

REVIEWS.

A METHOD FOR THE IDENTIFICATION OF PURE ORGANIC COMPOUNDS. Vol. II.
By SAMUEL PARSONS MULLIKEN, Ph.D. John Wiley and Sons, New York;
Chapman and Hall, Ltd., London. Price 21s. net.

By the author's system of classification, described in Vol. I., organic compounds are divided into order, genus, division, section, and species, which, when it is not logical, is at least biological. Having dealt with Order I., Dr. Mulliken now brings under review Order II., comprising the substances which contain the elements (*a*) carbon and nitrogen, (*b*) carbon, nitrogen, and hydrogen, (*c*) carbon, nitrogen, and oxygen, (*d*) carbon, nitrogen, hydrogen, and oxygen, an imposing array of close upon 4,000.

Preceding the tables in which these materials, with their physical and chemical properties, are arranged according to the above system, there are described the tests necessary to supplement those already given in Vol. I., and among them are included scales of bitterness, sweetness, and pungency, based upon quinine sulphate, cane-sugar, and ammonium hydroxide, respectively. Then follow the tables:—Suborder I., Genus I. (Acidic), Division A (Solid), Division B (Liquid). Suborder I., Genus II. (Basic), Division A (Solid), Division B (Liquid). Suborder I., Genus III. (Neutral), Division A (Solid), Division B (Liquid).

All these are colourless, or have colours "less saturated than Tint 3 of the color standard accompanying Vol. I.," and it is stated in a footnote to page 3 that "this color standard, consisting of the two cards A and B and a perforated screen, will be mailed to any person owning this work upon receipt of a postal money order for one dollar." Suborder II. comprises the solid "species" of this order, which are more saturated in colour than Tint 3 of the standard, but, for a reason which is obscure, acids, bases, and neutrals in this suborder are not distinguished.

The compounds in each division are tabulated in ascending order of melting-point or boiling-point, as the case may be. The work is thus directed towards paving a royal road to identification, and at first sight would seem to be a godsend to the harassed examinee; it looks almost as simple as furnishing at Drage's. Nobody has yet invented a thornless rose, however, and one disadvantage of the book from the standpoint of the sanguine student lies in the enormous number of materials involved, and of which hardly more than 3 per cent. are likely to be presented by any humane examiner. Consequently, to be useful, melting-points must be taken with meticulous accuracy, since a popular temperature, slightly confused by an unfaithful thermometer, may confront the victim with twenty or thirty alternatives. Moreover, there is always Tint 3 lurking in the background, tempting the ingenious examiner to crystallise his picric acid from petroleum.

Dr. Mulliken and his associates deserve the greatest possible credit for the monumental industry which they have exercised, but it remains questionable whether the tortoise method of identification is not, after all, the best education for the chemical sleuth.

M. O. FORSTER.

CHANGES IN THE FOOD-SUPPLY AND THEIR RELATION TO NUTRITION. By LAFAYETTE B. MENDEL. Oxford University Press, 1916. Price 2s. 6d. net.

In this suggestive essay, written for the meetings of the second Pan-American Scientific Congress at Washington, December, 1915, the author touches, somewhat lightly, on many interesting aspects of the question of national food-supply, more especially as affecting America, the object being rather to indicate the importance of many of the factors concerned than to make any definite suggestions. Short sections deal in turn with food production, preservation, and transportation, custom in diet, and changing social and hygienic conditions, and many interesting and curious facts are brought forward.

The author lays stress on the circumstance that the most diverse diets in various parts of the world are known to produce adequate nutrition, so that no one food material can be regarded as essential. He further points out, basing his observation on the recent work on nutrition carried out both in America and at home, that a profound modification of the food problem may be effected by the addition to unsatisfactory food-stuffs, such as maize, of a small proportion of some other material rich in the constituents which are missing from the former.

The importance of "accessory food factors" is also duly and rightly insisted on, and the danger accruing from the unrelieved employment of "artificial products" is indicated.

It is comforting to find that as regards the future food-supply of the world the author takes an optimistic view, considering that the progress of knowledge will for a very long period be more than able to cope with the increase of population and all its attendant difficulties.

A. HARDEN.

MICROSCOPY OF VEGETABLE FOODS. By A. L. WINTON, PH.D. Second Edition. New York, J. Wiley and Sons, Ltd.; London, Chapman and Hall, Ltd., 1916. Price 27s. 6d. net.

The first edition (1906) of this excellent work—which, however, is but a slightly improved issue, in English, of the second edition (1905) of Moeller's "*Mikroskopie der Nahrungs- und Genussmittel*"—was reviewed in the *ANALYST* (1907, **32**, 138).

This second edition (1915) is little more than a reprint of the first edition, and those who possess Moeller's work or Winton's first edition will hardly need to provide themselves with this.

There are exactly the same number of pages in the two editions—viz., 701. The Table of Contents, Glossary, and Index are exact reprints of those in the First Edition, and the General Bibliography so closely follows the earlier one that no additions to it have been made, though there is mention of some in the text of the work, and all that has been done is to substitute the date of a later for an earlier edition. That there are only five references in the General Bibliography to any work issued since 1906 would seem to indicate that finality had been reached in this subject.

As one puts the two editions side by side, page after page is ruled off without coming to any alteration, and when such does occur, by substitution of one diagram for another, or by the interpolation of new matter, there is seen the anxiety to catch up and get the old similarity of page-numbering and page-material restored.

The failure to have observed, or unwillingness to recognise, any work done subsequently to 1906, and to bring the present edition up to date, is shown by the occurrence in identical terms in the two editions of the footnote on p. 62: "Recently Brahms and Buckwald have found that the name aleurone cells is . . . erroneous." What was recent in 1906 would hardly be so in 1916.

Beyond the possible call for a re-issue of the work, and which one can well understand and appreciate—for the book is a really good and valuable one—the main idea of the second edition has been to give prominence to the work of the author's collaborateuse, Kate Barber Winton, and of Miss Kate G. Barber, whom, from the similarity of the diagrams in the two editions, one takes to be the lady who assisted in the preparation of the first edition.

Thus, there are now 635 illustrations as against 589 in 1906, 68 new ones—all but one being by one or other of the above-named ladies—being introduced, while 22 (mostly Moeller's) have been dropped, and sometimes not to advantage. The new matter is stated in the preface to consist of "additions to the sections on wheat and flour; a complete revision of such parts of the chapter on oil seeds as treat on mustards, rapes, cruciferous weed seeds, and linseed; a description of the histology of alfalfa, with distinctions from red and Alsike clover; a revision of the sections on pomes and drupes, with practical hints on the examination of almond pastes, jams, preserves, and other products; and rewritten descriptions of the cucurbitaceous fruits used as food and adulterants." An examination of these new features will lead to the conclusion that the revisions are not important nor extensive, nor are the additions material. In short, little or nothing has been done to supplement the information given in the first edition or to remedy defects in it.

When it is noticed that the subjects of mustards, rapes, etc., and of alfalfa, as well as of fruits generally, are those with which the additional illustrations supplied by K. B. Winton are associated, and that K. G. Barber has made all the illustrations of cucurbitaceous fruits, it will be seen that the new matter of this edition is concerned practically with the work of these ladies.

To take the new features in detail. Under Wheat and Flour come—on p. 50 an expansion of the description of the Pekar colour test, and on p. 55 a similar one of Banichl's test; two new cuts on p. 66, a slight alteration of the descriptive text on p. 67, the replacing of one of Moeller's illustrations by a K. B. W., and the dropping out of another illustration (p. 68 in first edition) by Moeller, which, to the reviewer's mind, gives to the analyst accustomed to deal practically with these matters a better idea than all the other illustrations, of what he is likely to come across in the actual examination of samples he has to identify. These are all the changes in this section.

Under Oil Seeds there are—a slight change in the analytical key to cruciferous seeds; three additions to the Bibliography (none of them noted in the Index); 10 illustrations by K. B. Winton of white, black, and brown mustard, and rape, in place of 6 of Moeller's, all of which have been dropped. Moeller suffers similar replacement in the case of false flax, but there are 4 new illustrations by K. B. Winton of shepherd's purse and pepper grass. Under Linseed there are 5 new

K. B. W. illustrations, Moeller's 2 being now omitted, and an addition of 10 lines is made to the histological description of the plant.

Under Legumes, alfalfa now has 3 pages devoted to it in place of 20 lines, the extra space being occupied mainly by 8 new illustrations, all by K. B. Winton.

Coming next to Fruits, there are 12 new illustrations by K. B. Winton, and the additions to the text do not occupy over a dozen lines.

In the section devoted to Vegetables, Miss Kate G. Barber has her turn, coming out strongly with 14 new illustrations of pumpkin, squash, cucumber, and melon, 2 of Moeller's having to make room for them. After the description of water-melon—which ends at p. 410 in each edition—the pages to the very end (p. 670) are exact duplicates throughout.

It is a pity that the opportunity was not taken to amplify in some cases the information given concerning the occurrence and use of the materials described, and to revise the somewhat loose statements met with here and there. If more is dealt with than the actual description and the microscopical characteristics, such additional information should be fairly complete and also correct. This is not always the case here—*e.g.*, it is merely said of linseed cake that it is “often contaminated with cruciferous and other seeds” (p. 206), and that it is “the mucilaginous substance found in linseed that gives the seed its value in medicine” (p. 204); alfalfa (p. 266) is spoken of as being grown especially in the arid and semi-arid regions of the United States, but there is no mention of the Argentine or other parts where it is extensively cultivated; to Carob bean (p. 277) the alternative and better-known name “locust bean” is not given, nor to pea-nut (p. 269) those of “earth-nut” and “ground-nut”; to Soya bean (pp. 248-9), because of its now largely increased use, more space might have well been given, and there is no mention of its being made into a feeding cake or of its other uses in the manufactures.

Here and there, and especially in the section relating to condimental foods, paragraphs bearing on “chemical examination” have been inserted, but these are of such a general nature as to be practically useless. Either this should be set out adequately or it should be omitted altogether, and reference be made to special books where it can be found.

It is to be regretted that the author, while giving such prominence to vegetables such as cucumber, melon, etc., has not seen his way to deal more fully with the distinctions that occur between seeds, etc., that may occur together and be readily mistaken one for the other—*e.g.*, cotton seed and kapok (silk-cotton) seed. The work would be made much more useful to the practitioner if it contained more information of this kind. It is comparatively seldom that the analyst has single materials only to recognise, but he has more frequently to identify different ones in the presence one of another, and a setting-out of the main characteristics as they present themselves in actual practice would be a great help to him. Thus, while it may be comparatively easy, by the aid of such illustrations as this book supplies, to recognise single substances, the occurrence of several together requires special experience to enable one to identify them, and it is to be feared that this work, valuable though it is, will give only modified help. Materials as they occur in actual practice, as, for example, in the case of an adulterated linseed cake, a compound feeding cake, or a food containing castor bean or other poisonous seed, do not present the clear

appearances set out in the illustrations given, and the analyst looks in vain for a setting-out of those characteristic features presented by each material or seed on which his experience tells him he must mainly rely. There is still a field open for a work which will supply this practical guidance.

J. A. VOELCKER.

TECHNICAL CHEMIST'S HANDBOOK: TABLES AND METHODS OF ANALYSIS FOR MANUFACTURERS OF INORGANIC CHEMICAL PRODUCTS. By GEORGE LUNGE, PH.D. Second edition, revised. London: Gurney and Jackson, 1916. Price 10s. 6d. net.

The author's intention in writing this text-book has been to assist as far as possible in securing uniformity not only amongst practical chemists and analysts, but also amongst buyers and sellers, in regard to numerical data and analytical methods employed in checking processes and testing the resulting products.

As in the previous edition, one good analytical method only is given in each case, one process for the preparation of standard solutions, and also one for the examination of each of the materials used in the particular industry concerned. This, as Dr. Lunge points out, tends to avoid discrepancies such as might arise should two or more methods be described.

In the present edition numerous small changes occur in the numerical data given, due to the recalculation of the latter on the basis of the atomic weights published by the International Committee for 1916. The first few tables include percentage compositions of the majority of chemical compounds in general use, factors for calculating gravimetric analyses, densities of gases and vapours, solubilities of salts and gases in water, specific gravities of solids and liquids, melting and boiling points. These are followed by gas analysis tables, properties of liquefied gases of commercial importance, mathematical tables, and also factors for the conversion of weights, measures, and coinage of different countries.

A very useful chapter devoted to fuel and furnaces gives also concise methods for testing the gases evolved, and tables to facilitate the work of the analyst. The manufacture of sulphuric acid, the examination of the materials employed and by-products obtained, are briefly described, the necessary calculation tables being appended. Some fifty pages in all are allotted to this important industry.

Bleaching powder, chlorate of potash, soda ash, and nitric acid, their manufacture and commercial examination, are all dealt with in turn, and the descriptions, though brief, are clearly given, and should suffice for the trained chemist, for whom the book is primarily intended.

In the final sections the cement industry and the production of coal-gas are discussed in a similar way, and some useful notes provided on the preparation of standard solutions and on methods of sampling.

The little book is compiled with skill and discretion, and in addition possesses the advantage of being handy in form, going conveniently into the pocket. Great care has evidently been taken in revising the proofs, a matter that in a work of this nature, filled as it is with numerical data, is all-important. There is little doubt that the need for tables of this kind is experienced by every analyst and technical chemist, whatever branch of work he may be engaged in, and hence Dr. Lunge's Handbook should find a welcome place in every laboratory.

P. A. ELLIS RICHARDS.