembering the fundamental equation which relates the pressure inside of a bubble to the radius of the bubble, the author twice uses the statement, "The more crowded the radii the higher the pressure." To show this, he draws portions of two circles of slightly different diameters; one is concave downward and contains three radii 60° apart; the other is concave upward and contains four radii 60° apart. It would seem that he should explain that by "crowded" he means that the chord, or its subtended arc, formed by the radii intersecting the circle is less when the radii are shorter. However, there would be little need for this memory aid if a more complete explanation of why there is a pressure difference had been given.

In the index the subject "Gibbs Adsorption Theorem" is followed by references to pages 64 and 150. On each of these pages brief references are made to applications of the theorem. One of these pages contains a reference to paragraph 50 on pages 82–83, where a fairly complete discussion of the theorem is given. It is obviously an oversight that this longer treatment was not listed in the index.

Generally, however, the reviewer feels that the terseness, clarity of expression, and brief, pointed descriptions of applications of fundamental theory constitute the strongest and most characteristic features of the book. It is a valuable addition to our list of books dealing with colloid chemistry and deserves a place in every reference library concerned with that subject.

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Microwave mixers. Robert V. Pound (with a chapter by Eric Durand). (Ed. by C. G. and D. D. Montgomery.) (Massachusetts Institute of Technology Radiation Laboratory Series.) New York-London: McGraw-Hill, 1948. Pp. xii + 381. (Illustrated.) $5.50.

This book presents the first collected data of a new art—that of the conversion frequency problem for microwave frequencies. This is a subject that was newborn out of the recent war. Whereas some of the previous volumes of this series tend to present the broad phases of microwave systems in semitechnical form, this volume treats a specialized portion of the microwave picture and subjects it to microscopic scrutiny. The purpose of such a thorough analysis is to yield data on microwave mixers sufficiently complete for design purposes.

The book is profusely illustrated with many perspective views and cross-sectional drawings of representative mixer assemblies. Dimensioning of the sectional drawings emphasizes very graphically the physical size and appearance of the "plumbing." The particular assem-

blies described were restricted to some of the designs evolved at the Radiation Laboratory and cannot, therefore, be considered to be the only practical ones. However, the examples cited are sufficiently varied to fire the imagination of the designer and give him a starting point.

The chapter on "Crystal Rectifier Units" does not cover crystal rectifiers in great detail. However, a sufficiently complete discussion is presented to lay the groundwork for a better understanding of the remainder of the book. A linear-network analysis of crystal frequency conversion, a description of noise-temperature measurements, and a table of commercial crystal types are included in this chapter.

The origin of superheterodyne receiver noise arising in the local oscillator is examined, and means for minimizing its effects by proper mixer design are treated. The design of balanced mixers is developed in detail.

A lengthy chapter, authored by Eric Durand, on "Local Oscillator Frequency Control" covers A.F.C. principles, suitable discriminator types, various hunting systems, and oscillator control circuits. Since it may be easily overlooked in this volume, it appears that this subject would be more in place in the volumes of this series devoted to receiver and oscillator design.

Descriptions of measurement techniques peculiar to microwave converters conclude the volume.

The book as a whole is well written and concise. Because of the limited subject and the very specialized subject matter, it may be considered a valuable reference source rather than a text.

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Scientific Book Register

ASTALDI, G., and BALDINI, M. *Il principio antianemico-pernicioso: natura, meccanismo d'azione, dosaggio.* Pavia, Italy: Il Farmaco Scienza e Tecnica, 1948. Pp. 234.

BAILEY, ALTON E. (Ed.) *Cottonseed and cottonseed products: their chemistry and chemical technology.* New York-London: Interscience, 1948. Pp. xxiii + 936. (Illustrated.) $17.50.

BEQUAERT, JOSEPH C. *Monograph of the Strophocheilidae, a neotropical family of terrestrial mollusks.* (Vol. 100, No. 1.) Cambridge, Mass.: Museum of Comparative Zoölogy, 1948. Pp. 210. (Illustrated.)

BUZZATI-TRAVERSO, ADRIANO, and CAVALLI, LUIGI L. *Teoria dell'urto ed unita biologiche elementari.* Milan, Italy: Longanesi, 1948. Pp. 254. (Illustrated.) 600 lire.

FROCHT, MAX MARK. *Photoelasticity.* (Vol. II.) New York: John Wiley; London: Chapman & Hall, 1948. Pp. xvii + 505. (Illustrated.) $10.00.

GOLDSMITH, ALFRED N., *et al.* (Eds.) *Frequency modulation.* (Vol. 1.) Princeton, N. J.: RCA Review, 1948. Pp. x + 515. (Illustrated.) $2.50.

HARRISON, BRUCE M. *The dissection of the cat (Felis domestica): a laboratory manual.* St. Louis, Mo.: C. V. Mosby, 1948. Pp. 109. (Illustrated.) $3.50.

KELLY, EMERSON CROSBY. *Encyclopedia of medical sources.* Baltimore: Williams & Wilkins, 1948. Pp. v + 476. $7.50.

KING, HORACE W., WISLER, CHESTER O., and WOODBURN, JAMES G. *Hydraulics.* (5th ed.) New York: John Wiley; London: Chapman & Hall, 1948. Pp. xii + 351. (Illustrated.) $4.00.

MOREHOUSE, LAURENCE E., and MILLER, AUGUSTUS T. *Physiology of exercise.* St. Louis, Mo.: C. V. Mosby, 1948. Pp. 353. (Illustrated.) $4.75.

RIDER, JOHN F., and USLAN, SEYMOUR D. *FM transmission and reception.* New York: John F. Rider, 1948. Pp. vi + 409. (Illustrated.) $1.80, paper; $2.70, cloth.

RUNES, DAGOBERT D. (Ed.) *The diary and sundry observations of Thomas Alva Edison.* New York: Philosophical Library, 1948. Pp. xii + 247. (Illustrated.) $4.75.

SEWELL, R. B. SEYMOUR. *The free-swimming planktonic Copepoda: systematic account.* (The John Murray Expedition, 1933–34, Sci. Reps., Vol. VIII, No. 1.) London: British Museum (Natural History), 1947. Pp. 303. (Illustrated.) 1£ 10/.

SMITH, SYLVANUS J. *Introductory chemical calculations.* New York: Macmillan, 1947. Pp. vii + 144. $1.00.

TANNER, FRED WILBUR, and TANNER, FRED WILBUR, JR. *Bacteriology: a textbook of microorganisms.* (4th ed.) New York: John Wiley; London: Chapman & Hall, 1948. Pp. x + 625. (Illustrated.) $4.50.

TOKSVIG, SIGNE. *Emanuel Swedenborg, scientist and mystic.* New Haven: Yale Univ. Press, 1948. Pp. 389. (Illustrated.) $5.00.

VAN VOORHIS, S. N. (Ed.) *Microwave receivers.* (MIT Radiation Laboratory Series.) New York-Toronto-London: McGraw-Hill, 1948. Pp. xviii + 618. (Illustrated.) $8.00.

VESTINE, E. H., *et al.* *The geomagnetic field, its description and analysis.* (Publ. 580.) Washington, D. C.: Carnegie Institution of Washington, 1947. Pp. vi + 390. (Illustrated.) $1.85, paper; $2.40, cloth.

VOGEL, ARTHUR I. *A text-book of practical organic chemistry including qualitative organic analysis.* London-New York-Toronto: Longmans, Green, 1948. Pp. xxiii + 1012. (Illustrated.) $10.00.

WILLIAMS, R. TECWYN. *Detoxication mechanisms: the metabolism of drugs and allied organic compounds.* New York: John Wiley, 1947. Pp. viii + 288. $5.50.

WILLIS, R. A. *Pathology of tumours.* London, Engl.: Butterworth; St. Louis, Mo.: C. V. Mosby, 1948. Pp. xxiii + 1044. (Illustrated.) $20.00.

WREDDEN, J. H. *The microscope, its theory and applications.* New York: Grune & Stratton, 1948. Pp. xxiv + 296. (Illustrated.) $5.50.

ZELIFF, C. COURSON. *Laboratory manual for introductory zoology.* (Rev. ed.) State College, Pa.: W. B. Keeler College Book Stores, 1948. Pp. 154. (Illustrated.) $2.75.