



**introduction to**

**FOODS**

**and**

**NUTRITION**

**STEVENSON**

**MILLER**



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FOODS  
**and**  
NUTRITION



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. . . . . To Pearl P. Swanson  
and  
Belle Lowe

This textbook was written for a one-semester introductory course at the college level. The subject matter of nutrition has been combined with that of food preparation and meal management for the purpose of applying nutritional facts realistically. When the book is considered as a whole, approximately equivalent content is assigned to each of these phases. We assume that the students generally will not have had college science courses, and special care has been taken to use common terms, to explain certain technical terms as they appear, and to include a glossary of terms.

We recognize that both nutrition concepts and the techniques of food preparation are in a state of change. Subjects that are in the developmental stages have not been avoided; each one has been considered in the light of existing information, and the information given is based upon generalizations derived from research. Wherever more than one point of view has been accepted, the merits of each have been discussed and the reader allowed to make his own decision.

The material is organized so that at first (in Chapter 1) a very brief basic background is laid in the overall area of nutritional needs so that the nutrients then can be considered as identities in the selection and preparation of foods containing them. Emphasis is placed upon the importance of fulfilling psychological as well as physiological needs in the selection of foods for the daily diet.

Chapter 2 presents a basic background in the “hows and whys” of food preparation techniques. Included are the chemical-physical properties of food constituents and nutrients and their reactions to air, water, heat, acid, and alkali, as encountered in the total period elapsing from food source to food intake.

The ensuing eight chapters—Chapters 3 to 10—are concerned with the specific food categories of Meats, Eggs, Milk, Cereals, Fats, Fruits and Vegetables, Carbohydrates, and Food Adjuncts. With the exception of Eggs, these follow the four food groupings of the Daily Food Guide of the U. S. Department of Agriculture plus the groups termed “other foods.” It seemed logical to isolate eggs from the group in which they are given in the Daily Food Guide, the Meat Group, because of the length of the meat chapter, the versatility of eggs in food preparation, and the differences in the selection and storage of meat and eggs.

A given pattern of subject-matter information is followed in each of the chapters dealing with specific food groups. Each chapter contains more details concerning the role of that group of foods as sources of nutrients than was given in the background chapter. The consideration of nutritional significance is followed by information on the purchase and care of that particular type of food and the preparation procedures necessary to attain desired palatability characteristics with a minimum loss of the nutrients for which the food group is especially stressed.

No doubt some instructors will feel that there is insufficient material given in these chapters about the metabolism of nutrients provided by the specific group of foods. This is not an oversight but a result of considerable deliberation. Certainly eggs and milk will be considered as important as meat in protein metabolism. To offset repetition and permit the individual instructors to proceed with the metabolism of specific nutrients at the desired phase and pace, most of the presentation of metabolism of specific nutrients has been concentrated in a reference chapter, Chapter 13, and frequent references specified in the food chapters. This arrangement of subject matter also permits, if so desired, the study of the metabolism of specific nutrients in the reference chapter before the various foods are considered in any order that seems best for the individual situation.

The amount of food preparation technique to be included was recognized as differing widely from chapter to chapter. An attempt has been made to simplify technique as much as possible, to avoid cookbook dogmatism, to encourage variations in recipes in accordance with the scientific principles involved, and yet to provide basic



formulas suitable for laboratory work if this is desired. It is our belief that the dogmatism of recipes inhibits the development of applied science and thus limits the student in his ability to transfer knowledge and to develop judgments.

Chapter 12 deals with an aspect of our foods too frequently overlooked, the agencies and individuals behind the scenes who work unobtrusively so that the consumer will have wide choices among safe, palatable food items at reasonable cost and with consistent standards of quality. The title of this chapter is *The Guardians of Our Food*.

We assumed that some instructors might prefer to teach the course in a different order from that given even though they may cover the same material in a given period of time. Those who wish to conduct laboratories on a meal-planning basis are referred to Chapter 11, *Marketing and Meal Management*, early in the course. The subject matter has been arranged so that the chapters may be studied in any desired sequence. The order given is only one that seemed to the authors, through their years of experience in teaching an integrated course, to be well-adapted to the teaching of students who have had no formal subject-matter background. It was anticipated that generally the parts of a meal would be studied by specific food groups before they were worked into the integrated activity of a whole meal. From the nutritional standpoint, the arrangement of subject matter begins with an explanation of the need for food followed by discussions of the preparation of food into menu plans, the serving of meals, and the ultimate physiological functions of the nutrients contained in the foods consumed.

The international aspects of foods and nutrition are interspersed throughout the text. Many cultures are represented in the United States today, and it is emphasized that food choices and preparation within each food group can be individualized to meet the tastes of any group. Because eating patterns that will provide an adequate diet are limitless, the intake of a variety of nutrients in each of the meals in any established routine is urged, rather than a set eating pattern for everyone.

Interspersed throughout most of the chapters is a consideration of the choices available to the consumer in the purchase of services along with the food. The so-called convenience items that are available in all lines of foods are considered in the chapter where the particular food is discussed, and, in most cases, information for the evaluation of these items has been given.

No documentation of subject matter was attempted, but references are given to substantiate factual information and to strengthen the

student's self-confidence and widen his food horizons. Therefore we hope that the material given will enable the student to evaluate new developments as they occur and to arrive at sound decisions concerning them.

As many students enter college with some knowledge and skills in food-preparation techniques, it is recommended that pretests be given to determine what procedure would be best suited to the class before the order of subject-matter presentation is planned. If the course is to be a one-year course, additional references and readings can be assigned and laboratory experiences in all phases of foods and nutrition can be enlarged.

*November 1959*

GLADYS T. STEVENSON  
CORA MILLER

## INTRODUCTION

The possibility of travel into outer space has progressed beyond the dreaming stage. One stumbling block yet to be completely overcome is a suitable food supply. Because man is a product of his environment, the constant need for oxygen, water, and food might appear to be an obstacle to space flights. Living in the atmosphere surrounding the earth, one hardly is conscious of the need for oxygen. Also, within easy reach of abundant water, one can hardly believe that an adult requires about 2 pounds of water daily for internal needs and often takes in twice that amount. In comparison with the need for water, one's total need for foodstuffs—proteins, carbohydrates, fats, minerals, and vitamins—is relatively small in weight. Although more than forty food nutrients are known to be required by man, their combined weights to fill one's daily needs is only approximately one-half pound.

If these weights are minimum needs and if, as the National Science Advisory Board states, 10 pounds of equipment are required to launch each pound of material into space, approximately a ton of additional equipment would be required to permit one 150-pound man a ten-day shaveless, bathless trip into space.

This book may seem to have little or no connection with travel in space, yet the study of the requirements for such a venture has brought many new food and nutrition concepts into our everyday life. Because of man's desire to conquer outer space, he has pushed ahead on new methods of food preservation as well as on a more exact study of body nutrient requirements. An understanding of these new food concepts and the science of nutrition must have a beginning; therefore, it is the purpose of this book:

- (1) To communicate and interpret some of the vast stores of knowledge that have been accumulated regarding the function of food in the human body.
- (2) To translate body needs for nutrients into terms of food available in retail markets of the United States.
- (3) To demonstrate that foods are generally priced according to factors other than their nutritive value.

(4) To present some of the developments in food technology that have contributed toward the improvement of the safety of food products, their prolonged storage life, convenience of their use, and their cost.

(5) To simplify the hows and whys of present food preparation techniques in order that individual tastes and preferences may be stimulated and fulfilled.

(6) To acquaint the student with the mores of food presentation in the present-day society in anticipation of contributing toward putting him at ease either as a host or as a guest and member of a family or group.

(7) To create or awaken an awareness of each individual's rights and responsibilities as a citizen of one of the leading countries of the world toward maintaining a safe and reasonably large supply of food for the expanding population of the world.

Toward these ends, the first chapter of this book discusses briefly the nutrients known to be required by man, the functions of these nutrients in the body and their dependence upon one another, the amounts of the various nutrients that are required, and how these amounts may be obtained by combining items chosen from each of several well-defined groups of foods into a daily diet. These chapters are followed by a resumé of scientific facts applicable in various food-preparation procedures. The chapters concerned with specific foods give their roles in the dietary patterns, the factors affecting the choices and cost of the food items, developments in food technology responsible for the wide choices among items, the hows and whys of preparation techniques, and the care and storage of the different foods. The psychological and sociological values of food are dealt with as a whole in the chapters pertaining to the presentation of foods. This subject includes the method of preparation, table-setting and table service acceptable to social practices, and other aspects of meal management. The chapter relating to consumer protection is concerned only with the machinery necessary in an organized complex society to assure a safe and adequate food supply, which makes possible the wide choices among food items which the people of this country enjoy today. Finally a reference chapter is appended to assist in a more complete understanding of the science of nutrition than is possible in the introductory chapters.

. . . . . CONTENTS

	<b>Introduction</b>	<b>xiii</b>
<b>Chapter 1</b>	<b>Nutrients Are Provided by Foods</b>	<b>1</b>
<b>2</b>	<b>Food Preparation Is a Science and an Art</b>	<b>27</b>
<b>3</b>	<b>Meat, the Focal Point in the Menu Plan</b>	<b>51</b>
<b>4</b>	<b>Eggs at Any Meal</b>	<b>111</b>
<b>5</b>	<b>Milk for All Ages</b>	<b>149</b>
<b>6</b>	<b>Bread, the Staff of Life</b>	<b>189</b>
<b>7</b>	<b>Fats in Moderation for Nutriment and Palatability</b>	<b>245</b>
<b>8</b>	<b>Fruits and Vegetables for Vitamins and Variety</b>	<b>285</b>
<b>9</b>	<b>Carbohydrates Add Pleasure to Meal Preparation</b>	<b>333</b>
<b>10</b>	<b>Food Adjuncts Provide Zest for Many Meals</b>	<b>361</b>
<b>11</b>	<b>Marketing and Meal Management</b>	<b>385</b>
<b>12</b>	<b>Consumer Protection</b>	<b>433</b>
<b>13</b>	<b>The Function of the Nutrients in the Body</b>	<b>453</b>
<b>Appendix A</b>	<b>Master Mixes That Can Be Compounded from Premeasured Ingredients</b>	<b>481</b>
<b>B</b>	<b>Glossary of Terms</b>	<b>485</b>
<b>C</b>	<b>Common Abbreviations</b>	<b>491</b>
<b>D</b>	<b>Suggestions for Measuring Foods</b>	<b>492</b>
<b>E</b>	<b>Approximate Boiling Temperatures of Water at Various Altitudes</b>	<b>495</b>
	<b>Index</b>	<b>497</b>

**CHAPTER 1**



# CHAPTER

# 1

# NUTRIENTS ARE

# PROVIDED BY FOODS

INTRODUCTION

BODY NEED FOR OXYGEN

BODY NEED FOR WATER

BODY NEED FOR FOOD

**Specific Functions of Nutrients**

**Recommended Daily Dietary Allowances**

**Nutritive Values of Foods**

**Food Guides**

Meat, Eggs, Legumes, and Nuts

Milk

Bread and Cereal

Fruit and Vegetable

Other Foods

Application to Various Situations

**Transfer of Nutrients from Food to Body**

Digestion

Absorption

Interrelationships of Nutrients

SUMMARY

READING LIST

◀ **Fig. 1.** Well-nourished individuals are alert, and have good posture, smooth skin, and lustrous hair. (Courtesy of Sunkist Growers, Los Angeles.)



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ONTRARY TO PUBLIC OPINION, MALNOURISHMENT AS IT EXISTS IN THE United States today is not the result of an inferior or low food supply but rather the result of economic status, ignorance, or self-imposed inadequate diets. It is difficult to comprehend that in spite of surplus food supplies, malnutrition exists at all levels of income. The low income group may feel that they do not have enough money to buy the “right foods” and the upper income groups may buy the food their appetites demand. Inadequate diets may result from misinterpretation of current research and misinformation regarding food values. This coupled with a desire to be lean, glamorous, and have a long life makes fashionable sensational diets that may be inadequate and in reality hasten the onset of old age and shorten the life span.

The total of the foods eaten is referred to as the diet, and the fate or path of the food in the body after it is digested and absorbed is termed nutrition. The component parts of the food that are essential to our existence are commonly known as nutrients. If a variety of foods that will furnish all of the nutrients required by the body are eaten, and eaten in amounts necessary for maintenance, growth, and energy needs, it is said that one has an adequate diet. On the other hand if any nutrients are omitted or are in short supply a state of malnutrition will exist in the body.

Only through a variety of foods can one achieve in a practical manner a diet that supplies all the parts of the body with all the nutrients for all the complicated functions that must be carried out throughout life (see Fig. 1).

The dramatic cases of scurvy, pellagra, beriberi, marasmus, kwashi-orkor, and other nutritional diseases plaguing peoples of many countries are few or entirely lacking among the peoples of the United States. However, the vague aches and pains, listlessness, and easy fatigue common among the rank and file of our population may be the result of faulty diets. As Dr. Waterlow<sup>1</sup> so aptly states, “malnutrition is not an all-or-nothing effect but a matter of more-or-less.”

It should be a challenge to the individuals who are so ready to try new mechanical things evolving from a changing world, to try also the new food products developed by the food technologists and the scientists in the biological fields as well as new food patterns advised by

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<sup>1</sup> Waterlow, J. C. (Editor), 1955. *Protein Malnutrition*, Univ. Press, Cambridge—for The Food and Agriculture Organization, World Health Organization, Josiah Macy Jr. Foundation.