

NEW BOOKS.

Elektrochemisches Praktikum. By DR. ERICH MÜLLER, Professor and Director of the Laboratory of Electrochemistry and Physical Chemistry; with an introduction by Dr. Fritz Foerster, Geheimer Hofrat, Professor and Director of the Laboratory of Inorganic Chemistry, both at the Technische Hochschule, Dresden. Second Edition. 240 pages, 24 figures, 31 diagrams. Theodor Steinkopff, Dresden, 1919. 23 X 15 cm.

This excellent manual of electrochemistry deserves a much wider recognition in this country than it now enjoys. Although written by Dr. Müller, it had its origin in a set of laboratory exercises prepared jointly with Dr. F. Foerster, for a class in electrochemistry at the Technische Hochschule in Dresden. The book contains directions for some 70 experiments, one-half of which deal with electrochemical theories and one-half with applications of these theories. The principles involved in each experiment are brought out clearly by a preliminary discussion and the directions for the execution of the experiments are straightforward and complete. They have evidently survived the ordeal of actual use. In connection with the experiments are given references to the excellent text-book of Foerster "Elektrochemie der waesserige Loesungen," Second Edition.

The experiments illustrating the applications of electrochemistry cover electroanalysis, electroplating, the preparation of inorganic and organic substances by electrolysis, the preparation of inorganic substances by electrothermal methods. Even these experiments are not mere directions for securing the desired end, but in each case involve a careful study of the process itself. The experiments on the electrolysis of chloride solutions are especially illuminating and instructive.

The second edition differs but slightly from the first, the only important addition being a study of the current and energy capacities, the efficiency and the shelf-life of the dry-cell.

ARTHUR B. LAMB.

A Treatise on Qualitative Analysis. Adapted for Use in Laboratories of Colleges and Technical Institutes. By FRANK CLOWES, D.Sc., Lond., AND J. BERNARD COLEMAN, A.R.C.Sc., Dublin. 9th Edition. 1920. J. & A. Churchill, London. pp. xiv + 400. \$5.00 net.

The present edition of this well-known work has been "rewritten, recast and enlarged in order to adapt it to modern methods of teaching," besides having an altered style and size of paper which makes it conform to the Quantitative Analysis by the same authors. The tables for systematic analysis are so arranged across the page that it is not necessary to turn the book while the tables are being consulted. Besides the usual inorganic reactions for metals and acid-radicals, considerable space (pp. 174-240) is given to the reactions and detection of typical organic substances. There is evident a painstaking endeavor to make everything easy for the student by abundant cross references, but it is to be feared

that their very multiplicity will defeat their purpose. The rather lengthy and detailed description of ordinary operations seems to be intended for a course without instructors, and aims at meeting conditions which do not prevail in this country. The space taken in a text-book (pp. 331-383) to describe in detail, "Laboratory Fittings, Apparatus, Chemicals, Reagents and Test Substances," would seem of more use to an instructor and supply-room man than to a student. The book will be of interest and value to industrial chemists as well as to students. The printing is good; the illustrations abundant, though some are antiquated. The methods of analysis are all tested by experience, though one notes the omission of several modern methods that are standard. That the book has an appeal to analysts and students is evidenced by the fact that nine editions have been printed since its first appearance. GEO. L. COYLE, S. J.

Die Bedeutung der Kolloide für die Technik. 3rd revised edition. By PROFESSOR DR. KURT ARNDT, Privatdozent at the Technische Hochschule, Berlin. Theodor Steinkopff, Dresden. 53 pp. 15 × 22 cm. \$0.50.

The first edition of this little book appeared in 1909, and its purpose was to state in simple and non-technical language some of the very numerous instances in which colloids play important rôles in the industries. It fulfilled this purpose admirably, as its continued publication eloquently testifies.

The present (3rd) edition contains many additions, though it has wisely been kept a small and simple pamphlet. New chapters on flotation and electro-osmosis have been added.

While the author has not wholly avoided a somewhat encyclopedic form of treatment, he has achieved the difficult task of presenting a technical subject simply, clearly, and interestingly. ARTHUR B. LAMB.

Chemistry for Public Health Students. 1st Edition. By E. GABRIEL JONES, M.Sc., F.I.C., Lecturer in Public Health Chemistry in the Univ. of Liverpool. Deputy Public Analyst for the City of Liverpool. Methuen & Co., Ltd., London, 1920. ix + 244 pp. 13 × 19 cm.

This book is more than a manual and guide for laboratory procedure in public health chemistry, although such is the purpose it principally aims to serve. A considerable amount of material has been added to each chapter which will add to the student's general knowledge of the subject and enlighten him upon the application of laboratory findings. It is needless to say that extended discussion is not permitted by the size of the volume, and that amplification will be necessary in some sections, either in the form of class room instruction or collateral reading, if the student is to properly digest the material.

The style adopted by the author is one which makes for clarity and concise statement. Numerous side headings are used which enhance the value for continued use or for reference. Altogether the book is very

readable and justifies the publication by bringing together within its covers a great many methods used in public health laboratories and much information in condensed form which is the stock in trade of the skilled public health analyst.

In general, the method of presentation is a separation of the important subjects, such as milk, alcoholic beverages, air and water, into separate chapters in which a few pages are given to general information on the subject. This is followed by the laboratory determination of different constituents. A summarized statement of the method is given, then a list of required apparatus and solutions and the detailed procedure. Frequent use is made of equations and examples of calculation.

The first two chapters of the book, some 25 pages, are given over to a discussion of the fundamental operations of quantitative analysis. It is evident that English experience in preparing students of public health chemistry has been much like that in America, in that it has found a majority unfamiliar with the principles and procedures which are the basis of the work which is to be undertaken. The author begins with detailed directions for the use of the balance and gives numerous rules and precautions to be observed in its manipulation. Full directions are then given for two typical gravimetric determinations. Under the head of volumetric analysis is a brief discussion of standard solutions, equivalent weights, normal solutions, indicators, acidimetry and alkalimetry. Greater space is devoted to the preparation and standardization of commonly used solutions of acids, bases and oxidizing substances. These serve as typical examples and care is taken to present equations and calculations. Procedures are also given to illustrate the use of the prepared solutions.

Twenty-five pages are devoted to the composition, analysis, and adulteration of milk. The composition of normal milk, the variations due to season, time of day, and methods of milking, come in for discussion. Excerpts are given from The Sale of Milk Regulations of the British Board of Agriculture. The procedures described for the estimation of fats, solids, gravity, nitrogen and lactose are characteristic of the attention given by the author throughout his book to the details and precautions of analysis.

There are certain omissions in this chapter which are apparent to one familiar with American practice. No mention is made of cream; the widely used Babcock method for fats does not appear, the Leffmann-Beam method evidently being more widely employed in England; the cotton-disc method for the rapid comparative estimation of sediment is not described.

A chapter is devoted to butter and margarine. In this there is a considerable discussion of the manufacture of margarine, the properties

which distinguish it from butter, and the substances employed for adulteration of both of these products. Methods of analysis are given for the determination of water, fat, and salt, and for the detection of preservatives and foreign fats in butter.

There is a short chapter dealing with alcoholic beverages, and in Chapter VI ten pages are devoted to the composition and adulteration of certain articles of food, as condensed milk, cheese, lard, and honey, to the beverages tea, coffee, and cocoa, and to condimental substances, such as vinegar, pepper, and spices. Continuing in the same chapter, the author summarizes the microscopical appearance of certain food stuffs and briefly discusses food values and vitamins.

Out of 24 pages devoted to a chapter on food preservation and the detection of metallic poisoning in foods, 13 pages are given to the subject of arsenic and its detection. Justification of the use of this space is evidently found by the author in the epidemic of arsenical poisoning from beer which was brought to light in England in 1900. In this country experience has not shown any great danger existing to the public health from such a source.

The fore part of the chapter discusses 8 methods of preserving food and continues with the subject of chemical preservatives, quoting the work of Wiley and others in this field. Recommendations of the departmental Committee on Preservatives and Coloring Matters in Food made in 1901 are listed.

Water and water supplies receive attention in the 50 pages of Chapter VIII. The author devotes the first few pages to a description of the different sources of water and the quality of the supplies derived from them. Detailed directions are then given for taking samples of water for chemical analysis. Methods are given for the determination of free and albuminoid ammonia, oxygen absorbed, chlorine, nitrates, nitrites, total hardness, temporary and permanent hardness, and for the detection of poisonous metals. In some cases, qualitative as well as quantitative methods are given, and it is needless to say these do not always conform to the standard methods of water analysis of the American Public Health Association, but rather suggest a choice of methods which has merit from the standpoint of instruction. The author is to be congratulated upon incorporating several pages of material on the interpretation of water analyses. This very important phase of the subject is too often omitted or neglected not only in the text-books but in the class room as well. In this connection several typical analyses are given from various sources and interpretation is made of the quality by the author.

The significance of algae and protozoa and of the microscopical examination in general is given in this chapter. Water softening is briefly discussed.

The Analysis of Sewage Effluents is the subject of a short chapter, in which modifications of some of the methods described under water analysis are given. The importance of suspended matter and of dissolved oxygen in sewage effluents is pointed out and methods for their determination are given. The chapter closes with the recommendations of the Royal Commission on Sewage Disposal (1912) in regard to the pollution of streams with sewage and sewage effluents.

One of the best chapters of the book is that dealing with air, to which 27 pages are devoted. Composition of normal outdoor air, the changes produced by respiration and combustion, and the detection of gaseous impurities are discussed in turn, and the author has given a very complete list of gaseous impurities liable to be encountered, particularly in the industries, together with methods for their detection and the permissible limits of their concentration. In connection with the subject of dust, extracts are given from the Report of the Committee appointed for the Investigation of Atmospheric Pollution (February, 1916).

The closing chapter is devoted to disinfectants, their action, detection and estimation. Directions are given in an appendix for the preparation of numerous solutions. Several useful tables will also be found here. Following these are 7 pages of questions and a bibliography of reference books.

This little book ought to prove helpful and useful not only to students but also to instructors of courses in sanitary chemistry and public health laboratory methods. It is unfortunate that more care should not have been given to certain details of publication. The uneven margins and careless trimming of leaves, which are conspicuous in the reviewer's copy, detract seriously from the true worth of the book.

MELVILLE C. WHIPPLE.