It is, of course, impossible to write a book which nobody can find fault with; for example, our author gives barium chromate as a pigment under the name of "Permanent Yellow," and omits any mention of strontium chromate; the former is a very inferior color, not known in this country, while the latter, known under the same name and also as "Perfect Yellow," is one of the most beautiful pigments known and, in spite of its low opacity, is considerably used. Also in the chapters devoted to "Metallic Pigments" and "Bronze Pigments," no mention is made of metallic aluminum, one of the most valuable and widely used pigments in this class.

The part of the book devoted to "Lakes" is, in the judgment of the reviewer, hardly up to the standard of the rest of the book, not because of what it contains but what it leaves out. The author seems to have felt less interest in this subject and has treated it less in detail, but it seems to be correct as far as it goes. The book, as a whole, is very satisfactory.

A. H. SABIN.

THE ELEMENTS OF PHYSICAL CHEMISTRY. Second Edition. By J. Livingston R. Morgan. New York: John Wiley and Sons. 1902. 13 x 19 cm. x + 352 pp. Cloth. Price, $2.00.

This book does not differ essentially from the first edition, which appeared in 1898, so that it would be superfluous to give an outline of its contents. The author states that he has endeavored, (1) to bring the subject matter up to date, (2) to make, wherever possible, the relations clearer than before, and (3) to make the book more useful to those studying the subject without an instructor. The changes made consist of a number of minor omissions and additions; a transposition of the chapter on the rôle of the ions in analytical chemistry, so as to form a part of the chapter on chemical change; and the addition of a final chapter containing problems for drill work.

The author has exerted himself to correct the numerous mistakes contained in the first edition; and yet, the new edition is by no means free from errors. It is impossible to cite all of these in detail here, but a few must be given by way of illustration. Thus on page 70 is the statement, "The surface-tension x of a liquid is the force in grams, dynes (or milligrams) which is necessary to form a surface one centimeter (millimeter) in length." The theory ascribed to Brühl on page 268 is simply the Nernst-

Thomson view of the relation between the dielectric constant of a solvent and its so-called dissociating power. The new idea that Brühl does put forth in the article cited, is that dissociating power is due to the unsaturated condition (*i. e.*, to spare valences) of solvents. On page 269 we read, "Because substances dissolve and go into the ionic state with a loss of heat energy, does not show that there is a loss of energy to the system, but only that by the transformation heat energy as well as electrical energy are given up."

The italicised statement on page 93 that "the osmotic pressure depends upon the solute and is independent of the nature of the solvent," and that on page 100, "those substances, and only those, which give abnormal osmotic pressures in solution are capable of conducting the electric current, and if they are dissolved in other solvents in which they behave normally, they lose this power", can no longer be considered "up to date."

A brief treatise on general physical chemistry which devotes such an undue proportion of its space to the exposition of the theory of electrolytic dissociation and its applications (without even attempting to indicate the shortcomings of this hypothesis) as this book does, can at the present stage of the development of the science, hardly claim to present the subject in a fair, well-balanced form. LOUIS KAHLENBERG.

OUTLINES OF ELECTROCHEMISTRY. BY HARRY C. JONES. New York: The Electrical Review Publishing Co. D. Van Nostrand Company. 1901. vi — 106 pp. Price, $1.50.

Contributed originally to the pages of the *Electrical Review*, the articles forming the chapters of this book are designed for the information of those interested in or concerned with electrical engineering, as well as for the student of the subject from the purely scientific standpoint. The author disclaims any pretensions to their forming a systematic treatise, yet the subject is treated in such a manner as to introduce the reader by comparatively easy steps to a knowledge of osmotic pressure and the ionization theory of solution, and of the bearings of these matters upon electrochemistry. The later chapters deal particularly with the calculation of the electromotive force of galvanic elements. While it may be admitted that, upon the whole, the book conveys to the so-far initiated reader a clear idea of the subject, and that a number of the chapters leave little to be desired as semi-