

more advanced. With this foundation the author has given the essential features of electromotive force, galvanic current, polarization and electrolysis, in a compact and connected form. This makes a readable little book which should find a place among our electrochemical textbooks.

The derivation of the gas equation from the laws of Boyle's and Gay Lussac (p. 17-18) should be either more complete or only the final result given. The equation $p_v = p_0 v_0 (1 + at)$ is not the product of the two equations given. The combination of the two laws depends on a proposition in variations and it might not be out of place to state this proposition in chemical text books for then the derivation is direct and simple and avoids the usual cumbersome, and generally to the beginner, misleading derivation. On page 79 and 81 the term "specific conductivity" is used, where no doubt specific conductance was intended. GEO. A. HULETT.

THE PRINCIPLES OF QUALITATIVE ANALYSIS, FROM THE STANDPOINT OF THE THEORY OF ELECTROLYTIC DISSOCIATION AND THE LAW OF MASS ACTION. BY WILHELM BÖTTGER, Privat-docent in the University of Leipzig. Translated with the author's sanction and revised with his co-operation by William Smeaton, Instructor in General Chemistry in the University of Michigan. Price \$2.00. Pp. 300 and XVI. P. Blakiston's Son & Co., Philadelphia, 1906.

The treatment of Qualitative Analysis from the point of view of the application of the equilibrium law to its reactions, as first demanded by Ostwald, appears now indispensable for a thorough comprehension of its methods and consequently for an intelligent completion of an analysis. On the other hand Qualitative Analysis affords splendid material, from a purely pedagogical point of view, for making a student thoroughly familiar with the application of these fundamental laws of chemistry to the most varied chemical changes; there is quite a difference between learning such laws and knowing how and where to apply them in the complex phenomena of most chemical changes. The study of analysis from the point of view mentioned has therefore the twofold advantage of developing keener, more intelligent analysts, and of developing better chemists through analysis. In Böttger's Qualitative Analysis, we have a very laudable effort to present the subject thoroughly and consistently from this point of view and without detriment to the purely analytical value of the book. For the trained, mature chemist and analyst, it is full of sound, interesting material and discussions. But it seems to the writer that pedagogically the treatment has been carried out in an extremely weak and confusing way and that this book in the hands of beginners in analysis would rather confuse than help them. There is no need at all for such an effect, for the treatment from the physico-chemical standpoint can be made pedagogically, simple, logical, direct and convincing. We note for instance that the treatment of complex ions (p. 16) precedes the presentation and application of the mass-action law (p. 33) and thus has become practically un-

intelligible to a beginner, who is plunged *ab initio* into a subject which he really cannot understand without the application of this law, by means of which the whole subject may be made beautifully clear and simple.

From the purely analytical point of view, the most interesting contribution by Böttger is the use of a systematic grouping of anions through the solubilities of the barium, lead and silver salts. For those who still favor the converting of the acids into soluble alkali salts as preliminary to the acid analysis, this grouping will probably prove welcome. In the experience of the writer, the change into alkali salts is subject to so many complications and exceptions and the gain by such a grouping is often so small, that it has been discarded except for the so-called "insoluble" (in acid) unknowns and all tests for acids, group and individual, are now carried out in *acid* solutions, without removing the cations: most of the important acid tests are, as it is, carried out in acid solutions and the results of the analysis for metal ions, with the solubilities of solid unknowns and the reaction of solutions, will usually give very considerable information as to what groups of acids may be present.

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PRACTICAL PHYSIOLOGICAL CHEMISTRY. BY PHILIP B. HAWK, Demonstrator of Physiological Chemistry in the Department of Medicine of the University of Pennsylvania. pp. 416. Price \$4.00 net. P. Blakiston's Son & Co., Phila.

This book is a combination of a laboratory manual and a text book. Attention is given in the main to the practical side of the subject but enough facts are introduced to make the outlined experiments intelligible. A new feature that has been introduced is a detailed study of the feces. One of the best points connected with this volume is the large number of beautiful illustrations of crystals and various pieces of apparatus.

F. P. UNDERHILL.

AUSFÜHRLICHES LEHRBUCH DER PHARMAZEUTISCHEN CHEMIE, BEARBEITET VON DR. ERNST SCHMIDT, Ordent Professor der Pharmazeutischen Chemie und Director der Pharmazeutischen-Chemischen Instituts der Universität, Marburg-Erster Band, Anorganische Chemie, Erste Abteilung; Mettalloide Fünfte vermehrte Auflage. Viewig u. Sohn, Braunschweig, 1906. pp. 528. Ladenpreis: geheftet Mark 10.

For years past this book has occupied a unique place as a treatise on chemistry and although entitled Pharmaceutical Chemistry and containing much that is useful to the pharmacist it is really a book of the greatest value to chemists in general. As a book of reference it is of especial value as it contains a vast amount of information and is somewhat unique in that not a little part of the information is of the uncommon sort that one is not apt to find included in a single book. The part under review is the first section of the first volume of the fifth edition which comprises the