

with iron oxide scales on the inside of the pipe through which the mixture was passing. A lead pipe was later substituted. The evaporation of salt by means of Mond producer gas and the utilization of the vapor from the brine evaporation as the supply of aqueous vapor to the producer, is one of the newer ideas noted. For cement-making, the rotary kiln is finding more extended use. The Höpfner electrical method of extracting zinc from blende is in successful operation at one works. A large part of the report is comprised in a further contribution upon "Studies of the Claus Kiln Reaction," with reference to the "Influence of the Various Contact Substances on the Interaction of Steam and Hydrocyanic Acid."

NEW BOOKS.

THE STUDY OF CHEMICAL COMPOSITION, AN ACCOUNT OF ITS METHOD AND HISTORICAL DEVELOPMENT, WITH ILLUSTRATIVE QUOTATIONS. By IDA FREUND, Staff Lecturer and Associate of Newnham College, Cambridge. Cambridge: The University Press. 1904. 650 pp. Price, 18/ net.

The second part of the title gives a better idea of the scope of this work than the first. It is not so much a treatise on chemical composition, after the manner of the ordinary text-book, as "an account of its methods and historical development, with illustrative quotations." The author disclaims that it is a history of chemistry, yet, while it does not enter into detail as fully as do many histories, the development of the fundamental chemical conceptions of the present day is very fully traced, much more fully and logically than in most histories of chemistry properly so-called. The author quotes very freely from original sources, the experiments of the writers being described and their reasoning given in their own words wherever possible, and this gives to the book a peculiar freshness which will be appreciated by every reader who has felt the advantage of going to original sources rather than consulting reviews, abstracts and restatements. Probably there has never been collected within the same space so many quotations from the fathers of chemistry, perhaps 40 per cent. of the volume of 650 pages being quoted, yet it is by no means a compilation merely, the original matter supplied by the author being also of great interest and value.

In the introduction the author discusses the method of the inductive sciences, observations, generalization, law, theory and hypothesis, using as illustrations the classical experiments of

Lavoisier on the supposed conversion of water into earth, of Davy on the supposed production of acid and alkali by electrolyzing water, and of Rayleigh and Ramsay on the density of nitrogen. In the following chapter the theory of combustion is set forth in the same manner. The discovery of the laws of fixed and multiple proportions is abundantly illustrated, and the theory and practice of the method of determining atomic weights is expounded with numerous quotations from Stas, Morley and other masters. About 30 pages are devoted to a consideration of the various classes of errors to be encountered and overcome in exact chemical work. The law of Avogadro, the periodic law, the doctrine of valency and other important generalizations of chemistry are interestingly treated of by the historical method. Two chapters are devoted to the ultimate constitution and genesis of matter, the former giving the views of the ancients and of the earlier chemists of modern times, especially with reference to the hypothesis of atoms, the latter and concluding chapter of the book dealing rather with more recent speculations, such as those of Prout and Crookes, and the recent researches on radio-activity and the speculations following therefrom.

The author has omitted to deal with the theory of solutions and other important branches of modern physical chemistry, and although this omission is explained in the preface as being due to lack of space and to the existence of many modern textbooks which cover the ground completely, yet we cannot but regret that she has so decided, as these subjects would undoubtedly have been treated in a fresh and original manner and the value of the work for the chemist and especially the general scientific reader would thereby have been increased. In distinction from the rest of the work the chapter on crystallography is more descriptive than historical, which we consider also a defect, as there are numerous books on this subject, but none which adopts as fully the evolutionary method of treatment so successfully followed in this work. With these exceptions the work is almost above criticism. It is earnestly to be recommended to all students of chemistry as a correction to the tendency to too close specialization, and should form a part of every course of chemical reading. Even those familiar with the outlines of chemical history will find it profitable reading. It might also be read to advantage by students of philosophy and others who wish to get an idea of

how and by what methods one of the most important of modern sciences has grown from its earliest beginning, and how difficult it is to arrive at anything like correct views of nature without constant appeal to nature itself.

In conclusion, the reviewer wishes to express the pleasure he takes in the fact that we have at last a chemical treatise by a woman, which shows a high degree of scholarly attainment and originality and which is well worthy to rank with the best known and most used works on the history and philosophy of chemistry.

H. N. STOKES.

ECONOMIC GEOLOGY OF THE UNITED STATES. By HEINRICH RIEB, A.M., PH.D., Assistant Professor of Geology at Cornell University. New York: The Macmillan Company. 1905. xxi+435 pp. Price, \$2.60 net.

The ground covered by this work is essentially that gone over in the elementary course in economic geology at Cornell University. The presentation of the subject differs from that in most text-books in that the consideration of the non-metallic minerals precedes that of the metallic minerals, this change having been made for the reasons that the production of the former is far in excess of the latter, and that the discussion leads up from the simpler to the more complex forms of mineral deposits. Geologic and physiographic principles are not presented. Brief statistical statements of production will be found of value by the student and lay reader, as also the bibliographical references at the end of each chapter.

W. F. HILLEBRAND.

A LABORATORY GUIDE TO THE STUDY OF QUALITATIVE ANALYSIS. Based upon the Application of the Theory of Electrolytic Dissociation and the Law of Mass Action. By E. H. S. BAILEY, PH.D., Professor of Chemistry, and HAMILTON P. CADY, PH.D., Assistant Professor of Chemistry in the University of Kansas. Fifth edition, thoroughly revised. Philadelphia: P. Blakiston's Son & Co. 1905. Price, \$1.25.

Although the entire book has been thoroughly revised, and certain portions of the text rewritten where greater clearness was desired, yet the principal change in the fifth edition of this book is one of arrangement. The entire scheme for the separation of the cations, accompanied by explanatory marginal headings, is placed at the end of the preliminary experiments upon the seven groups. This has the decided advantage of giving a definite, continuous procedure, which may be followed in making a complete separation of the cations, while the reactions dis-