

LABORATORY EXERCISES IN PHYSICAL CHEMISTRY. BY FREDERICK H. GETMAN, PH.D. John Wiley and Sons. 241 pp. 100 illustrations. 1904. Price, \$2.00.

As the author says in his preface, there is need for a shorter laboratory guide, one more specifically adapted to students beginning physical chemistry, than Ostwald-Luther's *Physico-Chemische Messungen*, which is rather a mine of information for the teacher. Dr. Getman's manual is the first in this field and will be welcomed with pleasure, but it will be subjected to a somewhat critical examination on that very account.

The topics taken up are more numerous than might be expected from the preface, or from the size of the book. The first section, "Introductory Measurements," is devoted to methods for the calibration of balances and weights, reduction of weighings to *vacuo*, calibration of flasks and burettes, determinations of specific gravity, viscosity, surface-tension and solubility. All that is said concerning the vapor-density methods is brought in under the head of specific gravity, and consists in the mention of the names of five methods and a description, two pages long, of the Victor Meyer method with a figure. The second section, on "Thermal Measurements," includes the calibration of thermometers by means of the usual fixed points, and by means of transition temperatures also (although it is not made clear how these are used), the determination of the coefficient of cubical expansion and of molecular volumes of liquids at their boiling-points, the boiling-point and the freezing-point methods, and a large number of details under the head of calorimetry. The section on "Optical Measurements" naturally consists of descriptions of the spectroscope, the Pulfrich and the Abbé refractometer, and the polarimeter. Under the section "Electrical Measurements," in sixty pages, most of the usual methods and instruments are dealt with. The method for the determination of the dielectric constant is very welcome. Some of the statements in this part of the book might be improved, for instance, on page 158 we find..... "since liquids have no definite form it is obvious that the above definition of specific conductivity does not apply," whereas it does apply, and the specific conductivities of solutions so defined enter into formulae on the next page. Six pages on "Dynamical Measurements," including the inversion of cane-sugar, the catalysis of

methyl acetate and the saponification of ethyl acetate, followed by 21 well selected and useful tables conclude the book.

As a whole, this manual is a fairly complete summary of the methods of physical chemistry, but too brief for the ground it covers. Formulae are freely inserted throughout, occasionally without their derivation, once even without a statement of the meanings of the symbols (the formula for the molecular lowering of the freezing-point on page 64), and more frequently omitting essential steps in their derivation. This occasional omission of essential steps is a fault more or less felt throughout the book, in fact, very few methods are presented with sufficient completeness to enable a beginner to carry them out without other assistance. Used as a skeleton outline, however, with a competent instructor at hand to fill in the gaps, it will unquestionably be of value in laboratory instruction.

S. L. BIGELOW.

GRUNDZÜGE DER SIDEROLOGIE. VON HANNS FREIHERR VON JÜPTNER, Professor an der K. K. technischen Hochschule in Wien. Dritter Teil, erster Abteilung: Die Wechselwirkungen zwischen Eisen und verschiedenen Agentien. 1904. Leipzig: Verlag von Arthur Felix. 152 pp. Price, 6.50 marks.

This book is the first part of the third volume of Jüptner's "Siderologie," the first two volumes of which have been reviewed in this Journal. The author considers, from the physico-chemical point of view, all those reactions which may take place when iron or its oxides are subjected to oxidizing or reducing agents, or when iron reacts with other elements as carbon, phosphorus, sulphur, or with slag. The equilibrium and dissociation phenomena are discussed in detail in a clear and precise manner, and the older experimental work is brought into harmony with the more recent views and the latest work on the physical chemistry of iron. Among the more important of recent investigations the author discusses, in detail, the work of Stead on phosphorus and iron, the work of Le Chatelier and Ziegler on the relations between iron, manganese and sulphur, and the important work of Charpy and Grenet on the breaking down of iron carbide into graphite and the influence of temperature and silicon on this reaction.

The high standard of the first two volumes is fully maintained in this one.

HENRY FAY.