

all the important work on this portion of Physical Chemistry, both theoretical and experimental, which has been published.

The thermodynamic principles and the dependent calculations of the electromotive force of cells are very clearly given and illustrated. It might be considered bold to introduce some of the present theoretical work into a so-called text-book, such, for example, as the electron theory, which has been advanced so rapidly by the work of J. J. Thomson in connection with conductivity in gases, and that of Drude in the case of metallic conduction, but the reviewer believes that the way in which these subjects are treated could hardly be improved, and that in the use of the book students cannot fail to be attracted by the complaisant fearlessness of the author. This will do much to advance the correct and to correct the imperfect in recent theories. A few useful tables have been appended to the work.

The text-book should be a very satisfactory one for use in classes in electrochemistry. It is certainly sufficiently advanced and completely put together to satisfy the needs of the most advanced classes studying this subject.

W. R. WHITNEY.

**TEXT-BOOK OF GENERAL PHYSICS FOR HIGH SCHOOLS AND COLLEGES.**

BY JOSEPH S. AMES, PH.D., Professor of Physics and Director of the Physical Laboratory in the Johns Hopkins University. The American Book Company, 768 pp. Price, \$3.50.

Professor Ames gives us in this volume an excellent text-book written in the conviction "that the most important element in a course of instruction in physics is a text-book which states the theory of the subject in a clear and logical manner so that recitations may be held on it." In the opinion of the reviewer the "attempt to give a concise statement of the experimental facts on which the science of Physics is based, and to present with these statements the accepted theories which correlate or 'explain' them" is eminently successful. The book is a good specimen of the book-maker's art and is remarkably free from errors of all kinds. A few inaccuracies of statement, however, have been noticed. Referring to p. 246, it may be said that the ordinary method of obtaining solid carbon dioxide is to invert the cylinder and allow the liquid to escape. The triple point for carbon dioxide is about  $-57^{\circ}$  and 5 atmospheres pressure, whence it follows that  $-80^{\circ}$  cannot, as has been done on p. 276, be said to be the boiling-point of the liquid.

It is suggested that in view of its greater simplicity and its much greater efficiency, at least for the smaller machines, a description of the Hampson apparatus for the liquefaction of air might advantageously have taken the place of one of the two given on pp. 280-281. Referring to p. 284, it is hardly true to say "that the whole science of Physical Chemistry" is based on the assumption of electrically charged ions.

E. C. FRANKLIN.

A TEXT-BOOK OF PHYSIOLOGICAL CHEMISTRY. BY OLOF HAMMARSTEN. Authorized translation by JOHN A. MANDEL. Fourth American Edition. 8vo. viii + 703 pp. New York: John Wiley & Sons. Price, \$4.00.

This translation is from the 5th German edition which appeared in March, 1904. The latter was called for by reason of the rapid advances recorded in physiological chemistry in the last four years, advances indicated by the success attending the publication of the new journals and reviews devoted to this special field. The appearance of the "Biochemisches Centralblatt," the "Beiträge zur chemischen Physiologie und Pathologie" and the "Ergebnisse der Physiologie" show beyond question the remarkable development of chemistry in its relations to medicine. The new edition of Hammarsten's work contains many things not in the old and in the selection of material from the enormous store available shows a success consistent with the reputation of the author. Even some of the latest discussions of the attempts at protein synthesis are fully considered.

The translator has apparently done his work well, as the English is smooth and straightforward. Certain blemishes in the earlier editions have been corrected in this. Beyond question this work is the most valuable book of the kind in our language. One of its greatest merits is its fairness, but it is just this which renders its use as a text-book in American medical schools somewhat problematical. Many of the discussions in physiological chemistry are still far from settled and in a fair treatment of these the author must present all sides deserving a hearing. This Hammarsten does admirably but the seeming contradictions are often very confusing to the student, especially to the beginner, and most of our students who use the work never pass beyond the beginner stage. Under the conditions which prevail in most of our schools of medicine the Hammarsten should be employed as a work of reference and for this purpose, with its many literature citations, it is