

the theory cannot explain. Though these facts have developed mainly from a study of non-aqueous solutions, yet in many instances the theory finds much difficulty in explaining the facts in case of aqueous solutions, especially when quantitative data are involved. It seems at present that even before the theory of electrolytic dissociation will have found its way into regular chemical text-books, it will have undergone radical modifications from its present form, or will perhaps have been superseded by more adequate explanations. LOUIS KAHLENBERG.

VICTOR V. RICHTER'S ORGANIC CHEMISTRY OR CHEMISTRY OF THE CARBON COMPOUNDS. Edited by PROF. R. ANSCHÜTZ. Authorized translation by EDGAR F. SMITH, Professor of Chemistry, University of Pennsylvania. Third American from the eighth German edition. Vol. II. Carbocyclic and Heterocyclic Series. Philadelphia: P. Blakiston's Son & Co. 1900. 671 pp. Price, \$3.00.

The first volume of this work was reviewed last year.<sup>1</sup> About the only adverse criticism which could be made of the completed work is that the theoretical discussions are often so concise that it is almost impossible for beginners to comprehend them. It is, however, necessary, in a book of this character, to choose between a very concise style and the omission of a great deal of material which it is desirable to include. The book is, undoubtedly, much more valuable because the former alternative was chosen. The comprehensive character of the work, considering its size, is remarkable.

In discussing Ladenburg's prism formula for benzene on page 41 the author has, apparently, overlooked the fact that, since the reduction of ortho compounds gives derivatives of cyclohexane in which the substituents are combined with adjacent carbon atoms, the prism formula must be considered as positively disproved.

Professor Anschütz has availed himself of the aid of other workers who are specially conversant with particular fields and has so secured an accuracy of presentation which a single author could not hope to attain. W. A. NOYES.

AN INTRODUCTION TO PHYSICAL CHEMISTRY. BY JAMES WALKER, Professor of Chemistry in University College, Dundee. New York: The Macmillan Company. 1899. 8vo. Cloth. x+335 pp. Price, \$2.50. A number of elementary treatises on physical chemistry have

<sup>1</sup> This Journal 21, 708.

recently appeared. Although Professor Walker's book is rather more voluminous than other works on the same subject intended for beginners, it does not pretend to give a complete or even systematic survey of physical chemistry. Its main object as expressed by the author is to be explanatory and to place the student in a position to profit by the study of the larger systematic works of Ostwald, Nernst, and van't Hoff.

The book is divided into 27 chapters; and, though the enumeration is somewhat long, there is perhaps no better way to convey an idea of the contents of this treatise than to indicate the subjects of these chapters together with the number of pages devoted to each. The chapters are as follows:—Units and Standards of Measurement, pp. 1-7; The Atomic Theory and Atomic Weights, pp. 8-21; Chemical Equations, pp. 22-26; The Simple Gas Laws, pp. 27-29; Specific Heats, pp. 30-37; The Periodic Law, pp. 38-49; Solubility, pp. 50-59; Fusion and Solidification, pp. 60-72; Vaporization and Condensation, pp. 73-83; The Kinetic Theory and Van der Waals' Equation, pp. 84-96; The Phase Rule, pp. 97-116; Thermochemical Change, pp. 117-126; Variation of Physical Properties in Homologous Series, pp. 127-135; Relation of Physical Properties to Composition and Constitution, pp. 136-147; The Properties of Dissolved Substances, pp. 148-157; Osmotic Pressure and the Gas Laws for Dilute Solutions, pp. 158-168; Deductions from the Gas Laws for Dilute Solutions, pp. 169-175; Methods of Molecular Weight Determinations, pp. 176-192; Molecular Complexity, pp. 193-200; Electrolytes and Electrolysis, pp. 201-216; Electrolytic Dissociation, pp. 217-233; Balanced Actions, pp. 234-253; Rate of Chemical Transformation, pp. 254-265; Relative Strengths of Acids and Bases, pp. 266-282; Equilibrium between Electrolytes, pp. 283-295; Applications of the Dissociation Theory, pp. 296-310; Thermodynamical Proofs, pp. 311-332.

The general treatment is non-mathematical, a few thermodynamical proofs in the last chapter being the only exceptions. The book really includes nearly all the important topics usually taught in classes in physical chemistry. The absence of a chapter on photochemistry may be noted, as may also the treatment of Nernst's theory of the E. M. F. of galvanic cells. The

order in which the subjects are considered is different from the usual one. Without going into details concerning this point, it may suffice to say that the manner in which the separate chapters are written is such as to weave them together in a logical way. The author seeks to have the student connect physical chemistry with his previous chemical knowledge so as to make the new subject of real use to him.

Clearness of statement characterizes the book throughout. The relative amount of space devoted to some of the subjects is perhaps open to some criticism; so, for example, the subject of thermal chemistry is treated in ten pages. The author, however, does not intend this to suffice but directs the student to the treatise of Muir and Wilson on this subject.

In the discussion of the applications of the dissociation theory the author has wisely chosen to content himself almost entirely with a merely qualitative treatment, since the quantitative side of this subject (especially whenever it involves the combination of the law of mass action and the theory of electrolytic dissociation) leaves much to be desired.

The book is indeed an introduction to the study of physical chemistry, for a perusal of its pages will give the student a knowledge of general, fundamental facts and will lead him to further inquiry. The author is clearly not one of those who believe that the subject of physical chemistry is already in a high state of perfection and that there is but little left to do except to fill in the details. It is to be regretted that the book does not contain more references to original articles.

LOUIS KAHLENBERG.

WATER AND WATER SUPPLIES. BY DR. JOHN C. THERSH. Second revised edition. vii+438. pp. Philadelphia: P. Blakiston's Son & Co. 1900.

Although this is called the second, revised edition of this work, it is an exact reproduction of the 1896 English edition, the only revision apparent being the correction of typographical and other errors in the first edition. It is nevertheless, a convenient handbook on water supplies.

The first part of the book treats of water, its composition, properties, etc.; the various sources of water supplies, as rain, surface, subsoil, spring, deep-well, and river water; the amount