

The table given below shows the results of the assays made on tablets that can be purchased on the open market. These assays, of course, show quite a variation on account of the variations of manufacturing technique.

Table II.—Results of Assays for Theobromine on Manufactured Tablets Purchasable on the Open Market

Tablet Mixtures	Assays for Theobromine	
<i>No. 1</i>		
Theobromine salicylate	68.74%	99.71
Calcium salicylate	11.46%	99.69
Phenobarbital	2.86%	99.20
Tablet excipients	16.94%	99.85
		98.62
		99.13
<i>No. 2</i>		
Theobromine with calcium salicylate	85.20%	99.55
Phenobarbital	2.84%	100.49
Tablet excipients	11.96%	100.83
<i>No. 3</i>		
Theobromine	69.66%	100.44
Phenobarbital	3.48%	99.83
Tablet excipients	26.86%	100.42
		99.78

*Discussion of Results.*—It is obvious that phenobarbital and other nitrogenous, non-alkaloidal substances have practically no effect upon this gravimetric precipitation. Iodides cause a marked interference. The method is applicable to mixtures containing theobromine alkaloid, theobromine salicylate, theobromine with sodium salicylate and theobromine calcium salicylate.

It was noticed that mixtures containing the free alkaloid had a tendency to form finer precipitates. The effect of this tendency may be overcome somewhat by longer digestion and by the use of sintered glass crucibles in place of Gooch crucibles with asbestos mats.

The precipitate on the filter in one determination was dried and weighed, then washed with cold *N/10*,  $H_2SO_4$  a few cubic centimeters at a time until 100 cc. had been passed through, then re-weighed after drying to constant weight again. By this proced-

ure, which resembles the usual washing technique, it was found that approximately 5 mg. of the precipitate on the filter were dissolved. The precipitates usually weigh approximately 1.2400 Gm. Therefore, the loss in weight from careful washing is quite low.

It is to be remembered that phosphatododecatungstic acid is an alkaloidal precipitant, and that if other alkaloids are present in the tablet mixtures they will be precipitated along with the theobromine.

#### SUMMARY

1. A method is proposed for the assay of theobromine and its salts in tablet mixtures.
2. The method is rapid and reasonably accurate.
3. The assay is satisfactory even though theobromine may be present with other nitrogenous substances such as the barbiturates.
4. The common tablet diluents, excipients and lubricants do not interfere with the assays.
5. Tablet mixtures containing iodides cannot be assayed satisfactorily by this method.

#### REFERENCES

- (1) Deal, E. C., 56th A. O. A. C. Convention Paper No. 113 (1940).
- (2) Emery, W. O., and Spencer, G. C., *Ind. Eng. Chem.*, 10 (1918), 605.
- (3) "A. O. A. C. Methods of Analysis" (1940), page 593.
- (4) Mellor, J. W., "A Comprehensive Treatise of Inorganic Theoretical Chemistry," 11 (1931), page 862.
- (5) "Allen's Commercial Organic Analysis," 6 (1912), page 593.
- (6) Heiduschka, A., and Wolf, L., *Schweiz. Apoth.-Ztg.*, 58 (1920), 213-218, 229-233.

## Book Reviews

*Food Analysis*, by A. G. WOODMAN, Associate Professor of Analytical Chemistry, Emeritus, Massachusetts Institute of Technology. 4th Edition. 607 pages. 1941. McGraw-Hill Book Company, Inc. Price \$4.00

The scope of the book remains the same as that of the third edition. The new edition has been enlarged by 50 pages. The first three chapters are devoted to the consideration of general methods; the microscopical examination of foods; and food colors and preservatives. The remaining eight chapters con-

sider the methods of analysis and the interpretation of the analytical results obtained for milk, cream and ice cream; edible oils and fats; carbohydrate foods; cocoa and chocolate; spices; cider vinegar; flavoring extracts; and alcoholic foods.

Since no new chapters were added the slight enlargement is distributed throughout the contents. Fourteen pages were added to the chapter on alcoholic foods, the section on whiskey undergoing the major change. Other additions include a discussion of photometers; a brief section on ice cream; a re-

vision of the methods for sugar determinations on cocoa and chocolate; a method for the determination of volatile oil in spices by direct measurement; and a method for the determination of the oxidation value of vinegars to aid in distinguishing between distilled vinegar and "artificial vinegar." The section on "permitted dyes" has been brought up to date and the names adopted in the regulations of the Food, Drug, and Cosmetic Act have been added. Less important methods have been deleted.

The author has again given the references to many of the methods of analysis suggested, and also a list of selected references at the close of each chapter.

The book is written "chiefly for students and beginners" and is well adapted for instructional and laboratory use. Its use as a reference also adds value to this book.—CHARLES W. BLIVEN

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*The Chemistry of Organic Medicinal Products*, by GLENN L. JENKINS, Dean and Professor of Pharmaceutical Chemistry, Purdue University, and WALTER H. HARTUNG, Professor of Pharmaceutical Chemistry, University of Maryland. xii + 457 pp., 78 figs., 16.5 x 24 cm. 1941. John S. Swift Co., Inc., 2100 Locust St., St. Louis, Missouri. Price, \$3.80.

There has been a need for an introductory volume that presents a systematic classification and a survey of the compounds in common use as medicinals. Therefore, this volume will prove most interesting and valuable to anyone interested in medicinal chemistry.

The text is divided into fifteen chapters, fourteen of which present the most important of the synthetic and natural drug products according to accepted chemical classification. The last chapter deals with stereoisomerism including asymmetric synthesis and physiological activity of the optical isomerides. The bibliography throughout is quite representative and good for a volume of such broad scope. A number of useful tables of miscellaneous character (physical properties, chemical classes of compounds, etc.) are included. The volume in general is readable and quite ably written. Although the text is written for students having basic training in chemistry, a good deal of space is devoted to nomenclature, preparation and general properties of each of the chemical classes of compounds discussed. Perhaps some of this space might have been used to better advantage for developing some of the more important topics (phosphoric acid esters, sulfonamide drugs, proteins, etc.) that are treated briefly.

As may be expected in a first edition, there is a comparatively large number of errors. However, considering the number of structural formulas and the general nature of the contents, the percentage of errors is not excessive. Several of the chemical formulas are incorrect, for example: santonin, page 210; acetarsonne, page 326; pyridium, page 257; scarlet red dyes, page 256; the tetranucleotide, page

194; and cholesterol, page 447. The structures for certain other substances are written in a manner no longer accepted, for example: the acridine dyes, pages 373–375; ring structure for betaines, pages 358, 398; quaternary nitrogen compounds and nitro compounds are shown with 5 covalent bonds for nitrogen. In addition, quite a number of typographical errors appear, which likely accounts for the erroneous chemical names assigned to: cacodylic acid, page 322; arspenamine, pages 327–328; scarlet red sulfonate, page 256, etc.

A number of compounds of biological and pharmacological importance do not lend themselves well to a rigid chemical classification, *e. g.*, cozymase, thiamine, azochloramide, etc. A classification on a basis of general pharmacologic properties and use would appear to offer a distinct advantage in such cases.

It is hoped that in subsequent editions a more complete index will be provided. Fluorescein, for example, appears in the index only under the name of soluble fluorescein; synthalin, although mentioned under guanidine derivatives, and nylon, which is also mentioned in the text, do not appear in the index.—T. C. DANIELS

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*Materia Medica and Pharmacology, an Introductory Text*, by CLAYTON S. SMITH, Ph.D., M.D., and HELEN L. WIKOFF, M.S., Ph.D. College Book Company, Columbus, Ohio, 1941.

This text is of the most elementary nature, written principally for classes in nursing. It employs mimeograph style printing, contains no tables, charts or illustrations, and lacks running page chapter headings.

The *Materia Medica* and *Pharmacology* are considered simultaneously, an approach which does not permit coordinated presentation of either one. The introduction contains brief discussions of definitions, official pharmaceutical preparations, dosage, administration of drugs and prescription writing. Part I consists of drugs acting before absorption, Part II drugs acting after absorption and Part III contains a discussion of arithmetic, percentage solutions and calculation of dosage. An appendix discusses sulfonamide drugs.

Parts I and II are organized by chapter headings with no further classifications of the drugs according to their pharmacological action. Symptoms of drug action, rather than basic pharmacological action, is the principal topic. The text is essentially accurate, but its superficial nature, with omission of any consideration of the fate of drugs, the autonomic nervous system as a unit, or the theory of chemical mediation, and the brevity of discussions on general principles of pharmacology such as synergism, antagonism and types of drug action, impose a tremendous limitation upon its usefulness. While it may be satisfactory for its intended use, it would be of little value for classes with even a minimum scientific background.—LLOYD W. HAZLETON