

The total nitrogen remains fairly constant in the natural leaves, but there is a noticeable decrease in the amino nitrogen. When these results are expressed in terms of the dry material, it is seen that there is a decrease in both the total and amino nitrogen as the plant increases in age. The same may be said of the stems both near the top and the bottom of the plant. It is also noticed that the amino nitrogen in the stems near the lower part of the plant are just a little less in percentage than the sample taken near the leaves.

In the case of these older plants it was impossible to get good, reliable results from the analysis of the roots because of the great difficulty of cleaning and freeing them from foreign materials. The results that were actually obtained from the analysis of the roots seemed to indicate a smaller percentage of amino nitrogen than was obtained in the stems. It also seems probable that the extreme ends of the roots contained a much smaller amount of amino nitrogen than the upper of the root.

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### NEW BOOKS.

**Landolt-Börnstein Physikalisch-Chemische Tabellen.** Fourth edition, revised and enlarged. Prepared under the direction of DR. RICHARD BÖRNSTEIN AND DR. WALTHER A. ROTH. Berlin: Julius Springer. 1912. pp. xvi + 1310. Price, M. 59.

The greatest shortcoming of the previous editions of this indispensable work has been the entire lack of tables of certain important and much used data. The removal of this deficiency is responsible for the greater part of the increase in size of this edition over the previous one. Among the new tables the following may be mentioned: Homogeneous Gas Equilibria, Equilibria between Organic Substances, Distribution Coefficients, Ionization Constants, Conductivity Data for Non-aqueous Solutions, Hydrolysis Data, Radioactive Constants, and an extended table giving the chief physical properties of all of the more important organic compounds.

E. W. WASHBURN.

**Notes on Elementary Inorganic Chemistry.** By F. H. JEFFERY. Cambridge University Press. G. P. Putnam's Sons: New York. i + 55 pp. Price, 60 cents.

The purpose of the author of this small volume has been to present "short summaries of certain facts and reactions which are commonly included in a course on elementary inorganic chemistry." It is intended that the book be used in connection with lecture and laboratory work in order that the notes presented may "serve for revision purposes" and also that they may "afford the comparative beginner groups of facts which he might find difficult to coördinate for himself." Among the ten chapter headings are found such topics as: Acids, Bases and Salts, Oxidation and Reduction, The Action of Certain Acids on Some Metals, and Certain

Examples of Electrolysis. The author has brought together in small compass many of the facts in reference to the elements and compounds which are usually discussed in the beginning courses in our colleges and universities.

It has seemed to the reviewer that the comparative beginner in the science would have been greatly aided in the coördination of the facts of chemistry and some little use been made of such useful instruments as the Periodic Law and also of some of the more commonly accepted theories. The almost entire absence of the terminology of these theories save in the chapter on "Certain Examples of Electrolysis" would seem to be unfortunate for the student. Some of the notions in reference to chemical equilibrium could have been introduced with great benefit in the chapter on "The Preparation of Certain Salts." Again, in the chapter on "The Action of Acids on Some Metals," a good opportunity is offered to present the electromotive series of metals as a useful aid in the work.

For the sake of clearness in the chapter on "Certain Examples of Electrolysis," it would have been better to represent the electrical charge carried by the cation and anion by different symbols rather than to use the same designation for both. Would not the student attach too great importance to potassium hydroxide by the first sentence on page 1; *viz.*, "The acids are compounds of hydrogen which react with potassium hydroxide in the following manner: if the acid be represented as  $H_pA$  it reacts with  $p$  equivalents of potassium hydroxide  $KOH$  to form  $K_pA$  and water only?" Owing to its brevity, many beginners would be satisfied with the sentence on page 2 that "Salts are compounds derived from acids," although the author discusses the idea of replaceable hydrogen in the next sentence.

However, this small digest of facts will undoubtedly serve a useful purpose. The chapters are composed of brief, numbered paragraphs with the topic to be discussed set in bold type. The book presents a pleasing appearance.

WM. LLOYD EVANS.

**Manual of Quantitative Chemical Analysis.** By J. O. FRANK AND E. A. CLEMANS. Oshkosh, Wis. Castle-Pierce Printing Co. 1914. 12 + 123 pp. Price, \$1.25.

This is a small, pocket-size book which, according to the preface, lays claim to being a laboratory manual only. This idea is consistently carried out, for the general descriptive matter is given in the merest outline. The deficiency is made up in a way by references to larger text-books; an excellent plan, if only there is a sufficiently large number of reference books at hand or a sufficiently small number of students to use them.

There are forty-nine laboratory exercises divided among gravimetric, electrolytic, volumetric and gas analysis. Twenty-two of these exercises call for the determination of some constituent of a pure salt, for example

copper in copper sulfate. The remainder of the list consists of methods for the preparation and standardization of volumetric solutions and for the analysis of commercial samples.

A systematic plan is used in presenting these laboratory exercises. There is first a short list of references to large text-books followed by a paragraph marked "Theory," in which a brief, general outline of the method is given. Next comes the "Method," the directions for carrying out the experimental work of the analysis in question. Finally there is a short list of questions followed by the chemical equations involved. This scheme of presentation and the concise directions for the laboratory work are the important features of the book.

The number and choice of the laboratory exercises to be used in the first year of quantitative work are a matter of opinion. Some prefer a large number of exercises containing many examples of pure salts, while others prefer a smaller number made up mostly of commercial samples, each exercise to be studied in detail. Those teachers who, like the authors, prefer a long list of determinations will do well to look into this little manual.

The book is, however, marred by the obvious failure to go through the proof sheets and eliminate such blunders as "dessicator" and such laboratory colloquialisms as "Using the result of your titration calculate the strength of your acid." The same carelessness is shown in not always looking up modern practice. On page 64 it is directed, in the emptying of a pipet, "to blow once or twice." To blow once is bad enough, but to leave the poor student the choice of blowing once or twice—! The above are typical of a large number of cases that detract from an otherwise good laboratory manual. Perhaps, though, the reviewer feels too strongly that there should be a direct relation between the accuracy of scientific work and the accuracy of writing about it.

C. W. FOULK.

**Principles of Quantitative Analysis. An Introductory Course.** By WALTER C. BLASDALE, Associate Professor of Chemistry in the University of California. D. Van Nostrand Company, New York. 1914. x + 394 pp.; 70 ills. Price, \$2.50 net.

In this work the author presents the fundamental principles of quantitative analysis, and outlines a method by which a working knowledge of the subject can be attained. This is done by a scheme of classification, which is based upon the different types of chemical and physical equilibria.

The subject matter is arranged in ten sections as follows: 1. General features of gravimetric processes, 77 pp. 2. Gravimetric gas-evolution processes, 33 pp. 3. Gravimetric precipitation processes, 84 pp. 4. Gravimetric solution and extraction processes, 21 pp. 5. Partition processes, 14 pp. 6. General features of volumetric processes, 22 pp. 7.

Volumetric processes involving precipitation, 21 pp. 8. Volumetric processes involving neutralization, 33 pp. 9. Volumetric processes involving oxidation, 44 pp. 10. Physico-Chemical processes, 31 pp.

In the first section the author discusses many things of a general nature which pertain to quantitative chemistry, such as weighing, solutions, electrolytes, calculation of results, etc.

In presenting the quantitative procedures which follow the introduction, the theory of each process is discussed from the point of view of modern theoretical chemistry. Then some typical illustrations are given in considerable detail, with questions and problems appended which may be assigned to the students for solution.

The book contains the most important facts and theories of quantitative chemistry very well arranged and clearly stated. The most notable feature of the work is the special attention given to theory, much more of it having been introduced than is generally found in text books on quantitative analysis. The author states, "It is only through a definite knowledge of the theory of each step of the process that the analyst can work intelligently and effectively; the mechanical performance of such operations without understanding the reason for each step is not worthy of being dignified by the term 'quantitative analysis.'" This attitude toward the work is certainly the proper one, but it is feared that the author in his endeavor to emphasize this feature of the work has included some theoretical matter too advanced for the beginner in quantitative analysis. The subject matter, however, is so systematically arranged, with the greater part of the theory placed at the beginning of each section forming a separate part, that more or less of it can be considered, as desired.

The minerals, ores, alloys and products selected for analyses are substances which the chemist is likely to meet in ordinary practice and vary sufficiently to give the student a variety of principles and methods of procedure. The methods selected are standard ones and are clearly and accurately described with sufficient detail.

The questions and problems following the procedures have been well selected and emphasize the general principles made use of in the work.

References to original papers relating to many of the processes described are given.

The student who masters the contents of this book will certainly obtain a thorough foundation in quantitative analysis. C. F. SIDENER.

**Monographs on Inorganic and Physical Chemistry.** Intermetallic Compounds. By CECIL H. DESCH, D.Sc., Ph.D., F.I.C. pp. vi + 116. Longmans, Green & Co., London, New York. Price, 90 cents.

Dr. Desch has accomplished a very useful piece of work in placing before the public in so concise and complete a form the data collected

in this field. To anyone who has not followed the recent literature on alloys, this small volume will be a surprise as to the extent of the work accomplished. The collection of data of this kind and the digestion of the literature is extremely helpful to those not making a specialty of the subject. The book is limited in its scope to the properties of and identification of compounds between metals, and assumes that the reader can interpret an equilibrium diagram.

The subjects discussed are: Thermal Analysis; The Principal Method for Identifying Intermetallic Compounds; Microscopic Structure; The Isolation of Intermetallic Compounds; Physical Properties; The Existence of Intermediate Compounds in the Liquid State; The Relations of Intermetallic Compounds to Carbides, Silicides, etc., and the Chemical Nature of such Compounds; Ternary Compounds.

The book is clearly written, well illustrated with diagrams, and a useful list of references is given.

HENRY FAY.

**Outlines of Organic Chemistry.** By F. J. MOORE, Professor of Organic Chemistry in the Massachusetts Institute of Technology. Second edition, rewritten. New York: John Wiley & Sons. 1914. xi + 325 pp. Price, \$1.50.

The present book, as suggested by the author, arose out of a course of lectures delivered almost exclusively to candidates for the bachelor's degree in Physics, Biology and Sanitary Engineering. An attempt has been made to present a "selection of topics. . . . which is somewhat different from that given to those who are fitting themselves to become organic chemists." The compounds discussed are selected because of their so-called practical importance or because of their convenient illustrative value in presenting fundamental principles.

Many topics of interest in organic chemistry, such as the synthesis of aceto-acetic ester, the Grignard reaction, etc., are omitted as not being of sufficiently vital interest to the classes of students concerned. In the case of simpler compounds, constitutional proof is presented in considerable detail. In other cases the author has avoided elaborate discussion and in some, the formulae alone are given.

Following the introduction there is given in Chapters 2-6, an elementary consideration of the saturated hydrocarbons, alcohols, acids, aldehydes, ketones, amines and unsaturated hydrocarbons. More complex organic compounds are presented in Chapters 7-11, followed in Chapter 12 by a discussion of the chemistry of certain vital processes. In Chapters 13-18 aromatic hydrocarbons and their simple derivatives are presented and in the concluding chapter, a brief discussion of the theory of structure.

In considering his treatment of the subject one cannot but feel that the author might, with advantage, have drawn a little more fully upon illustrative material, particularly from the field of applied chemistry. This would have much enhanced the interest of the work without unduly lengthening

the book. Of advantage, furthermore, would have been the addition of lists of suggestive questions and problems at the close of the several chapters.

Dr. Moore has, however, produced a book which is well written and clear in the exposition of the subject matter. As a brief introduction to organic chemistry, it merits the attention not only of the class for whom it was designed, but also of those who intend to devote their attention more fully to pure chemistry.

H. C. BIDDLE.

**A Study of Foods.** By RUTH A. WARDALL AND EDNA N. WHITE. Boston, Mass.: Ginn & Company. 174 pp. Price, 70 cents.

This is an elementary treatment of foods and is primarily suited for teachers of food courses in secondary and extension schools. It should also be found useful in the home. The treatment of the subject matter is simple and non-technical; in fact no chemical formulation is found. There are 22 chapters with a brief description of the common food constituents given in the first chapter. The next 18 chapters are devoted to the natural food materials themselves and their uses in the dietary. The 3 additional chapters relate to food requirements, selection of foods and serving of meals. In many instances one wishes that the treatment might have been more extensive, for the authors write with clearness and accuracy of statement. Rarely is there to be found any of the fads and notions prevalent about foods.

On page 5 occurs the statement "heavy eating of meat may easily furnish more protein than is desirable and it is believed that meat protein may cause more harm than other proteins," for which we might ask for definite proof.

This work is more than a book of recipes, yet combines briefly the usefulness of the recipe book with descriptions of the properties and general composition of the foods themselves.

Appended to each chapter is a helpful list of references. The illustrations are good and the printing and book make-up all that could be desired.

E. B. HART.