

and possibly more carbon atoms have been found in volatile oils, it is nevertheless remarkable that a large number of volatile plant substances are characterized by ten carbon atoms or a multiple thereof. Whatever significance may attach to this number, this much is true, that the "terpenes and camphors" have always received a larger share of attention than other volatile plant substances.

The secret of this seems to lie in the fact that the terpenes proper and their derivatives occupy places in that enormous field between the series of hydrocarbons and their derivatives belonging to the formula of saturation C_nH_{2n+2} on the one hand and the formula of saturation C_nH_{2n-6} on the other. The study of the terpenes and their derivatives has done fully as much as any one other subject, if not more, to make this vast *terra incognita* of a few decades ago better known. Incidentally these researches have thrown much new light on phyto-chemistry and the manufacture of volatile oils and of perfumes.

The arrangement of the book is that of the German original. The English edition, however, has been made much more valuable by the incorporation of the vast number of facts published since the appearance of Dr. Heusler's monograph. The number of terpenes described is twenty-two, the number of sesquiterpenes, fourteen.

The number of alcohols, ketones, amino derivatives, etc., has increased proportionately. To the same degree to which Dr. Heusler's monograph was indispensable to the investigator five years ago, to the same extent, and even more so, will Dr. Pond's larger work be indispensable to-day. Moreover, it will prove more satisfactory, for the type is larger, the page is better arranged, the references are more handy, and the book is provided with an index. Thus, while Heusler's work was indispensable to the specialist, the English work will prove useful also as a reference work to the non-specialist.

EDWARD KREMERS.

HANDBOOK OF TECHNICAL GAS ANALYSIS. BY CLEMENS WINKLER.

Translated from the third greatly enlarged German edition by GEORG LUNGE. London: Gurney and Jackson. 1902. 190 pp.

This book is more than the title indicates as it gives Professor Lunge's description of his own apparatus and in many cases his

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