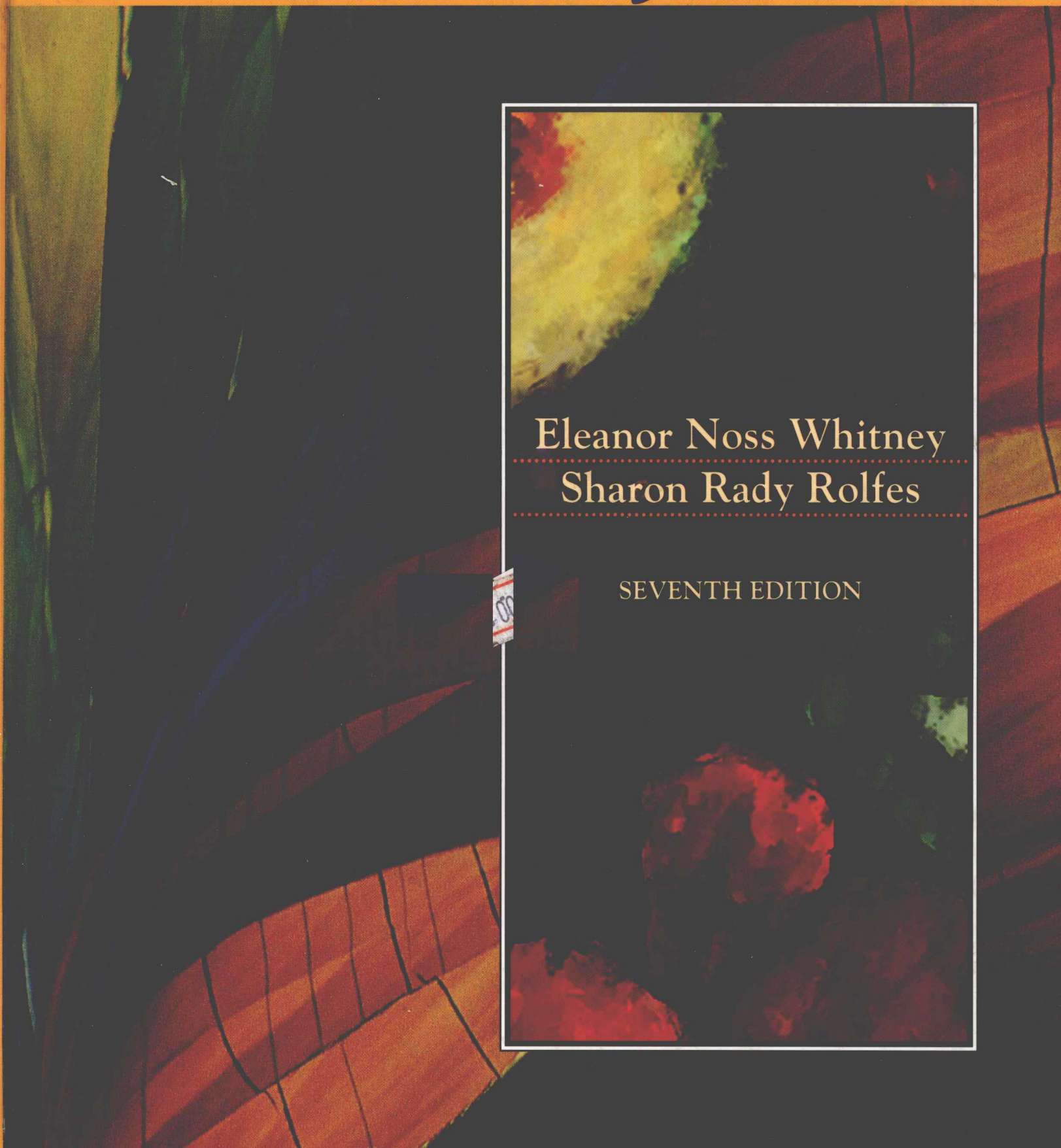
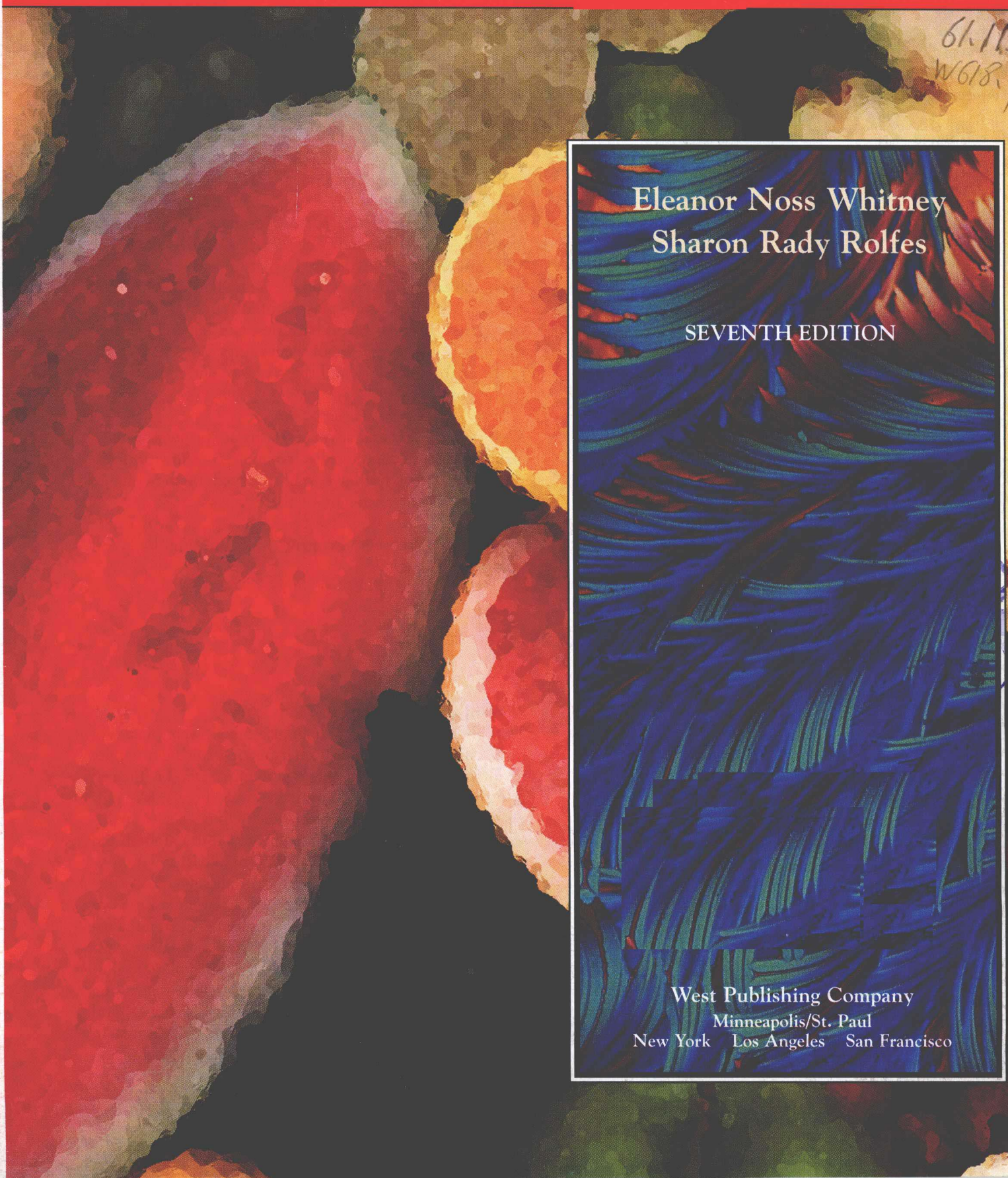
Understanding Nutrition



Eleanor Noss Whitney
Sharon Rady Rolfes

SEVENTH EDITION



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Eleanor Noss Whitney
Sharon Rady Rolfes

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A Word about Photomicrographs

The photomicrographs in the textbook were made of recrystallized vitamins and other nutrients using a variety of different techniques. Many vitamins can be imaged using the melt-recrystallization process where a few milligrams of the chemical are sandwiched between a microscope coverslip and slide, then heated until melted and allowed to slowly recrystallize. Alternately, for vitamin-salts that will not melt, the chemical is dissolved in a suitable solvent (water or alcohol) and a few microliters of solution are allowed to slowly evaporate between a microscope slide and coverslip. Upon recrystallization, the vitamins are viewed in a microscope using cross-polarized illumination where the crystallites diffract light depending both on the molecular orientation within the crystal and the crystal thickness. The colorful patterns illustrated in this text are a manifestation of both molecular orientation and crystal thickness.

Preface

This seventh edition of *Understanding Nutrition* shares the same goals established almost twenty 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.

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 and water supply. Chapter 20 closes the book with a look at hunger and global environmental problems and offers suggestions for establishing sustainable foodways.

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 century. One of the missions of this text, beginning in Chapter 1, is to show readers how researchers ascertain the "facts."

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

New to this edition are summary paragraphs, marked with a thin blue bar in the margin. These paragraphs review the contents of the previous section; in some chapters, such as those covering the vitamins and minerals, summaries appear in tables.

Also featured in this edition are the Healthy People 2000 nutrition-related priorities, which are presented wherever 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, and many chapters include problem sets. Study questions offer readers the opportunity to review the major concepts presented in the chapters. Problem sets present simple nutrition-related calculations that will prove many of the concepts introduced in the chapter (answers appear in Appendix K).

Highlights on current issues of interest alternate with the chapters. Each highlight provides readers with a brief look at a topic that relates to its companion chapter. New highlights in this edition explore healthy ethnic cuisines (including the Mediterranean diet), the fattening power of fat, the roles of antioxidant nutrients and nonnutrients in disease prevention, childhood obesity and its influence on the early development of chronic diseases, and nutrient-drug interactions.

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. Appendix G presents the Recommended Dietary Allowances (1989 RDA), the Daily Values for food labels, 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 data base 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 problem sets that appear at the ends of chapters.

We have tried to keep the number of footnotes to a minimum. Many statements that have appeared in previous editions with footnotes 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.

We hope our informal, conversational writing style makes the study of nutrition an enjoyable experience. Nutrition is a fascinating subject, and we hope our enthusiasm for it comes through on every page.

Eleanor Noss Whitney
Sharon Rady Rolfes
December 1995

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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We are especially grateful to our associates, friends, and families for their continued encouragement and support. We also thank our many reviewers for their comments and contributions.

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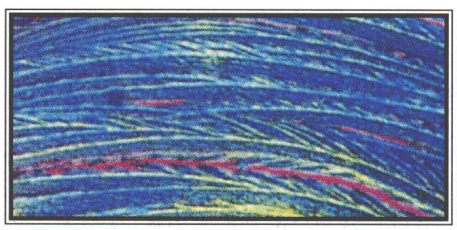

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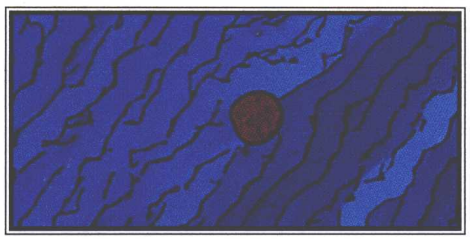

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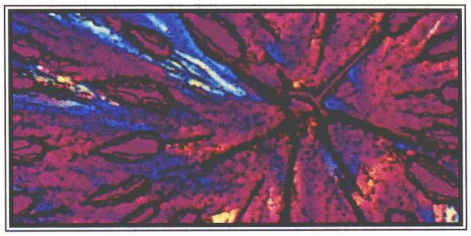

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