BOOK REVIEWS

A Treatise on Light. By R. A. HOUSTON. First edition 1915, new editions 1921 and 1923.—In the preface of the last edition the author says, "The present edition differs from the first one in having two colored plates, a new index and a short chapter on recent advances; also, owing to the courtesy of various correspondents, I have been able to make slight improvements throughout the work." One of the colored plates referred to, a frontispiece showing various types of spectra, was included in the *new impression* of 1919. The curious yellowish appearance between the green and the blue of some of these spectra is very noticeable. The new colored plate taken from Ganot's Physics and appearing in this edition for the first time shows six views of colored rings produced by polarized light in doubly refracting crystals. Space for insertion of a short paragraph explaining what each view represents was obtained by the omission of one of the four examples heretofore appearing on the page opposite. Except for a short supplementary index of topics discussed in the new chapter on recent advances, the more complete index [about twice as many items] was incorporated in the 1921 edition. A new chapter of seven pages on Recent Advances discusses Determination of Angular Diameter of Stars, the Half-Watt Lamp, the Neon Lamp, Einstein Star Shift, the Quantum, and Moseley's Work on X-Ray Spectra. It is regrettable that other topics dealing with modern developments in light have not been included; especially is this true of the recent advances in spectroscopy.

The merits of the book, of which there are many, are well known to students in this field. It has served to give an excellent preparation for further and more detailed study of the various subdivisions of the subject. Inaccuracies of statement have been unusually few. As indicated by the quotation from the author's preface clearness has been added by slight changes in wording here and there throughout the text.—Pp. XI+486. Price $4.00. Longmans, Green and Co., 1924. R. C. GIBBS.

A System of Physical Chemistry. Volume III; Quantum Theory. By WILLIAM C. McC. LEWIS. Third edition with certain appendices by James Rice, A. M'Keown, and R. O. Griffith.—This familiar book on the quantum theory has been enlarged and amplified to almost exactly twice the size of previous editions. As before, the book opens with a good non-technical account of some principles in statistical mechanics. Chapter II is devoted to the Planck radiation law, and Chapters III and IV to specific heats and infra-red absorption spectra. In presenting experimental material on the specific heat of hydrogen at low temperatures, Prof. Lewis says "It is impossible at the present time to account quantitatively for Eucken's results." This statement seems scarcely to do justice to the quantum theory of the molecular heat of gases developed by Reiche, Kemble, and others, which is mentioned only in a casual reference in a later chapter. A very interesting section, however, is included on the "degradation of gases."

Chapter V is devoted mostly to the Bohr theory of atomic structure, but also contains an account of Parson's magneton, the Langmuir inverse cube force, and Whittaker's magnetic wheel. Throughout much of the book one finds presented various versions of the quantum theory, differing widely in merit. It is thus perhaps doubtful whether all readers will recognize and esteem especially the particular developments which are legitimate applications or logical outgrowths of the Bohr-Sommerfeld quantum conditions.

Chapters VI to IX inclusive contain in particular much material not found in the earlier editions. Chapter VI deals with vaporization, thermionics, and photo-electricity.

Here the pages on contact electromotive force are very welcome. Chapter VII is especially valuable, for it devotes considerable space to quantum theories of chemical reactions. The two last Chapters VIII and IX are on Born's crystal lattices and on chemical constants, the Nernst heat theorem, etc. The "symmetry number" introduced by Ehrenfest, Trkal, and Fowler is unfortunately omitted as a factor in the formula (2) on p. 289 for the chemical constant of a diatomic molecule. The book closes with eight appendices, including one on the correspondence principle.

Prof. Lewis' book is lucidly written but can scarcely be regarded as an entirely accurate or up-to-the-minute account of the portions of the quantum theory which relate to theoretical physics. The greatest strength of the book lies rather along the line of physical chemistry. Here the volume contains much valuable subject matter, especially experimental, which is not contained in the usual treatises on the quantum theory of atomic structure.—Pp. x+407, price $5.00. Longmans, Green, and Co., 1924.

J. H. VAN VLECK

Colloid Chemistry. By JEROME ALEXANDER, Second edition, revised and enlarged. —This little book is intended to be used as an adjunct in teaching colloid chemistry. After six chapters on general theory, the author has eight chapters on the practical applications of colloid chemistry. In these eight chapters the subheads are: Astronomy; meteorology; smokes, fogs, and dusts; perfumes; geology; mineralogy; gems; agriculture; clays; ceramics and refractories; flotation; dyeing; shower-proofing fabrics; nitrocellulose and its products; celluloid; explosives; paints, pigments, and varnishes; emulsions; soaps; lubrication; coal; colloidal fuel; petroleum; asphalt; firefoam; insecticides; filtration; sewage disposal; photography; brewing; tanning; paper; rubber; foods and their preparation; baking; milk; ice cream; confectionery; gelatine and glue; glasses; metals and alloys; electrodeposition of metals; boiler scale; cement, mortar, and plaster; chemical analysis; pharmacy and therapeutics; antiseptics and bacteriology; biology and medicine; enzymes; cytology; growth; evolution; physiology and pathology; capillary circulation; psychiatry; anaphylaxis and immunity; healing of wounds; digestion; absorption; secretion, excretion; diagnosis; chemo-therapy and colloid therapy; serum therapy; plants; bio-electric currents.

From this summary it is clear that anybody who reads this book will get information on a large number of topics. The reviewer commends to the physicists the problem on p. 115 that photographic emulsions transmit reddish light when the silver bromide grains are less than one-tenth micron in diameter and green (or blue) light when the particles are over five-tenths micron. This same problem occurs with Porter and Keen's coagulating sulphur and with Piazzi Smyth's blue sun. In spite of a brave attempt by Raman, there is no satisfactory theory as to the transmission of green or blue by a system containing coarse but colorless particles. Pp. 216; price $2.00. Van Nostrand, New York, 1924.

WILDER D. BANCROFT

Storage Batteries. By GEORGE WOOD VINAL.—The book is a general treatise on the physics and chemistry of secondary batteries and their engineering applications. After a description of materials and methods of construction, the author gives a full and very adequate discussion of the electrolyte, transformation of energy and theory of reactions. Particular attention is given to the "double sulphate" theory, other theories being briefly mentioned. The latter half of the book deals with practical aspects of operation, efficiency and methods of testing. As the author states, he has drawn liberally on test reports and papers published by himself and his collaborators at the Bureau of Standards.

The wealth of material is well selected and well presented; the treatment thorough. Pp. VIII+402, 156 illustrations. Price $4.50. Wiley and Sons, 1924.

FREDERICK BEDELL