NEW BOOKS

Graphical and Tabular Methods in Crystallography as the Foundation of a New System of Practice, with a Multiple Tangent Table and a 5-Figure Table of Natural Cotangents. By T. V. BARKER. D. Van Nostrand Company, 8 Warren Street, New York; Thomas Murby and Company, 1 Fleet Lane, E. C. 4, London, 1922. xiv + 152 pp. 99 figs. 25 × 15 cm. Price 14s. net in England. Postage 5½ d.

This book, which deals with the formal treatment of goniometrical data, is written for the advanced student or research worker; "the main purposes are to provide the researcher with a select collection of exact graphical methods, which personal experience has proved to be both accurate and time-saving; to discuss the relation of these methods to formal processes of computation; and finally to outline a new system of practice." Goniometry, optics, crystallochemical analysis, and structure are reserved for a separate treatment.

The chief special tool of the graphical methods is a form of crystallographic protractor in which it is sought to combine the more useful features of previous protractors. The relation between the stereographic and gnomonic projections is discussed and the preparation of each described. A chapter is given to the graphical determination of indices and one to the preparation of drawings of crystals. A chapter on crystallographic calculations deals mainly with formulas relating the angles and indices of 4 tautozonal faces or 4 co-planar zone-axes; as an appendix to this there is a "Multiple Tangent Table" which gives directly values of $\tan^{-1} nx$ for $n = 1, 2, 3, 4$ or 5. In the last chapter suggestions for a new system of crystallography are made built on methods described earlier in the book. Its objects are the saving of the investigator's time and of the space required for publication of results. While these objects are desirable enough, such means of obtaining them as the suggestions "that two (or at the most three) crystals be measured" and "that the mean observed angles be published without any citation of limits" can hardly be generally recommended.

The discussion of reticular densities in connection with "Mallard's Gnomonic Theorem" is decidedly obscure. However, in view of the fact that the book is not introductory, the presentation of most of the material is probably sufficiently clear; numerous illustrative problems with answers are a useful addition to the text.

The book is a valuable compendium of useful methods and contains many practical suggestions.

ROSCOE G. DICKINSON

Lunge-Berl. Chemisch-technische Untersuchungsmethoden. (Chemico-technical Examination Methods.) By DR. ERNST BERL, Professor in the Technical High School at Darmstadt. Vol. II. 7th ed., revised and enlarged. Julius Springer, Berlin, 1922. xliv + 1411 pp. 313 figs. 24 × 16 cm. Price in America, $12.00.

This is the second volume of the seventh edition of the old "Lunge" now the "Lunge-Berl." Like the earlier editions it consists of a series

of chapters by different authors, each an expert in his line. Numerous references to the literature are scattered through the pages.

The major titles are given below, followed by the number of pages devoted to each. Metallographic Methods, 41; Electrolytic Analysis of Metals, 38; Technical Spectroscopic Methods, 39; Iron and its Ores, 118; Non-Ferrous Metals and Salts, 331; Minerals and Salts of Alumina, 29; Examination of Clay, 38; Clay Wares and Porcelain, 138; Mortar and Mortar Materials, 192; Glass and its Raw Materials, 60; Enamels and their Raw Materials, 10; Calcium Carbide and Acetylene, 20; Cyanogen Compounds, 32; Soils, 34; Fertilizers, 56; Feeding Stuffs, 29; Explosives, Matches and Fireworks, 151. An index of 57 pages concludes the large volume.

The book is a collection of comprehensive treatises on the subjects listed above and is therefore indispensable in any good analytical library.

One of the chapters, the analysis of enamels, is of American origin. It is from the Transactions of the American Ceramic Society.

C. W. FOULK

Calculations of Quantitative Chemical Analysis. By LEICESTER F. HAMILTON, S.B., Assistant Professor of Analytical Chemistry, Massachusetts Institute of Technology, and STEPHEN G. SIMPSON, S.B., Instructor in Analytical Chemistry, Massachusetts Institute of Technology. International Chemical Series, H. P. Talbot, Ph.D., Sc.D., Consulting Editor. McGraw-Hill Book Company, Inc., 370 Fifth Avenue, New York; 6 and 8 Bouverie Street, E. C. 4, London, 1922. x + 196 pp. 14.5 × 21 cm.

The authors, having in mind the problem of the proper distribution of the student's time and energy, seek a solution by the use of a textbook on chemical calculations whose content and arrangement shall be such as: "(1) to allow the instructor to devote more time in the class room to the chemistry of Quantitative Analysis; (2) to aid the student in grasping stoichiometric principles without extensive personal instruction; (3) to provide ample material for home assignments and quizzes; (4) to prepare the way to more difficult problem work in Physical Chemistry and Chemical Engineering."

The content of Chapter I entitled "Computation Rules" is of great importance and is almost never discussed in textbooks on quantitative analysis, which means that its systematic teaching is probably neglected—a serious loss from the standpoint of quantitative analysis as well as regards preparation for problems in physical chemistry and chemical engineering. Short chapters on the writing of equations and the use of the balance with pertinent problems aid materially in increasing the usefulness of the volume. The problems are numerous, practical, well chosen and very often with an historical background.

The reviewer would take the liberty of suggesting that the usefulness of a volume of this character might be increased somewhat by the insertion

of references to larger works on quantitative analysis in the case of problems involving analytical methods unfamiliar to the student. This would enable him to attack such problems more intelligently and increase his general information.

As a whole, the book seems to be the result of much care and thought and is recommended as a very desirable aid in a course in quantitative analysis.

J. P. SIMMONS

Practical Chemistry. By LYMAN C. NEWELL, Ph.D., Professor of Chemistry at Boston University. D. C. Heath and Company, Boston; New York; Chicago; 1922. viii + 543 pp. 218 figs. 12.5 × 19 cm.

After an absence of nearly 5 years from academic work, the reviewer finds one of the most striking pedagogical developments of this period to be the superior training in chemistry now being given in the high schools and the consequent need of closer correlation of the first year college course with the high school work.

Most collegiate institutions now recognize these facts. As a consequence, the entering class in chemistry is usually separated into two divisions—those who have not had any chemistry in high school and those who have. The former group are frequently required to go through the work of high school chemistry as a prerequisite to the real college first-year course. For such students and for high school pupils in general, Prof. Newell's book should serve as an excellent text.

The points in this book's favor are many. It is well printed, it is clearly written and it is obviously the work of a real teacher. I should think the ordinary high school boy or girl would like this book.

The practical aspect of the subject is emphasized, which probably is the right thing to do in a rapid survey of this character. Though the general arrangement of topics is along conventional lines, there are a few departures from the stereotyped method of approach. Thus, for example, the study of carbon is begun in Chapter III and more than usual space is devoted to the compounds of this important element. And so we have a review of this element and some of its compounds in Chapter XXI, a chapter on fuels and illuminants, a chapter on other carbon compounds (sugars, starches, cellulose, alcohols, etc.) and a chapter on food and nutrition. The last chapter mentioned is a little old-fashioned, perhaps, and dismisses the important subject of vitamins with a single sentence.

The portion of the text which deals with theory is distributed throughout the book and is as full as need be for beginners. The account of Canizzaro's work (pp. 182–185) is especially good. On the other hand, atomic numbers are given but two short paragraphs (p. 490).

F. E. BREITHUT

A First Book of Chemistry for Students in Junior Technical Schools. By A. COULTHARD, Ph.D. Isaac Pitman and Sons, 2–6 West 45th Street, New York. Parker Street, London; Bath, England; Melbourne; Toronto. 1922. viii + 156 pp. 89 figs. 12 × 18.5 cm. Price $1.25 net.

This little book is evidently the outgrowth of a long experience in English schools and technical institutes. It is written by a man who is now a research chemist for a dye corporation.

The book combines in a remarkably small space the descriptive matter, the class demonstrations, and the laboratory experiments, together with summaries and review questions, for a year's work in introductory chemistry, covering 3 or 4 hours a week. The method of presentation is distinctly inductive, and much more attention is paid to methods and to laboratory technique than to the accumulation of mere facts. There are a goodly number of rather simple quantitative experiments which are instructive and valuable for the beginner, but these experiments do not involve quantitative analysis of the kind that we are familiar with in colleges and technical schools.

The field of the book is distinctly limited as will be seen from the titles of the 8 chapters as follows: Historical Beginnings; Physical Properties and Simple Operations; Solution, Crystallization, Solubility Curves; Chemical and Physical Changes; Rusting and Combustion; Nitrogen and Oxygen; Acids, Bases, and Salts; Hydrogen, Water, Chemical Equivalents.

No symbols or formulas are used in the book, but word equations are sometimes introduced to make the chemical changes clear. The book is interestingly written and carefully worded, with an abundance of illustrations of the simplest sort. The laboratory experiments, especially, bear the earmarks of having been tried out in the class room and of having been gradually molded into their present shape.

A perusal of this book, I am sure, will cause many an American teacher to hesitate and wonder whether a little more of this kind of chemistry in our American schools would not help us to set up a more wholesome respect for Science and do something to check our habit of jumping to conclusions.

N. HENRY BLACK

Inorganic Chemistry. A Textbook for Schools. By E. J. HOLMYARD, B.A., Head of the Science Department, Clifton College, England. Edward Arnold and Company, London; Longmans, Green and Company, 55 Fifth Avenue, New York; 1922. xi + 560 pp. 119 figs. 19 × 12 cm. Price $2.00.

In striking contrast with Prof. Newell's "Practical Chemistry," which is the subject of the foregoing review, is this book of Holmyard's. Instead of emphasizing the practical side of the subject, this book lays stress on the "cultural" value of chemistry. The author's preface opens with this challenge:

"If Science is to retain the honorable place it has won in the educational system of this country, I believe we shall have to recognize that it is the greatest of the 'humanities,' and deliberately abandon the so-called 'utilitarian' standpoint. There are signs that this fact is being realized, and that schoolmasters are becoming alive to the vital truth recently re-expressed by Dr. Singer, 'Science is a method and not a collection of facts.' "

As a consequence of this point of view, Holmyard divides his book into two parts. Part I (175 pages) deals with "General Theory." Such topics as the atomic theory, molecular weights, the kinetic theory, thermal dissociation, chemical equilibrium, and the structure of the atom are fully discussed before the student is introduced to Part II (373 pages) which covers "The Elements and Their Compounds." This method of treatment was in vogue in this country many years ago and we Americans have probably gone to the opposite extreme in stressing the utilitarian aspects of the subject. One wonders whether it is the wisest of courses to plunge the youngster first tackling this difficult subject into such highly theoretical matter before he has had an adequate basis of experimental facts on which to base his reasoning.

The book is decidedly English in its tone. Like most English texts, it is unusually well written. At times it indulges in a sly humor that leavens the mass of scientific facts. The chapter on the structure of the atom is exceedingly modern, and the account of atomic numbers is fuller and better than in most of our American texts.

In these days of rigid inflexibility in American instruction in chemistry, it is difficult to picture just where this work will fit in. An American student brought up on this book would find himself, at the end of his first year, in a position in which he would have a greater knowledge of theory and a lesser knowledge of fact than is generally presented in most of our conventional first year courses.

I am glad to own this book and I should think most American teachers would find it valuable. The book may, therefore, be safely recommended to teachers rather than to elementary students.

F. E. BREITHUT