Affectionately Dedicated to the Memory of
Charles Pomeroy Worcester,
Former Analyst of the Massachusetts State Board of Health,
Whose lovable personality and sterling integrity were
A constant inspiration during many years
Of close companionship to
The Author.
PREFACE TO FOURTH EDITION.

The present revision has been carried out after a thorough search of the literature. A large amount of new material has been added or substituted for that in previous editions and the size of the book increased by 90 pages. While a somewhat different arrangement of the chapters may seem more logical, it was decided to retain the old order to which those who have hitherto used the book have become accustomed. The lists of references at the end of the chapters, which never aspired to be complete bibliographies, have been dropped and more attention has been given to footnote references.

The reviser is indebted for criticisms and notes to many friends, especially the following: Prof. E. J. Farrington, Prof. E. S. Guthrie, and Dr. L. L. Van Slyke (dairy products), Prof. H. S. Grindley (meat), Mr. F. C. Atkinson, Mr. Carl S. Miner, and Prof. Harry Snyder (cereal products), Mr. M. C. Albrech, Mr. F. M. Boyles, and Mr. A. E. Paul (spices), Mr. H. S. Bailey, Prof. E. F. Ladd, and Dr. David Wesson (oils), Dr. C. S. Browne, Mr. A. Hugh Bryan, Dr. W. D. Horne, and Mr. W. E. Rice (sugar), Mr. H. M. Loomis and Mr. W. E. Mathewson (colors), and Dr. A. R. Albright (flavoring extracts).

A special feature is a final chapter by Prof. Gerald L. Wendt, on the determination of acidity by the hydrogen electrode, a method which seems destined to play an important part in food analysis.

So far as possible original papers have been consulted, but whenever this was not possible owing to the war or other conditions the abstracts in the Experiment Station Record and Chemical Abstracts have proved invaluable.

A. L. W.

PREFACE TO FIRST EDITION.

In the preparation of the present work, the requirements of the public analyst are mainly kept in view, as well as of such officials as naturally cooperate with him in carrying out the provisions of the laws dealing with the suppression of food adulteration in states and municipalities. To this end special prominence is given to the nature and extent of adulteration in the various foods, to methods of analysis for the detection of adulterants, and to some extent also to the machinery of inspection.

While the analyst may not in all cases have directly to deal with the minutiae of food inspection, his work is so closely allied therewith that this branch of the subject is of vital interest and importance to him. Indeed, in many smaller cities one official often has charge of the entire work, combining the duties of both inspector and analyst.

Endeavor has been made, furthermore, to deal with the general composition of foods, and to give such analytical processes as are likely to be needed by the sanitary chemist, or by the student who wishes to determine the proximate components of food materials.

It has been thought best to include brief synopses of processes of manufacture or preparation of certain foods and food materials, in cases where impurities might be suggested incidental to their preparation.

In view of the fact that Massachusetts was the pioneer state to adopt, over twenty years ago, a practical system of food and drug inspection, and for many years was the only state to enjoy such a system, no apology is perhaps needed for more frequent mention of Massachusetts methods and customs than those of many other states, in which the food laws are now being enforced with equal zeal and efficiency.

Considerable attention has been paid in the following pages to the use of the microscope in food analysis. Of the figures in the text illus-
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trating the microscopical structure of powdered tea, coffee, cocoa, and the spices, fifteen have been reproduced from the admirable drawings of Dr. Josef Moeller, of the University of Graz, Austria. Acknowledgment is gratefully given Dr. Moeller for his kind consent to their use.

The photomicrographs in half-tone, forming the set of plates at the end of the volume, were all made in the author’s laboratory, and may be divided into three classes: 1st, illustrations of powdered pure foods and food products, as well as of powdered adulterants; 2d, types of adulterated foods, chosen from samples collected from time to time in the routine course of inspection; and 3d, photographs of permanently mounted sections of foods and adulterants.

While recent works covering the whole field of general food analysis are comparatively few, the number of treatises, monographs, government bulletins, and articles scattered through the journals, dealing with special subjects relative to food and its inspection, is surprisingly large, and from a painstaking review of these much information has been culled, for which it has been the author’s intention at all times to give credit.

Special mention should here be made of the valuable publications of the U. S. Department of Agriculture, both the bulletins issued from Washington, and those from the various experiment stations, an ever-increasing number of which are becoming engaged in human food work. The author has freely drawn from these sources, and especially from the data and material furnished by his coworkers in the recent and still pending labor of preparing food methods for the Association of Official Agricultural Chemists, and he wishes to extend his thanks to all of them for their assistance. Appreciation is also expressed for the care and discrimination shown by Mr. L. L. Poates in the preparation of the cuts. Thanks are especially due to Mr. Hermann C. Lythgoe, Assistant Analyst of the Massachusetts State Board of Health, for his invaluable cooperation, and to Dr. Thomas M. Drown for helpful hints and suggestions.

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