

compounds" being formed. He properly disclaims any wide validity of so-called "laws" of enzyme concentration and action (such as the Schütz-Borissow law). "Neither the linear nor the exponential law can be practically applied except when direct experiments with corresponding relative concentrations of enzyme and substrate have shown what law holds." The reversibility of enzyme reaction and its presumable bearing on synthetic action in living organisms are advocated within the limits of our meager experimental data.

Among the other topics briefly noted are: general methods of enzyme preparation and investigation; co-enzymes and anti-enzymes; zymogens; oxidation processes and certain complex systems. The monograph (with a bibliography of nearly 200 titles appended) will form a desirable supplement to current text-books.

LAFAYETTE B. MENDEL.

Untersuchungen Ueber Kohlenhydrate und Fermente. By EMIL FISCHER. Berlin: Julius Springer. 1909. pp. iv + 912. Price (bound), 24 M.

In this volume are brought together the articles published by Fischer and his students describing their researches on the carbohydrates and related products, carried on from 1884 to 1908. One paper only ("Synthese des *d*-Glucosamins") is omitted from the list, this having been published previously in Fischer's "Untersuchungen über Aminosäuren."

The book contains five general discussions or reviews of the subject and 104 papers. Of the five discussions, three have been published in chemical journals and one in the form of a monograph. The remaining one was written especially for the book. Of the 104 papers, 92 have been published in the "*Berichte der deutschen chemischen Gesellschaft*," 10 in "*Liebigs Annalen der Chemie*," and 2 in other journals. The articles are practically exact reproductions of the original papers, the only significant change being the substitution of the mark "dl" for "i" in the designation of racemic compounds. The only additional matter is in the form of an occasional foot-note.

It is entirely superfluous for one to comment on the character of the research since it has taken its place as one of the classical investigations in the field of organic chemistry. It is certainly significant that the original papers can be reprinted to-day practically unchallenged either in regard to the experimental details or conclusions drawn.

Chemists everywhere will regret that the author probably will be unable to continue his investigations on the polysaccharides because of his extreme sensitiveness to the evil physiological effects of phenylhydrazine and its related compounds.

WILLIAM MCPHERSON.

Practical Physiological Chemistry. By P. B. HAWK. 2nd Edition, Blakiston's Son & Co. Philadelphia. Price \$2.50, reduced from \$4.

This is another of the many laboratory manuals of physiological chemistry, but this is decidedly better than most of them. It is perhaps the

most complete of the manuals in English, though it falls far short of the standard of Hoppe-Seyler and Thierfelder. It is something more than a laboratory manual, as there is a good deal of explanatory matter, usually found in text-books, incorporated with the laboratory directions. The book is especially well illustrated both as regards apparatus and the crystalline forms of the more important substances. Graphic formulae are given everywhere and they are unusually free from errors. Directions for work are full and fairly accurate and an admirable feature is the clear statement of the best quantitative methods for the determination of many of the physiologically interesting substances. The book is designed primarily for medical students, one-half of it being given over to the examination of the human urine. It contains nothing of general biology or plant chemistry.

The second edition differs from the first in containing a new chapter on enzymes; a revision of the chapter on the proteins and the incorporation of some new qualitative and quantitative methods.

The main points to be criticized are the lack of all references to the original sources which greatly reduce its value as a reference work; the lack of any mention of the cell and its chemistry, protoplasm not being referred to; the lack of any explanations or criticism of the reactions and tests given, particularly in the case of the proteins; the complete neglect of the whole of physical chemistry and its numberless illuminations of physiological processes; the giving of a great number of tests not differing in principle from each other under the name of the author, instead of the character of the test. There are certain oversights, also, which should be remedied in another edition. For example, in speaking of the modern work on the nature of the proteins, practically entire credit is assigned to Fischer and Abderhalden and no mention is made of the work of Curtius or of Kossel, which is so largely responsible for the true conception of the nature of the proteins.

The influence of this and all other manuals of the kind will be pernicious, if the student simply follows it through in a mechanical way. Its main usefulness will be found in putting large classes of medical students through the educational mill in which mechanical devices are developed to the highest point of perfection and thought relegated to the background. While such methods of instruction should have no place in any university they unfortunately are common, and for those teachers so situated that they must act as millers, this book can be heartily commended as on the whole the least pernicious. It is also useful to other than medical students as a reference book, but its usefulness in this direction would be greatly increased if references to the original sources had been given.

ALBERT P. MATHEWS.