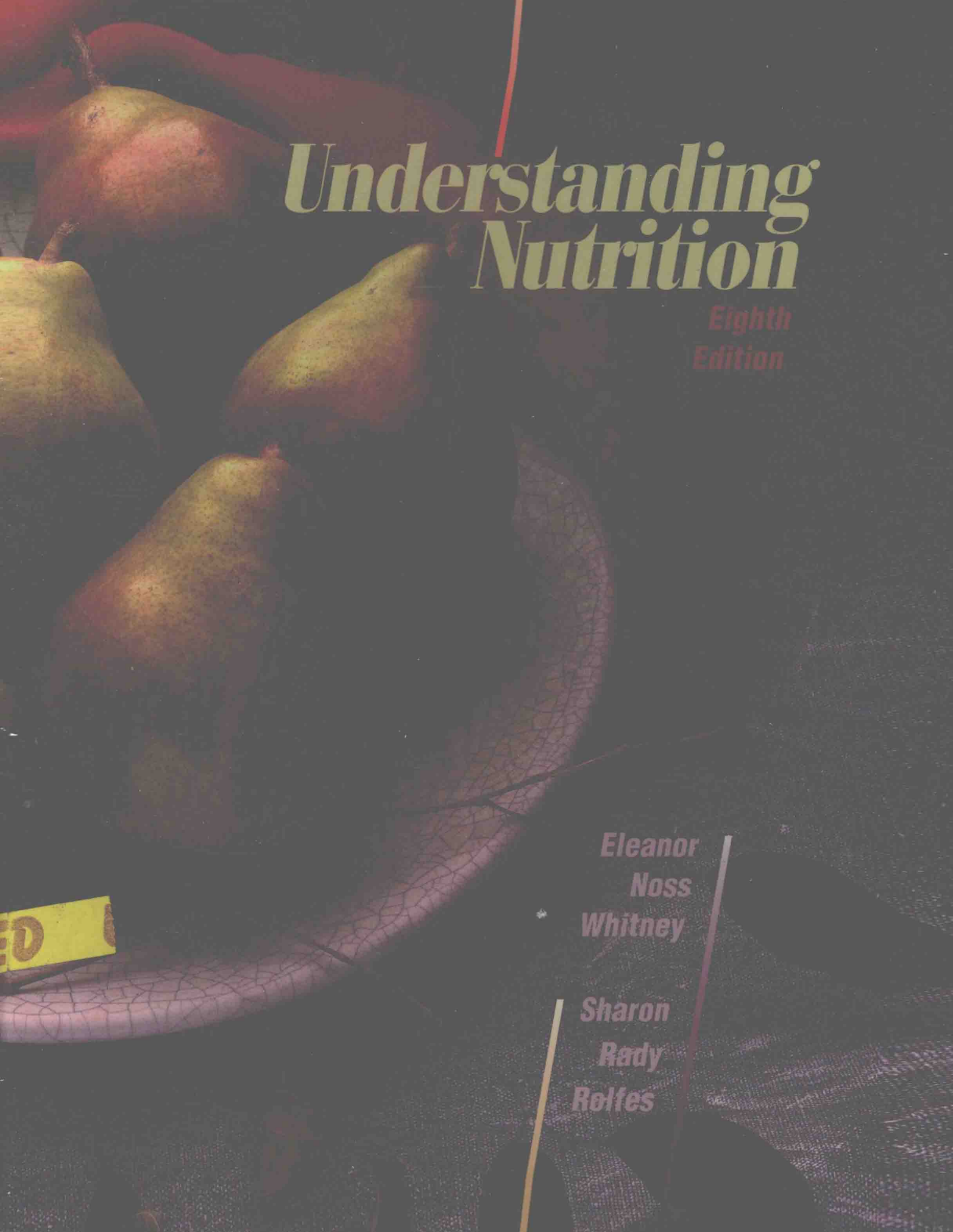
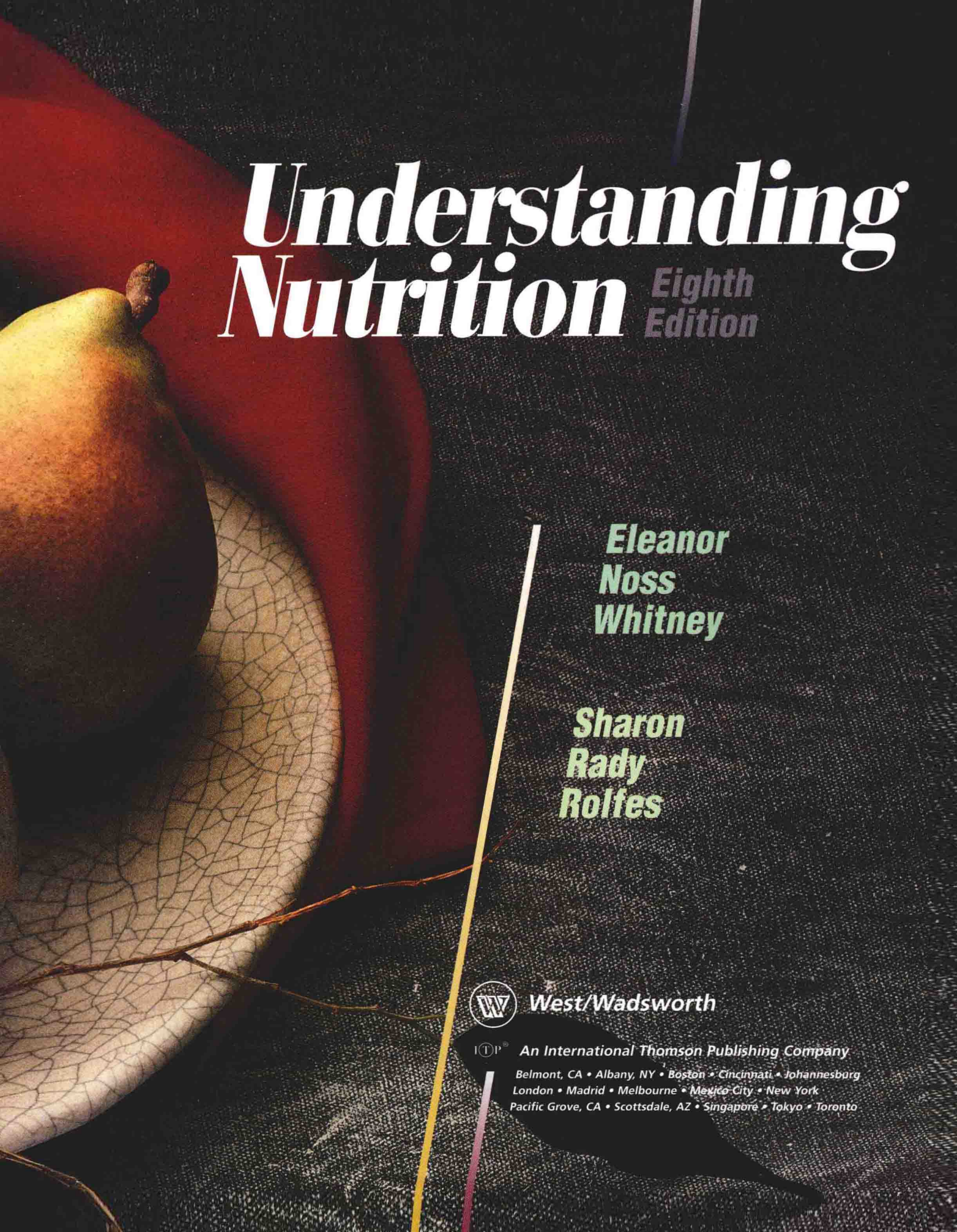


Understanding Nutrition

Eighth Edition

Eleanor Noss Whitney

Sharon Rady Rolfes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To

The memory
of my beloved
husband, my hero,
Jack Yaeger, Jr.

Ellie

To

My wonderful
husband, Tom, and
our delightful
children, Kristen,
Lyle, and Marni.

Sharon

About the Authors

Eleanor Noss Whitney, Ph.D., received her B.A. in biology from Radcliffe College in 1960 and her Ph.D. in biology from Washington University, St. Louis, in 1970. Formerly on the faculty at Florida State University, and a dietitian registered with the American Dietetic Association, she now devotes full time to research, writing, and consulting. Her earlier publications include articles in *Science, Genetics,* and other journals. Her textbooks include *Understanding Normal and Clinical Nutrition, Nutrition Concepts and Controversies, Life Span Nutrition: Conception through Life, Nutrition and Diet Therapy,* and *Essential Life Choices* for college students and *Making Life Choices* for high school students. Her most intense interests currently include energy conservation, solar energy uses, alternatively fueled vehicles, and ecosystem restoration.

Sharon Rady Rolfes, M.S., R.D., received her B.S. in psychology and criminology in 1974 and her M.S. in nutrition and food science in 1982 from Florida State University. She is a founding member of Nutrition and Health Associates, an information resource center that maintains an ongoing bibliographic database that tracks research in over 1000 nutrition-related topics. Her other publications include the textbooks *Understanding Normal and Clinical Nutrition, Understanding Clinical Nutrition, Life Span Nutrition: Conception through Life,* and *Nutrition for Health and Health Care* and a multimedia CD-ROM called *Nutrition Interactive.* In addition to writing, she also lectures at universities and at professional conferences and serves as a consultant for various educational projects. She maintains her registration as a dietician and is a member of the American Dietetic Association.

Preface

This eighth edition of *Understanding Nutrition* shares the same goals established over 20 years ago in writing the first edition: to provide a textbook that would both reveal the fascination of the science of nutrition and share the fun and excitement of nutrition with the reader. Readers want more than just facts—they want an understanding of how the scientific facts apply to their daily lives. While the goals for this edition remain unchanged, every chapter has been substantially revised to reflect the many changes that have occurred in the field of nutrition over the years.

To the person reading this text, it will be obvious that, like most sciences, nutrition possesses no absolute certainties. Nutrition scientists simply do not have all the answers yet; in some cases, we have not even asked all the questions yet. This is true in many areas of nutrition; it is a growing, young science dating only from around the turn of the twentieth century. One of the missions of this text, beginning in Chapter 1, is to show readers how researchers ascertain the "facts."

• ***The Chapters*** • This book presents the core information of an introductory nutrition course. Chapter 1 wastes no time in exploring why we eat the foods we do and continues with a brief overview of the nutrients, the science of nutrition, recommended nutrient intakes, assessment, and important relationships between diet and health. Chapter 2 describes the diet-planning principles and food guides used to create diets that support good health and includes instructions on how to read a food label. In Chapter 3, readers follow the journey of digestion and absorption as the body transforms foods into nutrients. Chapters 4 through 6 describe carbohydrates, fats, and proteins—their chemistry, health effects, roles in the body, and places in the diet. Then Chapter 7 shows how the body derives energy from these three nutrients. Chapters 8 and 9 continue the story with a look at energy balance, the factors associated with overweight and underweight, and the benefits and dangers of weight loss and weight gain. Chapters 10 through 13 complete the introductory lessons by describing the vitamins, the minerals, and water—their roles in the body, deficiency and toxicity symptoms, and sources.

The next seven chapters weave that basic information into practical applications, showing how nutrition influences people's lives. Chapter 14 describes how physical activity and nutrition work together to support health. Chapters 15, 16, and 17 present the special nutrient needs of people through the life cycle—pregnancy and lactation; infancy, childhood, and adolescence; and adulthood and the later years. Chapter 18 focuses on the dietary risk factors and recommendations associated with chronic diseases, and Chapter 19 addresses consumer concerns about the safety of the food supply. Chapter 20 closes the book with a look at hunger and global environmental problems and offers suggestions for establishing sustainable foodways.

• ***The Features*** • The chapters in this edition have been designed with special features to enhance learning. For example, definitions are provided whenever new terms are introduced. These definitions often include pronunciations and derivations to facilitate understanding. A glossary at the end of the text includes all defined terms.

New to this edition are notations of Web site addresses. These sites offer additional information and resources on the topic discussed in the accompanying text.

Many of the chapters include "How to" sections that guide readers through problem-solving tasks. For example, the "How to" in Chapter 1 shows readers how to calculate energy intake from the grams of carbohydrate, fat, and protein in a food; another "How to" in Chapter 13 describes how to calculate iron absorption from a meal.

Many chapters close with a "Making It Click" section. These sections reinforce the "How to" lesson and provide practice in doing nutrition-related calculations. The problems enable readers to apply their skills to hypothetical situations and then check their answers (found in Appendix K). Readers who successfully master these exercises will be well prepared for "real-life" nutrition-related problems.

Each major section within a chapter concludes with a summary paragraph that reviews the key concepts. Similarly, summary tables, figures, and margin lists cue readers to important reviews.

Also featured in this edition are the Healthy People 2000 nutrition-related priorities, which are presented whenever their subjects are discussed (Appendix G presents them in full). Healthy People 2000 is a report developed by the U.S. Department of Health and Human Services that establishes national objectives in health promotion and disease prevention for the year 2000.

Each chapter closes with study questions in essay and multiple-choice format. Study questions offer readers the opportunity to review the major concepts presented in the chapters in preparation for exams. The page numbers after each essay question refer readers to discussions that answer the question; multiple-choice answers appear in Appendix K.

• ***The Highlights*** • Every chapter is followed by a Highlight. Each Highlight provides readers with an in-depth look at a current, and often controversial, topic that relates to its companion chapter. New Highlights in this edition examine the use of the Internet in finding reliable nutrition information, the science and science fiction behind high-protein weight-loss diets, and the possible benefits and potential harms of alternative therapies.

• ***The Appendixes*** • The appendixes are valuable references for a number of purposes. Appendix A summarizes background information on the hormonal and nervous systems, complementing Appendixes B and C on basic chemistry, the chemical structures of nutrients, and major metabolic pathways. Appendix D assists readers with calculations and conversions. Appendix E provides detailed coverage on nutrition assessment, and Appendix F lists nutrition resources, including book and journal recommendations as well as addresses, phone numbers, and Websites. Appendix G presents the Recommended Dietary Allowances (1989 RDA), the nutrition-related priorities of Healthy People 2000, the United States Exchange System, and recommendations from the World Health Organization (WHO). Appendix H is a 2000-item food composition table made from the latest nutrient database assembled by ESHA Research, Inc., of Salem, Oregon. Appendix I presents information for Canadians: the Recommended Nutrient Intakes (1990 RNI), the Exchange System, and instructions on reading food labels. Appendix J describes measures of protein quality, and Appendix K presents the answers to the "Making It Click" sections and multiple-choice questions that appear at the ends of chapters.

• ***The Inside Covers*** • The inside covers put commonly used information at your fingertips. The front covers presents the current nutrient recommendations (introduced in Chapter 1); the inside back cover (left) features the nutrient values used on food labels (described in Chapter 2); and the inside back cover (right) shows the suggested weight ranges for various heights (discussed in Chapter 8).

• ***Closing Comments*** • We have tried to keep the number of notes to a minimum. Many statements that have appeared in previous editions with notes now appear without them, but every statement is backed by research, and the authors will supply references upon request. We have not provided a separate list of suggested readings, but have tried to include references that will provide readers with additional details or a good overview of the subject. Nutrition is a fascinating subject, and we hope our enthusiasm for it comes through on every page.

Eleanor Noss Whitney
Sharon Rady Rolfes
October 1998

Acknowledgments

To produce a book requires the coordinated effort of a team of people—and, no doubt, each team member has another team of support people as well. We salute, with a big round of applause, everyone who has worked so diligently to ensure the quality of this book.

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