

the temperatures ; the effect of pressure on condensed systems ; and the detailed discussion of the methods of determining the transition temperature.

It is to be regretted that several important phases of the general subjects have not been brought into discussion : the topic of catalytic actions ; the applications of the electrolytic dissociation theory to the phenomena of equilibrium ; the translator's own admirable work on the freezing-points of sulphuric acid solutions ; the author's extended investigations on dilute solutions ; and several others.

Here and there the need of more careful proof-reading is evident. The general typography of the book is, however, exceptionally fine, and the illustrations most effective. The fullness of the bibliographic features is particularly commendable. As we welcome so admirable an aid and guide to experimental work in physical chemistry, we cannot but regret that, thus far, there are so few centers in our own country, where the factors of experience, instrumental equipment, and enthusiasm combine to render America a noteworthy contributor in this field. Many indications, however, point to a rapid and early improvement in this respect.

THOMAS H. NORTON.

PRINCIPLES AND PRACTICE OF AGRICULTURAL ANALYSIS. BY HARVEY W. WILEY, Chemist U. S. Dept. of Agriculture. VOL. III, AGRICULTURAL PRODUCTS. xii + 665 pp. Easton, Pa.: Chemical Publishing Co. 1897. Price \$3.75.

This volume completes the most exhaustive work ever published on agricultural analysis. One of the sub-titles states that it is a manual for the examination of soils, fertilizers, and agricultural products. It is more properly a treatise on these subjects.

The volume under review is arranged in seven parts. Part I deals with the collection, preparation, and preservation of samples, the drying of organic bodies, the determination of ash, and the general description of the objects and methods of extraction by solvents. The full discussion of the subject of collecting and drying samples is timely and if the suggestions of the author had been more generally followed, the analyses of agricultural products that are found in various works of reference would have had a far greater value.

Parts II and III deal with the carbohydrates; Part II with sugars and starch in comparatively pure forms, while Part III deals with all carbohydrates in crude or manufactured products. These two parts comprise 250 pages and contain an enormous amount of information. Here the principles, as well as the practice, are well brought out. Numerous and extended tables of valuable factors are put where they are needed and the twenty-seven formulas for "Fehling's solution" will be appreciated by those who have had occasion to search chemical literature with only an author's name for a guide.

These sections include the more recent analytical methods for separation of the substances that are usually determined by difference and reported under the negative term of nitrogen-free extract.

Part IV is devoted to the examination of fats and oils. The physical methods are well represented while the best of the somewhat empirical methods for preliminary examination and identification of various oils and fats are very satisfactorily described and a good estimate of their comparative value is given. A considerable portion of this part of the work is devoted to descriptions of methods which are to be used in the examination of products that are more fully treated of in the last two parts of the volume.

The separation and estimation of bodies containing nitrogen which constitute Part V will prove of great interest and value to all chemists who are called upon to deal with animal and vegetable products. The results of much recent work on proteids are included here and the whole matter is presented in a far more satisfactory and systematic manner than is to be found in any other work in English.

The full treatment of the subjects in the first five parts enables the author to condense into less than eighty pages of Part VI an enormous amount of information on the subject of the examination of dairy products. Here we find all the important short cut methods for partial milk analysis and a very excellent discussion on the investigation of other dairy products.

If there is anything in the line of agricultural analysis that one cannot find elsewhere, he will find it in Part VII, which is devoted to miscellaneous agricultural products. Into 100 pages

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-