

experience. It deals very fully and satisfactorily with the subjects of the collection and measurement of gases, the preparation of reagents and arrangement of a laboratory.

Two-thirds of the volume is devoted to the apparatus and methods of analysis, almost every important apparatus and method being clearly and minutely explained together with a critique of the various modifications which have been proposed. In many cases a brief historical notice lends interest to the description.

While the references to German periodicals are very complete, the same cannot be said regarding English or American literature, no mention being made of the work of Clowes, of Phillips, of Campbell and Hart and others.

An admirable feature of the work is the attention given to the applications of the methods: it would have seemed better to have included the method of calculation of the losses in chimney gases—a very important subject—than to have referred the student to other books.

Nearly every process is illustrated by examples from practice but it seems somewhat incongruous in a work on *technical* analysis to report the constituents sought to hundredths of a per cent. as is done in nearly every case. Inasmuch as the readings were taken only to tenths of a per cent. and some of the methods are accurate to only half of one per cent., the hundredths must have been obtained arithmetically.

It is, however, a book which should be in the hands of every one having to deal extensively with the analysis of gases.

A. H. GILL.

METHODS OF GAS ANALYSIS. By DR. WALTHER HEMPEL. Translated from the third German edition and considerably enlarged, by L. M. DENNIS. New York: The Macmillan Co. 1902. xix + 490 pp. Price, \$2.25.

This well-known book has been very considerably enlarged and improved by Professor Dennis. Not only has the entire work been thoroughly revised and brought up to date but a number of new forms of apparatus and new methods of analysis have been incorporated. The text has been increased by more than one hundred pages. Some of the new methods are: the separation of argon from the atmosphere, the analysis of acetylene, examination

of gases produced by bacteria, new methods for determining carbon monoxide, determination of the heating power of gases, of sulphur in organic substances, the gas lantern, analysis of the gases evolved in the electrolysis of chlorides and in the manufacture of bleaching-powder.

In its new form this work will undoubtedly come to be regarded as the standard text-book and reference book on gas analysis and will be found indispensable in all chemical laboratories.

EDWARD H. KEISER.

SEWAGE WORKS ANALYSES. BY GILBERT J. FOWLER, M.Sc. (Vict.) F.I.C. Superintendent and Chemist, Manchester Corporation Sewage Works. New York: John Wiley and Sons. London: P. S. King & Son. 1902. Price, \$2.00.

With the development of bacterial processes for the treatment of sewage, has arisen the necessity for constant and careful control of the working of the bacterial filters, and this can only be done by chemical analysis of the effluent. In order to keep a sewage plant in good working condition the effluent from each bed must be constantly examined, and the amount of sewage to be applied to the bed determined by the results thus obtained. The methods that are used for this purpose by Mr. Fowler, manager and chemist of the Manchester Sewage Works, and by Mr. Scudder, of the Mersey and Irwell Commission, are now published for the first time, and the book, "Sewage Works Analyses," is an important addition to the literature of the subject. The methods for determining free, albuminoid, and organic ammonia, nitrogen as nitrites and nitrates, solids in suspension and solution, absorbed oxygen, dissolved oxygen, chlorine, iron compounds, acidity and alkalimetry, are so fully and carefully described, that it would be possible for one who has had very little training in chemistry, not only to understand the methods, but to perform successfully the various determinations. It may, however, be well to call to the attention of those not familiar with sewage analysis, that the English method of determining the oxygen consumed, with potassium permanganate and potassium iodide, is not usually used in this country, but in its place, a modification of Kubel's method, heating a known quantity of the sewage for five minutes with a solution of potassium permanganate, and determining the amount of potassium permanganate used by titrating with oxalic acid;