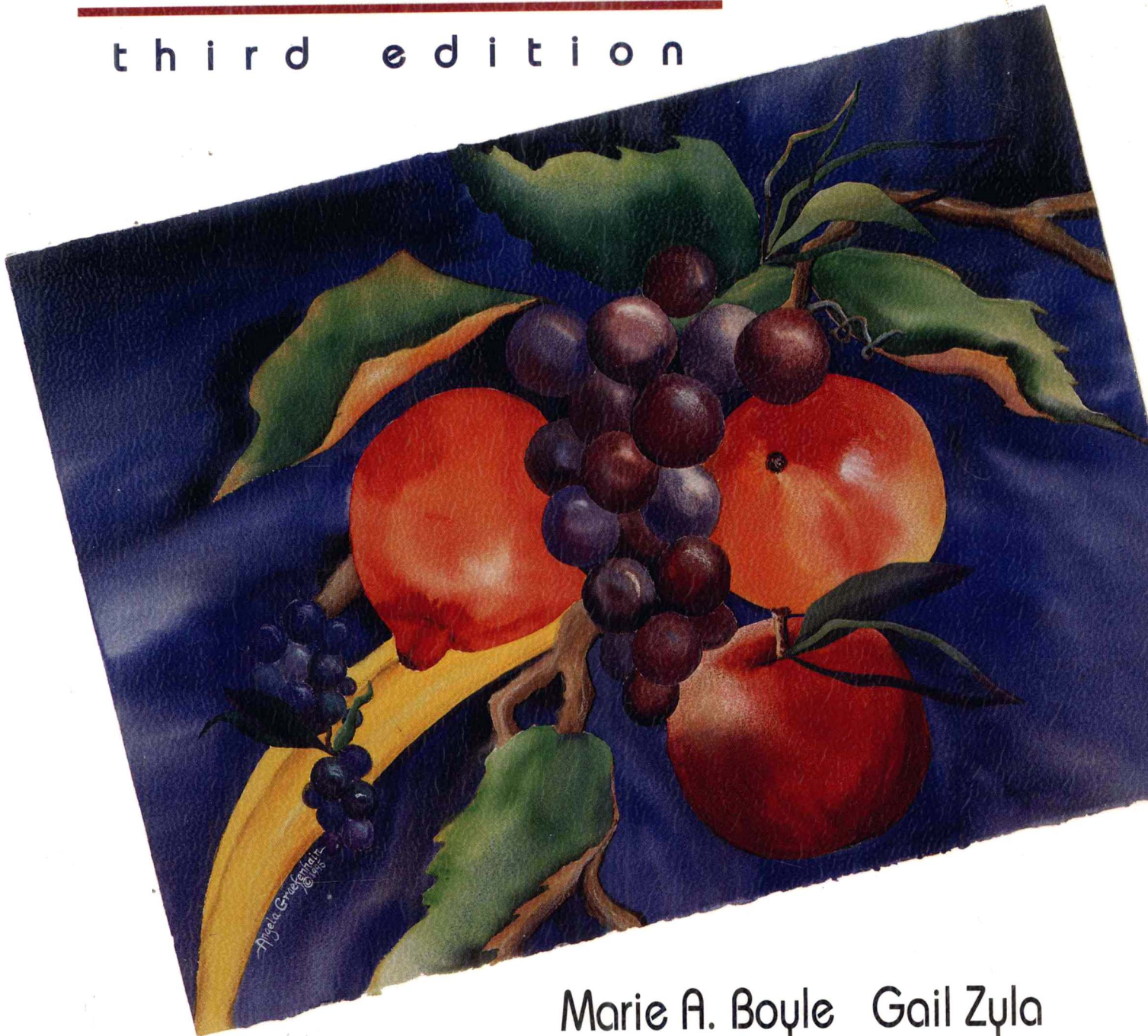
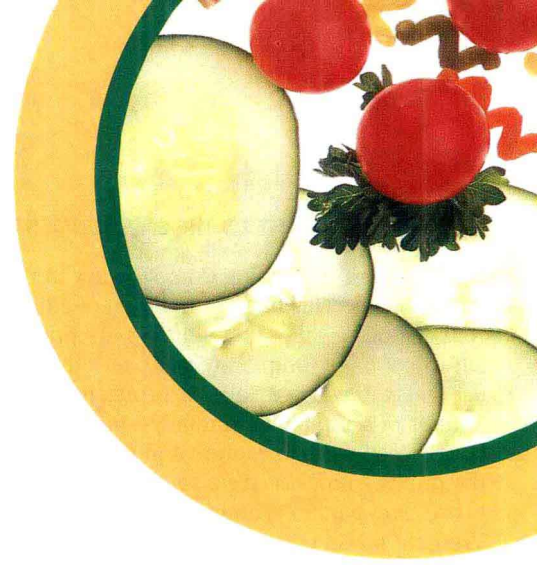

PERSONAL NUTRITION

t h i r d e d i t i o n



Marie A. Boyle Gail Zyla





Personal Nutrition

Third Edition

Marie A. Boyle

Gail Zyla

*Tufts University
Diet & Nutrition Letter*

WEST PUBLISHING COMPANY

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RECOMMENDED DIETARY ALLOWANCES (ADA), 1989^a

Age (years)	Weight Height				Protein (g)	Vitamins & Minerals																	
	(kg)	(lb)	(cm)	(inches)		(RE) Vitamin A	(µg) Vitamin D	(mg) Vitamin E	(µg) Vitamin K	(mg) Vitamin C	(mg) Thiamin	(mg) Riboflavin	(mg equiv.) Niacin	(mg) Vitamin B ₆	(µg) Folate	(µg) Vitamin B ₁₂	(mg) Calcium	(mg) Phosphorus	(mg) Magnesium	(mg) Iron	(mg) Zinc	(µg) Iodine	(µg) Selenium
INFANTS																							
0.0-0.5	6	13	60	24	13	375	7.5	3	5	30	0.3	0.4	5	0.3	25	0.3	400	300	40	6	5	40	10
0.5-1.0	9	20	71	28	14	375	10	4	10	35	0.4	0.5	6	0.6	35	0.5	600	500	60	10	5	50	15
CHILDREN																							
1-3	13	29	90	35	16	400	10	6	15	40	0.7	0.8	9	1.0	50	0.7	800	800	80	10	10	70	20
4-6	20	44	112	44	24	500	10	7	20	45	0.9	1.1	12	1.1	75	1.0	800	800	120	10	10	90	20
7-10	28	62	132	52	28	700	10	7	30	45	1.0	1.2	13	1.4	100	1.4	800	800	170	10	10	120	30
MALES																							
11-14	45	99	157	62	45	1000	10	10	45	50	1.3	1.5	17	1.7	150	2.0	1200	1200	270	12	15	150	40
15-18	66	145	176	69	59	1000	10	10	65	60	1.5	1.8	20	2.0	200	2.0	1200	1200	400	12	15	150	50
19-24	72	160	177	70	58	1000	10	10	70	60	1.5	1.7	19	2.0	200	2.0	1200	1200	350	10	15	150	70
25-50	79	174	176	70	63	1000	5	10	80	60	1.5	1.7	19	2.0	200	2.0	800	800	350	10	15	150	70
51 +	77	170	173	68	63	1000	5	10	80	60	1.2	1.4	15	2.0	200	2.0	800	800	350	10	15	150	70
FEMALES																							
11-14	46	101	157	62	46	800	10	8	45	50	1.1	1.3	15	1.4	150	2.0	1200	1200	280	15	12	150	45
15-18	55	120	163	64	44	800	10	8	55	60	1.1	1.3	15	1.5	180	2.0	1200	1200	300	15	12	150	50
19-24	58	128	164	65	46	800	10	8	60	60	1.1	1.3	15	1.6	180	2.0	1200	1200	280	15	12	150	55
25-50	63	138	163	64	50	800	5	8	65	60	1.1	1.3	15	1.6	180	2.0	800	800	280	15	12	150	55
51 +	65	143	160	63	50	800	5	8	65	60	1.0	1.2	13	1.6	180	2.0	800	800	280	10	12	150	55
PREGNANT																							
					60	800	10	10	65	70	1.5	1.6	17	2.2	400	2.2	1200	1200	320	30	15	175	65
LACTATING																							
1st 6 mo					65	1300	10	12	65	95	1.6	1.8	20	2.1	280	2.6	1200	1200	355	15	19	200	75
2nd 6 mo					62	1200	10	11	65	90	1.6	1.7	20	2.1	260	2.6	1200	1200	340	15	16	200	75

^aThe allowances are intended to provide for individual variations among most normal, healthy people in the United States under usual environmental stresses. Diets should be based on a variety of common foods in order to provide other nutrients for which human requirements have been less well defined.

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UNIT CONVERSIONS

Vitamin A: 1 RE (retinol equivalent) = 1 mcg (or µg) retinol = 6 mcg beta-carotene = 5 IU (International Units) Vitamin A;
1 mg beta-carotene = 833 IU Vitamin A or 5,000 RE.

Vitamin D: 1 mcg (or µg) = 40 IU

Vitamin E: 1 mg αTE (alpha tocopherol equivalent) = .3 IU

Niacin: 1 mg NE (niacin equivalent) = 1 mg niacin = 60 mg dietary tryptophan

MEDIAN HEIGHTS AND WEIGHTS AND RECOMMENDED ENERGY INTAKES (UNITED STATES)

AGE (YEARS)	WEIGHT		HEIGHT		AVERAGE ENERGY ALLOWANCE			
	(kg)	(lb)	(cm)	(inches)	REE ^a (cal/day)	Multiples of REE ^b	cal per kg	cal per day ^c
INFANTS								
0.0-0.5	6	13	60	24	320		108	650
0.5-1.0	9	20	71	28	500		98	850
CHILDREN								
1-3	13	29	90	35	740		102	1300
4-6	20	44	122	44	950		90	1800
7-10	28	62	132	52	1130		70	2000
MALES								
11-14	45	99	157	62	1440	1.70	55	2500
15-18	66	145	176	69	1760	1.67	45	3000
19-24	72	160	177	70	1780	1.67	40	2900
25-50	79	174	176	70	1800	1.60	37	2900
51 +	77	170	173	68	1530	1.50	30	2300
FEMALES								
11-14	46	101	157	62	1310	1.67	47	2200
15-18	55	120	163	64	1370	1.60	40	2200
19-24	58	128	164	65	1350	1.60	38	2200
25-50	63	138	163	64	1380	1.55	36	2200
51 +	65	143	160	63	1280	1.50	30	1900
PREGNANT (2ND AND 3RD TRIMESTERS)								+ 300
LACTATING								+ 500

^aREE (resting energy expenditure) represents the energy expended by a person at rest under normal conditions.

^bRecommended energy allowances assume light-to-moderate activity and were calculated by multiplying the REE by an activity factor.

^cAverage energy allowances have been rounded.

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DAILY VALUES (USED ON FOOD LABELS)

DAILY REFERENCE VALUES (DRVs) ^a		REFERENCE DAILY INTAKES (RDIs) ^c			
Food Component	DRV	Nutrient	Amount	Nutrient	Amount
fat	65g ^d	vitamin A	5,000 International	vitamin B ₆	2.0 mg
saturated fat	20 g		Units (IU), 1000 RE	folate	0.4 mg
cholesterol	300 mg ^a	vitamin C	60 mg	vitamin B ₁₂	6 µg ^f
total carbohydrate	300 g	thiamin	1.5 mg	phosphorus	1.0 g
fiber	25 g	riboflavin	1.7 mg	iodine	150 µg
sodium	2,400 mg	niacin	20 mg	magnesium	400 mg
potassium	3,500 mg	calcium	1.0 g	zinc	15 mg
protein ^b	50 g	iron	18 mg	copper	2 mg
		vitamin D	400 IU, 10 µg	biotin	0.3 mg
		vitamin E	30 IU, 10 mg αTE	pantothenic acid	10 mg

^aBased on 2,000 calories a day for adults and children over 4 only.

^bDRV for protein does not apply to certain populations; Reference Daily Intake (RDI) for protein has been established for these groups: children 1 to 4 years: 16 g; infants under 1 year: 14 g; pregnant women: 60 g; nursing mothers: 65 g.

^cFormerly the U.S. RDA, based on National Academy of Sciences 1968 Recommended Dietary Allowances.

^d(g) grams

^e(mg) milligrams

^f(µg) micrograms

SOURCE: R. Kunzwell. 'Daily Values' encourage healthy diet, *FDA Consumer*, May 1993, pp. 40-45.

ESTIMATED SAFE AND ADEQUATE DAILY DIETARY INTAKES OF ADDITIONAL SELECTED VITAMINS AND MINERALS (UNITED STATES)^a

VITAMINS

Age (years)	Biotin (μg)	Pantothenic Acid (mg)
INFANTS		
0-0.5	10	2
0.5-1	15	3
CHILDREN		
1-3	20	3
4-6	25	3-4
7-10	30	4-5
11 +	30-100	4-7
ADULTS	30-100	4-7

TRACE ELEMENTS^b

Age (years)	Chromium (μg)	Molybdenum (μg)	Copper (mg)	Manganese (mg)	Fluoride (mg)
INFANTS					
0-0.5	10-40	15-30	0.4-0.6	0.3-0.6	0.1-0.5
0.5-1	20-60	20-40	0.6-0.7	0.6-1.0	0.2-1.0
CHILDREN					
1-3	20-80	25-50	0.7-1.0	1.0-1.5	0.5-1.5
4-6	30-120	30-75	1.0-1.5	1.5-2.0	1.0-2.5
7-10	50-200	50-150	1.0-2.0	2.0-3.0	1.5-2.5
11 +	50-200	75-250	1.5-2.5	2.0-5.0	1.5-2.5
ADULTS	50-200	75-250	1.5-3.0	2.0-5.0	1.5-4.0

^aBecause there is less information on which to base allowances, these figures are not given in the main table of the RDA and are provided here in the form of ranges of recommended intakes.

^bBecause the toxic levels for many trace elements may be only several times usual intakes, the upper levels for the trace elements given in this table should not be habitually exceeded.

SOURCE: *Recommended Dietary Allowances*, © 1989 by the National Academy of Sciences, National Academy Press, Washington, D.C.

ESTIMATED MINIMUM REQUIREMENTS OF SODIUM, CHLORIDE, AND POTASSIUM

AGE (YEARS)	SODIUM ^a (MG)	CHLORIDE (MG)	POTASSIUM ^b (MG)
INFANTS			
0.0-0.5	120	180	500
0.5-1.0	200	300	700
CHILDREN			
1	225	350	1000
2-5	300	500	1400
6-9	400	600	1600
ADOLESCENTS	500	750	2000
ADULTS	500	750	2000

^aSodium requirements are based on estimates of needs for growth and for replacement of obligatory losses. They cover a wide variation of physical activity patterns and climatic exposure but do not provide for large, prolonged losses from the skin through sweat.

^bDietary potassium may benefit the prevention and treatment of hypertension and recommendations to include many servings of fruits and vegetables would raise potassium intakes to about 3500 mg/day.

SOURCE: *Recommended Dietary Allowances*, © 1989 by the National Academy of Sciences, National Academy Press, Washington, D.C.

**To my brother,
Bob,
with hope and love
in words unspoken**

Marie Boyle



For Pearl Woods

Gail Zyla

ABOUT THE AUTHORS

Marie A. Boyle, Ph.D., R.D., received her B.A. in Psychology from the University of Maine in 1975, her M.S. in nutrition from Florida State University in 1985, and her Ph.D. in nutrition from Florida State University in 1992. She has taught undergraduate and graduate nutrition and health-related courses at Edison Community College in Naples, Florida, the University of Florida in Gainesville, and Florida State University in Tallahassee. She is co-author of the senior-level textbook *Community Nutrition in Action: An Entrepreneurial Approach*. Her other professional activities include teaching a community-based “Culinary Hearts Cooking” class for the American Heart Association, developing a community workshop on “Nutrition and Health Fraud,” and serving on the local Dietetic Association’s Hunger Committee. She presently works as a consultant, writer, and nutrition/health educator in Atlanta, Georgia, where she teaches nutrition and health classes at Life College and Kennesaw State College. She maintains memberships with the American Dietetic Association, Georgia Dietetic Association, Florida Association of Professional Health Educators, and the American Public Health Association, and serves as a reviewer for the *American Journal of Health Promotion* and the *Florida Journal of Public Health*.

Gail Zyla, M.S., R.D., received her B.S. in Home Economics from Valparaiso University, Valparaiso, Indiana, in 1985 and completed her dietetic internship at Massachusetts General Hospital, Boston, in 1986. She received her M.S. in nutrition and communications from Boston University in 1988. Currently she serves as senior editor of the *Tufts University Diet & Nutrition Letter* in Boston, a position she has held since 1988. She is also a contributing editor for *Parenting* magazine, and she writes about nutrition for a variety of other consumer publications. In addition, she is an instructor at the Tufts University Schools of Medicine and Dental Medicine.



TO THE READER

With this third edition of *Personal Nutrition*, we continue to develop the vision we had in writing the earlier editions of this book—that is, to apply basic nutrition concepts to personal everyday life. This edition reflects not only the many changes that have taken place in the field of nutrition in recent years, but also the increasing demands of our readers for practical nutrition information useful for making healthful decisions both now and in the future. Our challenge has been to teach the facts about nutrition as well as how to evaluate them and, most importantly, to motivate readers to apply what they learn in daily life. It is our hope that you will benefit from the new and fundamental information presented in this edition and enjoy its exciting and colorful new design.

Nutrition is a subject that is forever changing, and it is important that you, as a consumer of nutrition information, have the knowledge to evaluate the nutrition issues and controversies that confront you, both today and tomorrow. Newspapers are quick to print nutrition breakthroughs, new fad diets appear monthly on the magazine racks, and television advertising extols the wonders of products of questionable value. Nutrition claims bombard us frequently, and we must evaluate and assess them. This edition of *Personal Nutrition* continues to provide a sieve through which to separate the valid nutrition claims from the rest.

Chapter 1 provides a personal invitation to eat well for optimum health and assists the reader in becoming a sophisticated consumer of new information about nutrition. It also includes a new section that explores the factors that affect food choices, including the media, advertising, and cultural factors. Chapter 2 introduces the basic nutrients the body needs along with the nutrition tools and most recent guidelines needed to help make sound food choices. Beginning with Chapter 3, and continuing through each of five chapters, is a new and practical feature on “Checking Out the Food Label,” which provides pointers for understanding the information found on food labels. Another new feature to these same chapters is the colorful “Pyramid Pointers” graphic which offers selection tips from the Food Guide Pyramid for building a healthful diet. Chapters 3 through 7 present the nutrients and show how they all work together to nourish the body. In addition, Chapter 3 includes a new section on various international and ethnic cuisines that highlights the multicultural heritage of our country. The chapters on vitamins and minerals spotlight the emerging importance of the antioxidant nutrients and phytochemicals and also feature colorful new food photos depicting food sources for individual vitamins and minerals. Chapter 8 discusses weight loss and weight gain and includes a new summary table that compares the major weight-loss diets and programs, and many of the popular diet books. Chapter 9 addresses the relationships between nutrition and person-

al fitness. Chapter 10 describes the special nutrition needs and concerns that arise during the various stages of the life cycle from conception through old age. Chapter 11 addresses consumer concerns about the safety of our food supply and provides a glimpse at some of the newer food technologies on the horizon.

The *Nutrition Action* features that appear in every chapter are magazine-style essays that keep you abreast of current topics important to the nutrition-conscious consumer. The *Nutrition Action* features address topics such as fast food, smart snacking, dental health, sweet alternatives to sugar, the trans fatty acid controversy, amino acid supplements, nutrition savvy in cooking to preserve vitamins in foods, calcium and osteoporosis, diet and blood pressure, the “never say diet” approach to weight loss, behavior modification, nutrition and stress, caffeine, the organic foods industry, and recycling and the environment.

Each chapter continues to provide a *Consumer Tips* feature that contains practical suggestions for healthful eating. They include stocking your cupboards with nutritious staple goods, supermarketing, choosing healthful ethnic foods, modifying recipes, packing healthful bag lunches, selecting a vitamin-mineral supplement, seasoning foods without excess salt, dining defensively, adding exercise to your day, making meals for one, and using the microwave oven safely.

Scorecards are hands-on features included in every chapter. *Scorecards* allow readers to evaluate their own nutrition behaviors and knowledge in many areas. Some of the *Scorecards* assist readers in assessing their longevity, diet, calcium intake, weight, exercise habits, and food safety knowhow.

The *Ask Yourself* sections at the beginning of each chapter contain a set of true-false questions designed to provide readers with a preview of the chapter’s contents. New to this edition is the *Check Yourself* section at the end of each chapter, which includes review questions designed to test readers’ comprehension of the chapter material.

The final special feature of each chapter is the *Spotlight*—many are brand new to this edition, and the others have been updated. Each addresses a common concern people have about nutrition. *Spotlight* topics include nutrition and the media, food labels, ethnic cuisines and multiculturalism, diet and heart disease, the vegetarian diet, antioxidant nutrients and phytochemicals, water safety, eating disorders, alcohol and nutrition, and nutrition and cancer prevention. The final *Spotlight* covers the many factors that influence nutrition and food insecurity among the people of the world and underscores that the practical suggestions offered throughout this book for attaining the ideals of personal nutrition are the very suggestions that best support the health of the whole earth as well. The *Spotlights* continue in their question and answer format to encourage the reader to ask further questions about nutrition issues. We encourage you to ask us questions, too, in care of the publisher.

The *Appendixes* have been updated. Appendix A contains an invaluable listing of general nutrition resources as well as current electronic sources of nutrition information; Appendix B provides a colorfully illustrated introduction to the workings of the human body; Appendix C includes the Canadian Dietary Guidelines and other recommendations; Appendix D presents aids to calculations, including how to calculate the percentage of calories from fat in one’s diet; Appendix E provides both the U.S. and Canadian Food Exchange Systems; Appendix F includes the chapter reference notes; Appendix G sup-

plies a guide to the *West Diet Analysis Plus* software; Appendix H provides answers to selected *Check Yourself* questions at the end of each chapter; and Appendix I includes our *Table of Food Composition*. The *Glossary* of terms that follows the Appendixes provides a quick reference to the nutrition terminology defined in the margins of the text and can be used as a review tool.

We welcome you to the fascinating subject of nutrition. We hope that the book speaks to you personally and that you find it practical for your everyday use. We hope, too, that by reading it you may enhance your own personal nutrition and health.

Marie Boyle
Gail Zyla



ACKNOWLEDGMENTS

We are grateful to the many individuals who have made contributions to the development of this third edition of *Personal Nutrition*. We thank our families and friends for their continued support and encouragement throughout this endeavor. We appreciate the insights and support provided by our colleagues—especially Diane Morris, Ph.D., R.D., Jean Kressy, Anne Fletcher M.S., R.D., and Mary Thang. Also, a word of special thanks goes to Larry Lindner of the *Tufts University Diet & Nutrition Letter* for his patience and generous support throughout this endeavor and countless others. Thanks also to Bob Geltz and Betty Hands and their staff at ESHA research for creating the food composition table (Appendix I), and the computerized diet analysis program that accompanies this book.

Special thanks to our editorial team of Pete Marshall, Becky Tollerson, and Brenda Owens for ensuring the quality of this production. We appreciate the work of our copyeditor, Deborah Cady, and the artwork of Randy Miyake. We also owe much to the following professionals who provided expert reviews of the manuscript, not only for their ideas and suggestions, many of which made their way into the text, but also for their continued support and interest in *Personal Nutrition*: Ellen Brennan, San Antonio College; Velma Butler, Northeast Louisiana University; Deborah Cohen, Creighton University; Dorothy Coltrin, De Anza Community College; Diane Fletcher, Pacific Union College; Diana Polley-Fugitt, University of Central Oklahoma; Caroline Knutson, Clackamas Community College; Lorrie Miller Kohler, Minneapolis Community College; Joan Magee, Henry Ford Community College; Rose Martin, Arizona State University; John Orta, California State University—Los Angeles; Carol Seaborn, University of Wisconsin-Stout; Kathy Talis, Aquinas College; Ann VanBeber, Texas Christian University; and Suzanne Vieira, Johnson and Wales University.



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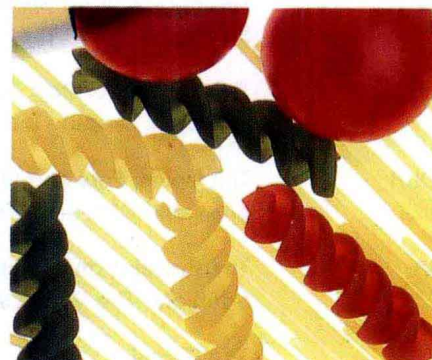


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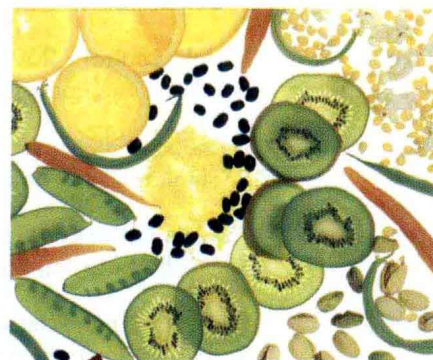
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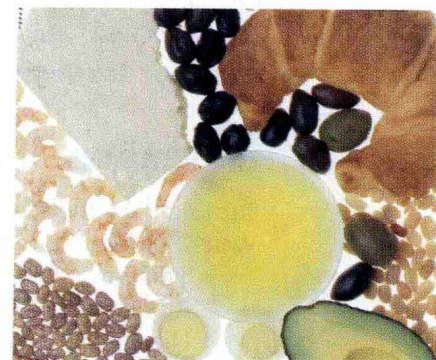
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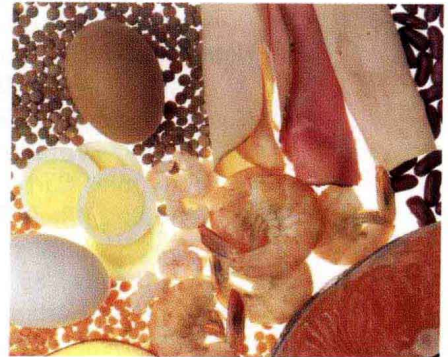


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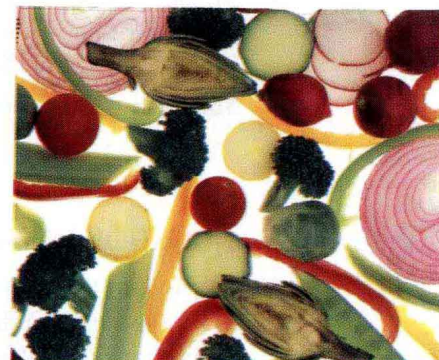
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