

with the common metals and acids, while it is well supplemented by a very comprehensive chapter on the reactions of the rare metals.

The appendix on the preparation of reagents will be found useful to teachers.

This manual is not intended to merely make the student a good analyst; it is rather a manual of instruction in chemistry through the medium of qualitative analysis. It is not a book for self-instruction, but it is intended that the student shall have the constant supervision of an instructor. As a manual for college students it does not appear to be too much to say that of all the many books of its class it is the best.

JAS. LEWIS HOWE.

PRINCIPLES AND PRACTICE OF AGRICULTURAL ANALYSIS. BY HARVEY W. WILEY. VOL. II. FERTILIZERS. Cloth, 8 vo. pp. 332. Easton: Chemical Publishing Co. 1895. Price, \$2.00.

The official inspection of fertilizers involves such great pecuniary interests that the chemical methods used for the purpose are matters of the highest importance to analyst and manufacturer. All countries in which fertilizers are used to any extent have some plan of inspection and certain methods of conducting the chemical work required. These methods are the result of very numerous and often difficult investigations of the men best qualified to deal with the subject.

In the volume under consideration the subject of fertilizers is treated under four heads: (1) Phosphates and phosphatic fertilizers; (2) Nitrogen in fertilizers and fertilizing materials; (3) Potash in fertilizing material and fertilizers; (4) Miscellaneous fertilizers, lime, gypsum, ashes, coarse manures, etc.

The matter of drawing samples of various materials receives a deservedly large share of attention. Then the analytical work proper is taken up and treated very fully and clearly. The different analytical methods of various countries are given in full and a brief but very valuable discussion of the merits of the methods follows. In many cases the value of the discussion is increased by full statements of analyses.

The matter thus brought together consists of both original matter and material published at home and abroad; and often published in such a way as to be now inaccessible to many workers on the subject.

The treatment of the subject is full, clear, systematic, and well up to date. Enough technology is included to show the reader the reason for the methods used in the work; and the author has not lost sight of the fact that he is writing on the principles as well as the practice of agricultural analysis.

The chemist who has been unfortunate enough to buy a number of alleged treatises on agricultural chemical analysis (chiefly of English origin) that have recently appeared will fully appreciate the merits of this work and heartily thank Dr. Wiley for producing a work that is full and reliable. For if the investigator of questions bearing on the analysis of fertilizing material does not find here methods suitable for the purpose he has in view, he may as well resign himself to working the matter out for himself.

To the teacher the book is of very great value, and if used by students they will have the satisfaction of knowing that they are well prepared for technical work in factory or inspection laboratories.

The full citation of authorities and an unusually complete table of contents and index are commendable features of the work.

In the preface, the author regrets "that the contents of the volume have again exceeded all expectations." His readers will not share this regret, for there is nothing here that could have been omitted to advantage.

It is to be hoped that there may be no delay in the appearance of the remaining volumes of a work that is of such high value to those who wish to keep informed on so wide a range of chemical work as is included under the term agricultural analysis.

H. A. HUSTON.

LABORATORY WORK IN CHEMISTRY. A SERIES OF EXPERIMENTS IN GENERAL INORGANIC CHEMISTRY. BY EDWARD H. KEISER. 8 vo. viii, 119 pp. New York: American Book Co.

This little book, in spite of its name, is not exclusively a laboratory guide nor is it exclusively devoted to experiments in inorganic chemistry. Thus, we find (p. 62) a definition of *equivalent*, and a description of the properties of carbon (p. 94). The experiments relating to the organic compounds, marsh gas,