

gests that the sulphide formed is "oxidized at the time of its appearance by the oxygen which would be liberated at the surface of that portion of the copper which is immersed in the acid, since the whole arrangement would form a galvanic cell consisting of a metal, a liquid, and a gas."

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### NEW BOOKS.

PRINCIPLES AND PRACTICE OF AGRICULTURAL ANALYSIS. BY HARVEY W. WILEY. Volume I, Soils. Cloth, 8 vo., pp. 607, figures, 93. Easton: Chemical Publishing Co. 1894. Price, \$3.75.

This first bound volume includes the first eight parts of the compendious work now in process of publication.

In attempting to meet the wants alike of analysts, teachers, and students of agricultural chemistry, the author has undertaken a most difficult task. The needs of the several classes of readers are widely different, often distinctly opposite.

Beyond doubt, each of the classes named has need of a thoroughly modern treatise upon this subject. There is extant no satisfactory systematic introduction through the general principles of analysis to the special methods applicable to agricultural materials; the student is ordinarily compelled to the study of many methods, in the illustration of general principles and for the acquirement of facility in manipulation, that are not directly required in his future work, and which might often be happily substituted by methods which are of immediate use. Again, there is no English work on agricultural analysis—except of the most incomplete scope—which is at all modern; nor does any work upon the subject in any language cover the methods developed in America during the past ten years. On the other side, the Proceedings of the Association of Official Agricultural Chemists state the American official methods most briefly, for the guidance of analysts presumably acquainted with the methods in general, and more or less familiar with the reasons for the several specifications, and, therefore, without explanatory comment; nor has this Association undertaken, as yet, to cover all of the large field involved. Even assuming a degree of linguistic attainment altogether beyond that of the average student, and of

many a practicing analyst, the foreign treatises upon the subject are often so brief as to mislead the student and to be useless even to the practicing analyst. The opening for a treatise of the design outlined by Professor Wiley is therefore wide.

The perspective of the volume will serve quite well, perhaps, to elucidate the author's treatment of his subject in its salient features; of 607 pages, over one-tenth is devoted to a brief study of the materials to be analyzed, and their origin; one-twentieth is given to the sampling of the soil; one-seventh to the physical properties of the soil, including their estimation; one-sixth to mechanical and mineralogical analysis; one-thirtieth to the determination of the gases of the soil; the remaining half of the volume deals with the chemical analysis of the soil, including soil waters.

In no other treatise of this kind are the relations of the analytical method to the nature of the problem it is used to solve, so fully dwelt upon; and in no other similar treatise do the physical and mineralogical properties receive a treatment so fully in accord with their importance.

The style is clear and compact. In his selection of methods no attempt has been made by the author to limit those described to the number found useful in a single laboratory only, but general experience has rather been consulted. Especial stress is laid upon American methods because the reader will chiefly use these methods, and because other treatises so frequently ignore them; yet no other treatise gives nearly as full discussion even to the Continental official methods, and the judicial impartiality of the author is highly praiseworthy. The very recent literature has been drawn upon for material, and the wealth of reference will be especially appreciated by the teacher and analyst; this volume alone contains 348 listed references to original papers.

This work is furthermore noteworthy as being probably the first important chemical treatise to rigidly follow the American Association for the Advancement of Science revision of chemical orthography. The practice of beginning with a lower-case type all proper names used in the text to designate methods is an innovation less certain to be followed. The figures are well selected and apposite.

The publishers are to be congratulated on the beautiful typography of the volume, its good press-work, and its freedom from printer's errors.

Judging of this work by the first volume it may be said, briefly, that it is the most modern, the most complete and the very best treatise upon the subject of agricultural analysis, and that it meets more largely than any other book on the subject, the needs of the teacher, the student, and the working analyst. It is not, of course, a text-book of agricultural chemical analysis, nor a hand-book of the laboratory, but it should find its place upon the reference tables of all laboratories. Nor is its usefulness confined to the analyst of agricultural products alone, for every general analyst will find in its pages a great mass of material, superbly arranged, to which he could daily refer with direct advantage to his work.

WILLIAM FREAR.

A HAND-BOOK OF INDUSTRIAL ORGANIC CHEMISTRY. BY SAMUEL P. SADDLER, PH.D., F.C.S. Second revised and enlarged edition. 8 vo. pp. 537. Philadelphia: J. B. Lippincott & Co. 1895. Price, cloth \$5.00, sheep \$6.00.

The hundreds of manufacturers of chemical products in this and other countries who are struggling with the puzzling problems of daily practice and the vexatious details so essential to commercial success, eagerly watch for and greedily accept everything which may possibly clear up difficulties or offer suggestions, and such works as this of Dr. Sadtler's find the heartiest of welcomes waiting for them. It is not surprising, therefore, that this work from so excellent authority should soon be out of print and that a second edition should be needed to meet the current demand.

Limited in volume, and, therefore, in detail, works of this class serve two important purposes: First, they furnish teachers in compact and reliable form for presentation to their students, ample description of the principles and processes used in the chemical industries. Second, they furnish manufacturers, working in more or less empirical ways, knowledge of the fundamental principles of the processes they employ, or general principles of methods other than their own but attaining the same end, possibly with greater economy both of time and means.

In the second instance they meet only partially the prevailing