

269), although sodium carbonate, having been handled in the preceding chapter, would have been a more natural choice; the electromotive series is discussed under potassium and sodium, although the illustrations necessarily deal with less electro-positive elements which have not yet been reached. Sometimes unimportant matters are dignified with distinct headings, while highly important things are concealed in paragraphs nominally on other subjects. Thus, the first summary of the chemical relations which distinguish the compounds of the metallic elements occurs in a paragraph on "Some Properties and Reactions of Iron."

As the list of contents shows, physico-chemical subjects occupy a conspicuous place in the book. This was what we should expect from a pioneer of physical chemistry in English. It is questionable, however, whether clear ideas will be obtained by beginners from such discussions as that of hydrolysis (page 209), and the neutralization of strong bases by weak acids (page 248).

There are not many slips in the book. Manganese dioxide and chromic acid are described as "basic peroxides" (page 110). Among the oxides which react with water to form the corresponding acids, but are not obtainable from those acids, P_2O_3 and Mn_2O_7 appear (page 193). On the same page, As_2O_3 is included among the oxides which, with water, do not give acids. Unfortunately for the elaborate illustration of the dissociation of SCl_4 (page 237), Ruff and Fischer have shown that SCl_2 does not exist. On page 247 the words hydroxide and hydrate should be transposed and on page 254 ($x-1$) should be $(1-x)$ throughout.

While this is an interesting attempt to present elementary chemistry from the modern standpoint, the peculiarities indicated above are likely to interfere with its wide adoption. A. S.

ANALYTICAL CHEMISTRY. VOL. II. QUANTITATIVE ANALYSIS. BY F. P. TREADWELL. Translated (with the author's permission) from the second German edition by WILLIAM T. HALL. New York: John Wiley and Sons, publishers. Price, \$4.50.

This book is a translation of the second German edition which appeared soon after the first, and which is already known to many English readers, though neither of the original editions has thus far received notice in this Journal.

Works on quantitative analysis are made up of art and science

in widely varying proportions. The latter is likely to be the feebler element in the best, while in the worst it sinks to the vanishing point. Treadwell's "Quantitative Analysis" gives a commendable share of attention to modern theory. The mass law electrolytic dissociation, hydrolysis, the theory of indicators, and separation by immiscible solvents are all treated here, and some satisfactory application of these principles is also to be found. In the main, however, the application in any detailed way to specific cases is still wanting, though this is due chiefly, not to any oversight on the part of the author, but to a lack of available data. More experimental work must be done before a book can be written in which the analytical result is not quite so exclusively as now, the end in view.

The author says in his preface: "I had intended to describe only such methods as I had found satisfactory from my own experience, and this is true of the majority of the processes." Those which he has not tested are given only on the authority of reputable analysts and are marked with a star. This personal guarantee by a man of experience and authority is undoubtedly the feature of the book, and will atone for any lack of comprehensiveness to be found in it. It is not elementary. Although the rarest elements are not mentioned, we have methods for the determination of zirconium, thorium, vanadium, tungsten, uranium, selenium and tellurium, in addition to the commoner elements. (The proportionate space devoted to the different branches of the subject is as follows: Analytical operations, 33 pages; gravimetric analysis, 377 pages; volumetric analysis, 143 pages; gas analysis, 74 pages.) The number of volumetric methods for the metals strikes one as rather meagre, there being none at all for copper, zinc or lead (except peroxide). A short treatise on the fire assay for the precious metals is given, but it is too brief to be generally useful.

In style the book is admirable. Without sacrificing clearness, the author is very successful in abbreviating those masses of detailed directions to which many writers on this subject are prone.

These qualities are well preserved in the translation. The German text has been followed not too servilely, and there are some changes and many additional notes. A few errata only have been noticed. We read *calorimetrically* for *colorimetrically* on page 57, and *iron* for *ion* on page 561, but there is much evidence

of bad presswork in blurring or entire omission of letters, words and subscripts.

We may say, without reservation, that this book will take and hold a preëminent place among works of its class, and it is just such as will be greatly extended in use by a translation.

E. T. ALLEN.

CHEMISCH-TECHNISCHE UNTERSUCHUNGSMETHODEN HERAUSGEGEBEN VON DR. GEORG LUNGE. Fünfte Auflage, Ersterband, mit 180 abbildungen. xxvi + 953 pp. 8vo. Price: Paper 20 marks. Bound, 22 marks. Berlin: Verlag von Julius Springer.

This is the fifth edition of a valuable work. The fact that the last (third) volume of the fourth edition bears the date 1900 shows that the work is appreciated by the chemical public.

The operations described under each heading are divided into three sections: The examination of raw material, the analytical and other methods needed to control the manufacture, and the examination of the product.

This is frankly a book intended to be of use to those actually engaged in manufacture and all methods chemical and physical are given together. This first volume is divided as follows: General Operations to page 210, by Dr. Lunge; Technical Gas Analysis and Fuel Examination to page 264, by Dr. Ferd. Fischer; Manufacture of Sulphurous, Nitric and Sulphuric Acids, Sulphate and Muriatic Acid, Soda and Chlorine to page 524, by Dr. Lunge; Potash Salts to page 553, by Dr. L. Tietjens; Cyanogen Compounds to page 573, by Dr. H. Freudenberg; Clay Analysis to page 600, by Ph. Kreiling; Examination of Pottery to page 616, by K. Dümmler; Aluminum Compounds to page 632, by Dr. Lunge; Glass to page 672, by E. Adam; The Mortar Industry to page 767, by Dr. Carl Schoch; Potable Water to page 836, by Dr. L. W. Winkler; Boiler Water to page 846, by Dr. Lunge; Sewage and Soils to page 908, by Dr. E. Haselhoff; The Air to page 953, by Dr. K. B. Lehmann.

Complete unity of treatment and avoidance of occasional repetition can hardly be expected in a work put together in this way, but the result of coöperation is a more useful book. Dr. Lunge is a very painstaking editor and has turned out an admirable volume, which will be useful to all concerned in the subjects treated. The publishers promise the second volume by the end of 1904, and the third before July, 1905.

EDWARD HART.