

is put a mass of explanations and directions for the examination of practically all agricultural products that, taken in connection with the previous volumes and parts of this work, constitute a veritable working library of agricultural analysis. The work is illustrated with many cuts, plates, and sections of apparatus, those on optical apparatus being especially full and clear.

There has been a slight tendency to criticise the work as being too full and as not pointing out select methods. The author forestalls this thought in his preface and must be congratulated on standing by his original purpose of presenting to the busy worker a broad view of a great subject.

The volume closes with the bouquet of fermented and distilled liquors, and no one will begrudge the author these delights at the close of his arduous and valuable work.

H. A. HUSTON.

A MANUAL OF QUANTITATIVE CHEMICAL ANALYSIS FOR THE USE OF STUDENTS. BY FREDERICK A. CAIRNS, A.M. Third edition, revised and enlarged, by ELWYN WALLER, Ph.D. New York: Henry Holt & Co. 417 pp. Price, \$2.00.

The unusual success that "Cairns' Manual of Quantitative Analysis" has won is doubtless largely owing to the attention given in it to the details of manipulation. It is not enough to tell a student of quantitative analysis what to do; he must be told how to do it. To write a book on this subject that will stand the test of laboratory use by students, one must be both a skillful analyst and an experienced teacher.

In the new edition, which has been largely rewritten by Dr. Elwyn Waller, several changes have been made. The chapters on "Proximate Analysis" have been cut out, and the scope of the work restricted to "Mineral Analysis;" a wise step, as the analysis of organic substances has been so largely extended, and has become a special subject with a literature of its own. Dr. Waller's excellent and useful paper on the "Properties of Precipitates" has been added, and the list of tables in the appendix has been increased. Under "Manufactured Irons" are described the colorimetric method for combined carbon, Stead's alkali method, Drown's method for silicon, the rapid volumetric method for phosphorus, Carnot and Drown's, and McKenna's methods for aluminum, and Lundin's method for arsenic. Under "Min-

eral Water" Gooch's method for boric acid is given. Under "Fertilizers" the methods of the Association of Official Agricultural Chemists are quoted, and the Lewis-Thompson calorimeter is explained in determining the heating power of coal.

While to a professional analyst grammatical style may not seem of great importance, there can be no doubt about its importance to the student. He is frequently assured that accuracy of thought and lucidity of diction are characteristics of the truly scientific mind; but the vague, involved, and verbose style of more than a few of our chemical text-books cannot fail to make him doubt whether their authors possessed either accuracy or mental lucidity. In the present work, however, the clearness of the directions and the excellence of the grammatical style are worthy of commendation and imitation, while the printing and make-up of the book are creditable to the publisher. The new edition of the "Cairns-Waller Manual" will beyond a doubt be even more successful than the former one.

PETER TOWNSEND AUSTEN.

ENGINEERING CHEMISTRY: A Manual of Quantitative Chemical Analysis for the Use of Students, Chemists, and Engineers. BY THOMAS B. STILLMAN, M.Sc., Ph.D., Professor of Analytical Chemistry in the Stevens Institute of Technology. With illustrations. Easton, Pa.: Chemical Publishing Co. 1897. xxiii + 523 pp. Price \$4.50.

This volume will be found of great utility to the analytical chemist, and especially to him whose chief work comprises the examination of the materials of engineering. It contains a mass of most valuable data conveniently and compactly arranged, much of which is original and much of which was heretofore, for the most part, only to be found scattered through the files of periodical literature, or else in text-books relating to some special branch of the subject, and which has therefore only been available to the general analyst or to the chemical engineer as the result of more or less elaborate research.

Not only are described in detail nearly all of the conventional methods of analysis applicable to the various materials of engineering, such, for example, as the metals, alloys, cements, paints, oils, fuels, gases, water, etc., but many physical and mechanical tests in general use are clearly set forth, as, for instance, the mechanical testing of Portland cement, physical tests