

THIRD EDITION UPDATE

ON BAKING

A TEXTBOOK OF BAKING & PASTRY FUNDAMENTALS



SARAH R. LABENSKY • PRISCILLA A. MARTEL • EDDY VAN DAMME

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Approach and Philosophy of **ON BAKING**

On Baking, Third Edition Update, follows the model established in our previous editions, which has prepared thousands of students for successful careers in the baking and pastry arts by building a strong foundation based upon sound fundamental techniques. *On Baking* focuses on teaching the hows and whys of baking. *On Baking* starts with general procedures, highlighting fundamental principles and skills, and then presents specific applications and sample recipes. Core baking and pastry principles are explained as the background for learning proper techniques. Once mastered, these techniques can be used in the preparation of a wide array of baked goods, pastries and confections. The baking and pastry arts are shown in a cultural and historical context as well so that students understand how different techniques and flavor profiles developed.

Chapters focus on four areas essential to a well-rounded baking and pastry professional:

- 1 **Professionalism** Background chapters introduce students to the field with material on culinary and baking history, food safety, tools and ingredients.
- 2 **Breads** Four chapters focus on breadmaking, from basic quickbreads to yeast breads and advanced artisan specialties such as sourdough breads and laminated doughs.
- 3 **Desserts and Pastries** Fundamental baking techniques used in the preparation of cookies, pies, cakes, custards and frozen desserts are explained and then demonstrated with a wide range of recipes. Healthy baking concludes this section.
- 4 **Advanced Pastry Work** Chapters on tortes and modern entremets, petits fours, plated desserts, chocolate and sugar work demonstrate advanced concepts and techniques.

UPDATES

- ▶ More than **230 new photographs and illustrations** provide clear representations of core preparations that are the foundation of any good baking textbook.
- ▶ Over **40 new recipes** reflect up to the minute trends in bakeries and foodservice.
- ▶ New **step-by-step photographs emphasize stages** in making key products such as flaky biscuits, pie crust and meringue.
- ▶ New **photographs that show contemporary plate presentation styles** to help students in their mastery of plating and presentation.
- ▶ **Coverage of the construction of tiered specialty cakes** has been expanded to include new photographs of celebration cakes from professional cake decorators.
- ▶ Content updates reflect **current trends in the world of baking and pastry**, such as the interest in food science, ingredient function and specialty cake production.
- ▶ **Expanded coverage of flavors** and **advanced pastry techniques** is offered in new sidebars and recipes.
- ▶ **Additional troubleshooting content** is included to help students master challenging bakeshop items such as puff pastry, meringues, éclair paste and pastry cream.
- ▶ MyCulinaryLab for *On Baking* features new culinary math questions with step-by-step remediation that instructors can assign as homework. Topics covered in these problem sets include measurement conversions, metric conversions, formula conversions, baker's percentages, and yield percentages. Updated chapter tests, chapter quizzes, and dynamic study modules can also be assigned for homework.

GUIDED TOUR

Easy to navigate, *On Baking* is divided into bite-sized subsections to optimize your learning experience. We invite you to explore this new edition with the following Guided Tour through the features presented.

HALLMARK FEATURES

After studying this chapter, you will be able to:

- understand the various mixing methods used in the bakeshop
- understand how heat affects batters and doughs, the basis of most bakeshop items
- identify and understand the basic baking and cooking methods employed in the bakeshop
- understand the science of taste and basic flavor principles

► Chapter Introduction

Introductory paragraphs summarize the main themes in each chapter and help reinforce topics.

SAFETY ALERT Milk Storage

Canned milks, aseptically packaged milks and dry milk powders are shelf-stable products needing no refrigeration. After the can or box is opened or the powder is reconstituted with water, however, these become potentially hazardous foods and must be handled just as carefully as fresh milk. Do not store an open can of milk in its original container, and keep all milk products refrigerated at or below 40°F (4°C).

◀ Learning Objectives

Each chapter begins with clearly stated objectives that guide you to focus on what can be achieved by completing the chapter.

BREAD MAKING IS AN ART THAT DATES BACK TO ANCIENT

TIMES. Over the centuries, bakers have learned to manipulate the basic ingredients—flour, water, salt and leavening—to produce a vast variety of breads. Thin-crust baguettes, tender Parker House rolls, crisp flatbreads and chewy bagels derive from careful selection and handling of the same key ingredients. A renewed interest in the traditional craft of baking has seen many new artisan bread bakeries open in recent years. Customers are demanding, and more restaurants are serving, exciting bread assortments to their guests at every meal. Although few baked goods intimidate novice bakers as much as yeast breads, few baked goods are actually as forgiving to prepare. By mastering a few basic procedures and techniques, restaurants and bakeshops can offer their customers delicious, fresh yeast products.

Yeast breads can be divided into two major categories: lean doughs and rich doughs. Lean doughs, such as those used for crusty French and Italian artisan breads, contain little or no sugar or fat. Traditional sourdough and rye breads are lean doughs that require special handling to bring out their unique flavor. Rich doughs, such as brioche and challah, contain significantly more sugar and fat than lean doughs. Rich dough bakes into softer products with a tender crust and interior crumb and is discussed in Chapter 8, Enriched Yeast Breads. A specific type of rich, flaky dough is made by incorporating layers of fat and flour and is covered in Chapter 9, Laminated Doughs.

This chapter covers in detail the basic production techniques for making lean and sourdough bread products. The principles discussed in this chapter apply to working with all types of yeast-raised products, including artisan-style breads also discussed here. Rereading the discussion of the function of ingredients found in Chapter 4, Bakeshop Ingredients, is recommended before beginning this chapter.

► Margin Definitions

Important terms are defined in margin notes to help you quickly master new terminology.

flavor an identifiable or distinctive quality of a food, drink or other substance perceived with the combined senses of taste, touch and smell

mouthfeel the sensation created in the mouth by a combination of a food's taste, smell, texture and temperature

aroma the sensations, as interpreted by the brain, of what we detect when a substance comes in contact with sense receptors in the nose

taste the sensations, as interpreted by the brain, of what we detect when food, drink or other substances come in contact with our taste buds

◀ Safety Alerts

Brief notes remind you of safety concerns and encourage you to incorporate food safety and sanitation into your regular kitchen activities.



1 A vol-au-vent cutter looks like a double cookie cutter with one cutter about 1 inch (2.5 centimeters) smaller than the other. To cut the pastry, simply position the cutter and press down.



2 To shape with rings, use two rings, one approximately 1 inch (2.5 centimeters) smaller than the other. The larger ring is used to cut two rounds. One will be the base and is set aside. Use the smaller ring to cut out an interior circle from the second round, leaving a border ring of dough.

◀ Procedures

Step-by-step color photographs of various stages in the preparation of ingredients and dishes help you visualize unfamiliar techniques and encourage you to organize kitchen activities.

▶ Product Identification

Hundreds of original color photographs help you identify ingredients. Descriptions let you explore a huge variety of items such as fruits, sugars, nuts or chocolates.



Pomegranates

MISE EN PLACE

- ▶ Allow the butter, eggs and buttermilk to come to room temperature.
- ▶ Zest the lemon and orange.
- ▶ Grease pans.
- ▶ Preheat oven to 400°F (200°C).

◀ Mise en Place

French for “put in place,” this margin feature accompanying in-chapter recipes lists what needs to be done *before* starting to prepare the recipe, such as preheating the oven, chopping nuts or melting butter.

▶ Line Drawings

Detailed line drawings illustrate tools and equipment commonly used in a bakeshop.



Pastry Wheel

▼ Formulas

Recipes, more appropriately called *formulas* in professional bakeshops, demonstrate techniques and provide delicious laboratory experiments for all skill levels.



BRAN MUFFINS WITH RAISINS

Yield: 36 Muffins, 3 ½ oz. (105 g) each

Method: Muffin

Buttermilk	1 qt.	960 ml	152%
Wheat bran	10 oz.	300 g	47%
Salt	0.75 oz.	22 g	3.5%
All-purpose flour	1 lb. 5 oz.	630 g	100%
Baking powder	0.6 oz. (4 tsp.)	18 g	3%
Baking soda	0.6 oz. (4 tsp.)	18 g	3%
Cinnamon, ground	0.4 oz. (2 Tbsp.)	12 g	2%
Eggs	6.5 oz. (4 eggs)	195 g	31%
Vegetable oil	12 fl. oz.	360 ml	57%
Brown sugar	1 lb. 8 oz.	720 g	114%
Raisins, conditioned	1 lb.	480 g	75%
Streusel Topping (page 145; optional)	as needed	as needed	
Total batter weight:	7 lb. 11 oz.	3697 g	587%



Rasp-Style Grater

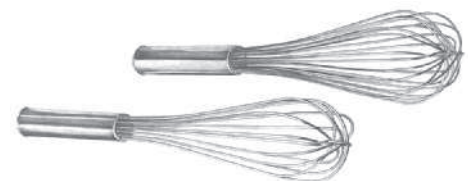
▼ Icons



Our adaptation of the MyPlate icon identifies healthy formulas.



The scale icon identifies formulas for which larger quantity measurements are provided in Appendix III.



Balloon and Rigid Whisks

► Photographs

Formulas are illustrated with both step-by-step photographs showing procedural techniques, as well as photographs of finished products or plated desserts.



Measurements

All formulas include ingredient quantities in both U.S. and metric measurements. U.S. and metric measurements for all temperatures, pan sizes and other quantities are provided throughout the text.

Baker's Percentage

A way of expressing the ratio of ingredients unique to professional baking, baker's percentages are used primarily with breads, cakes and dough products and are provided with those formulas.

Variations

Variations show how to modify a formula to create different flavor profiles and new dishes.

Nutritional Analysis

All formulas include a nutritional analysis prepared by a registered dietitian.

TRADITIONAL SHORTBREAD



Yield: 7 Dozen Cookies, approximately 1/2 oz. (15 g) each

Method: Icebox cookies

Unsalted butter, softened	1 lb.	480 g	84%
Powdered sugar	8 oz.	240 g	42%
Vanilla extract	0.5 fl. oz.	15 ml	3%
Salt	0.2 oz. (1 tsp.)	5 g	1%
Pastry or all-purpose flour	1 lb. 3 oz.	570 g	100%
Egg wash	as needed	as needed	
Total dough weight:	2 lb. 11 oz.	1310 g	230%

- 1 Blend the butter and powdered sugar in a mixing bowl without creaming. Stir in the vanilla and salt, mixing thoroughly. Add the flour and mix until just combined.
- 2 Divide the dough into four equal portions. Roll each piece of dough into 8-inch (20-centimeter) disks. Wrap in plastic. Freeze until hard, approximately 30 minutes.
- 3 Remove from the freezer and unwrap, then lightly brush each disk with egg wash. Cut each disk into eight wedges. Dock the wedges with a fork.
- 4 Bake at 375°F (190°C) until pale golden brown, approximately 15 to 20 minutes.

VARIATIONS:

Bergamot Shortbread—Add 12 drops of oil of bergamot with the vanilla in Step 1. Divide the dough into four equal portions. Roll each piece into a 10-inch- (25-centimeter-) long cylinder. Freeze until hard, approximately 30 minutes. Brush each cylinder with egg wash. Roll each cylinder in granulated sugar. Cut the cylinders into 1/2-inch- (1.2-centimeter-) thick slices, then place the slices cut side down on paper-lined sheet pans. Dock the cookies with a fork and bake.

Pecan Shortbread—Add 7 ounces (210 grams/37%) of finely chopped pecans to the dough in Step 1.

Approximate values per cookie: **Calories** 70, **Total fat** 4.5 g, **Saturated fat** 3 g, **Cholesterol** 10 mg, **Sodium** 30 mg, **Total carbohydrates** 8 g, **Protein** 1 g



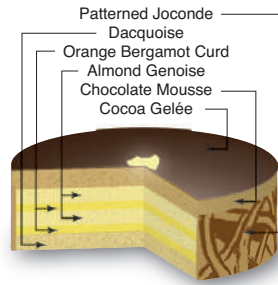
Bergamot Shortbread



Pecan Shortbread

► Color Illustrations of Torte Assembly

Full-color illustrations accompany torte formulas to show the internal assembly of these finished desserts.



▼ Flavor Sidebars

These features show how flavoring ingredients may be used to change the character of a dessert preparation.

VARIETAL HONEY

More than three hundred types of varietal honey are available in the United States. Each nectar source contributes a distinct color and flavor to the honey. Use this to advantage when selecting honey to use in ice cream, mousses and custards. From the rich buttery flavor of avocado honey to the delicate floral taste of tupelo honey, alternating honeys will change the flavor profile of a dish. Do taste these honeys before using them. The pronounced taste of buckwheat or heather blossom honey may be better suited to baked goods or chocolate desserts. Edible honeycomb makes an attractive garnish, as do granules of dried honey.

▼ Troubleshooting Charts

Troubleshooting charts enhance the learning experience by clarifying “how” and “why,” and by helping you diagnose and correct problems.

TABLE 10.2 TROUBLESHOOTING CHART FOR COOKIES

PROBLEM	CAUSE	SOLUTION
Cookies too dense or hard	Too little liquid in the dough	Adjust formula or measure carefully; add more eggs
	Too little fat in the dough	Adjust formula or measure fat carefully
	Too much flour in the dough Dough overmixed	Adjust formula or measure flour carefully Cream properly; avoid overmixing after adding dry ingredients
Cookies tough	Cookies overbaked	Remove cookies from oven promptly
	Improper flour used	Use lower-protein flour
	Too much flour in the dough	Adjust formula or measure flour carefully
	Too little fat in the dough	Adjust formula or measure fat carefully
Cookies too crumbly	Too little sugar in the dough	Adjust formula or measure sugar carefully
	Dough overmixed	Avoid overmixing after adding dry ingredients
	Dough reworked during rolling	Roll dough carefully; do not re-roll scrap dough
	Dough lacks gluten development	Mix longer; use higher-protein flour
	Too much chemical leavening, fat or sugar used in the dough	Adjust formula or measure carefully
Cookies flatten and spread too much	Too few eggs in the dough	Adjust formula
	Dough too thin	Roll or cut dough thicker
	Wrong type of flour used	Use higher-protein flour
	Too little flour in the dough	Adjust formula or measure flour carefully
	Too much chemical leavening, fat or liquid in the dough	Adjust formula or measure ingredients carefully
	Too much grease on baking sheets	Grease equipment carefully
	Dough too warm before baking	Chill dough thoroughly before using
Oven too cool	Adjust oven	

▼ Tables

Tables and charts offer visual support and organization of material to enhance your understanding.

TABLE 10.1 COOKIE TEXTURES

DESIRED TEXTURE	FAT	SUGAR	LIQUID	FLOUR	SIZE OR SHAPE	BAKING
Crispness	High	High; use granulated sugar	Low	Strong	Thin dough	Well done; cool on baking sheet
Softness	Low	Low; use hygroscopic sugars	High	Weak	Thick dough	Use parchment-lined pan; underbake
Chewiness	High	High; use hygroscopic sugars	High	Strong	Not relevant; chilled dough	Underbake; cool on rack
Spread	High	High; use coarse granulated sugar	High; especially from eggs	Weak	Not relevant; room-temperature dough	Use greased pan; low temperature

▼ Sidebars

Sidebars present additional information on food history, food in culture and the background of professional food service. These sidebars help you understand baking and pastry arts in a wider social context.

THE RISE OF YEAST BREADS

How and when the first yeast-leavened breads came into being, no one knows. Perhaps some wild yeasts—the world is full of them—drifted into a dough as it awaited baking. Perhaps some ancient baker substituted fermented ale or beer for water one day. In any case, the resulting bread was different, lighter and more appetizing.

Based on models, images and writings found in excavated tombs, historians are fairly certain that the ancient Egyptians saved a bit of fermented dough from one day's baking to add to the next day's. This use of sourdough starter continues today, enjoying widespread popularity.

Other cultures developed their own leavening methods. The Greeks and Romans prepared a wheat porridge with wine, which caused their doughs to ferment. The Gauls and Iberians added the foamy head from ale to their doughs. Both methods resulted in lighter breads that retained their fresh textures longer. Since ancient times, bread baking has been one of the first household tasks readily turned over to professionals. The first cooks to work outside homes during the Greek and Roman empires were bakers. The bakery trade flourished during the Middle Ages, with a wide variety of breads being produced. Yeast-leavened breads remained the exception, not the



norm, until well into the 17th century, however. The first real collection of bread recipes is found in Nicolas Bonnefon's *Les Délices de la campagne*, published in 1654. Bonnefon's instructions, meant for those dissatisfied with commercial products of the time, included the use of beer yeast. By the end of the 17th century, published works included recipes for breads leavened with sourdough starter and the yeasts used in breweries.

Louis Pasteur finally identified yeast as a living organism in 1857. Soon after, a process for distilling or manufacturing baker's yeast was developed. By 1868, commercial baking yeast was available in stores.

▼ Questions for Discussion

Questions for Discussion appear at the end of each chapter to encourage you to integrate theory and technique into a broader understanding of the material. Web-based activities, as indicated by the WWW icon, encourage you to conduct research and seek answers from outside your primary classroom material.



- 1 Explain the differences among active dry yeast, instant dry yeast and compressed yeast. Describe the correct procedures for working with these yeasts.
- 2 Explain the differences between a sponge and a sourdough starter. How is each of these items used?
- 3 Describe the straight dough mixing method and give two examples of products made with this procedure.
- 4 List the 10 production stages for yeast breads. Which of these production stages would also apply to quick bread production? Explain your answer.
- 5 Locate a professional organization for bread bakers. What services are available to its members? 
- 6 Locate two recipes each for typical French, German and Italian yeast breads and determine whether they are made with the straight dough, sponge or other pre-fermentation method. 

QUESTIONS FOR DISCUSSION

Terms to Know

leavening	kneading
active dry yeast	windowpane test
instant dry yeast	pickup stage
starter	punching down
dough	rounding
temperature	proofing
straight dough	scoring
method	refresh
sponge method	lactic acid
sourdough	acetic acid
method	poolish
old dough	biga

◀ Terms to Know

A list of important terms used in each chapter is provided to help enhance your vocabulary and reinforce professionalism.

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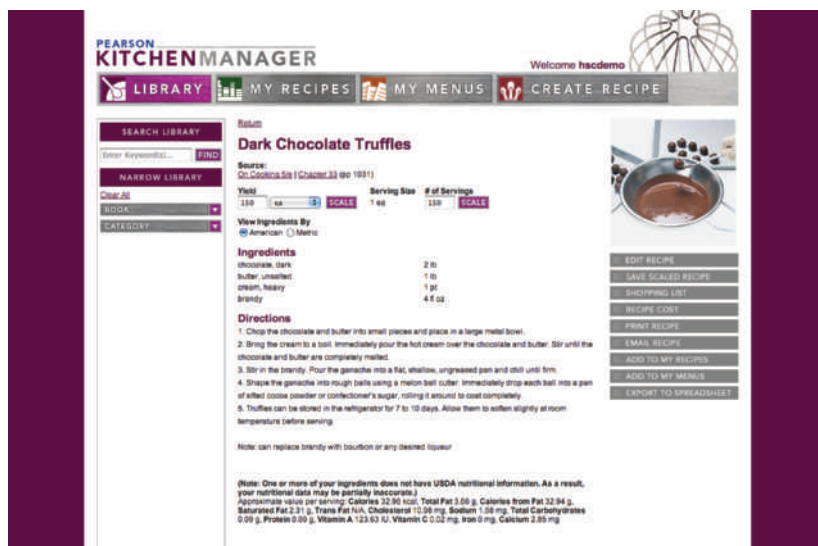
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Text Font: Adobe Garamond Pro, 10.5/12

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Library of Congress Cataloging-in-Publication Data

Labensky, Sarah R.

On baking : a textbook of baking and pastry fundamentals / Sarah R. Labensky and Priscilla Martel; with Eddy Van Damme, Houston Community College; photographs by Richard Embery and Eddy Van Damme; drawings by Stacey Winters Quattrone and William E. Ingram.—Third edition. Update.

pages cm

Includes bibliographical references and index.

ISBN 978-0-13-388675-7—ISBN 0-13-388675-1

1. Baking. 2. Pastry. I. Martel, Priscilla. II. Van Damme, Eddy. III. Title.

TX763.B3233 2016

641.81'5--dc23

2014041642

10 9 8 7 6 5 4 3 2 1



ISBN 10: 0-13-388675-1
ISBN 13: 978-0-13-388675-7

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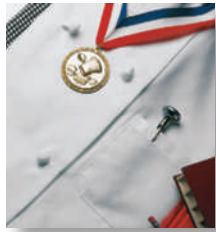
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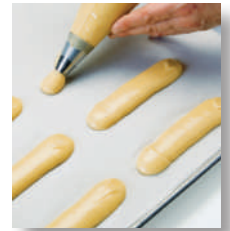
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PREFACE

On Baking: A Textbook of Baking and Pastry Fundamentals builds on the successful approach developed in *On Cooking: A Textbook of Culinary Fundamentals*. This is a carefully designed text intended to teach both the principles and practices of baking and the pastry arts. The baking information presented in *On Cooking* is suitable for culinary students seeking a general knowledge of baking. *On Baking* takes the same clear, organized approach and expands the material into far greater depth, covering techniques and formulas required for core and advanced baking and pastry programs.

This book aims to teach professional culinary students core baking principles and the skills necessary to produce a wide array of baked goods and confections. Our goal is not merely to offer a collection of recipes, although there are over 775 recipes for a wide variety of baked goods and confections. We include these formulas to illustrate the techniques presented in the teaching sections of each chapter. Throughout the text, we discuss both the “how” and “why” of baking. Extensive step-by-step photographs help you visualize the techniques used to form bread dough, shape cookies or temper chocolate while recipes illustrate the baking principles and procedures. Throughout the book we provide extensive illustrated sections identifying bakeshop ingredients and equipment. We believe that a thorough understanding of the function of ingredients will serve you well throughout your baking career.

Winner of the 2004 **Gourmand World Cookbook Award** as the “**Best Book for Food Professionals in the World,**” *On Baking* has been uniformly praised for its organization, clarity, ease of use and use of quality photography to illustrate professional techniques. This third edition update seeks to further enhance the content included in prior editions.



THE STORY BEHIND THIS UPDATE

Baking programs vary in terms of content and depth. After speaking with instructors and hearing from reviewers, we wanted to incorporate material at a wide range of skill levels and interests.

Our commitment to offering a range of formulas for various skill levels led us to institute an in-classroom testing program for many of the recipes in both the second and third editions. The testing enabled chef instructors to share useful feedback about how they approach a particular topic.

Much of the feedback we received since *On Baking* was first published indicated that students and instructors appreciate a book with clear, thorough explanations of fundamental techniques used in professional bakeries. Users also look for an assortment of formulas for making classic pastries and items served at modern bakery cafes, as well as dishes that reflect a wider ethnic influence. We have expanded this coverage and sought to add more formulas that speak to these trends. All of the formulas featured in *On Baking*, Third Edition Update, as well as many formulas found in previous editions, are available online through the Pearson Kitchen Manager application, which is accessible at www.pearsonhighered.com/pkm or integrated within MyCulinaryLab™ at www.myculinarylab.com. By creating an online database of formulas, we are able to expand the content covered and support the book with photographs and illustrations while maintaining an acceptable size and cost.

A NOTE ON RECIPES AND FORMULAS

The featured recipes are designed to reinforce and demonstrate techniques that are presented within the text. Many of these formulas intentionally produce low yields, which are more appropriate for students beginning to learn about baking and for small schools and teaching kitchens. Selected larger volume formulas appear in Appendix III and are noted with the scale icon shown at left. We provide volume measurements only when the quantity of an ingredient is difficult to weigh without specialized equipment: less than ½ ounce of salt, leavening or spices, for example. We list all ingredients



in both **U.S. and metric measurements**. In most instances we round off the metric equivalents to even, easily measured amounts.

Consider the U.S. and metric ingredient lists as separate recipes or formulas; do not measure some ingredients according to the metric amounts and other ingredients according to the U.S. amounts or the proportions will not be accurate and the intended result will not be achieved.

Baker's percentages are included with many formulas, especially those for breads. Widely used in the professional bakeshop, baker's percentages are very useful for increasing or decreasing yields as needed. We provide **yields** in either total batch weight or total yield and offer suggested portion sizes where appropriate.

We present detailed procedures for standard techniques, then generally do not repeat them in each recipe (for example, “apply egg wash” or “divide the dough”). A **mise en place** feature is included with recipes that appear in the front section of recipe chapters. Ingredients that require preparation before beginning to prepare the recipe are listed in the margin. You should consult this brief checklist after you read the recipe but before you begin to bake. No matter how detailed the written recipe, however, we must assume that you possess certain knowledge, skills and judgment.

Variations appear at the end of selected recipes. These variations enable you to see how a set of techniques or procedures can be used to prepare different dishes with only minor modifications. Variations also provide the advanced baker or pastry chef the opportunity to customize recipes for different applications. **Headnotes** that describe the cultural or historical background of a bread or pastry or the unique techniques used in its preparation appear with many of the recipes. This short text should enhance your understanding of a baking style or technique.

A registered dietitian analyzed each recipe using nutritional analysis software that incorporates data from the U.S. Department of Agriculture, research laboratories and food manufacturers. The **nutrient information** provided here should be used only as a reference, however. A margin of error of approximately 20 percent can be expected because of natural variations in ingredients. Preparation techniques and serving sizes may also significantly alter the values of many nutrients. In the nutritional analysis for a recipe that offers a choice of ingredients, the first-mentioned ingredient is the one used unless stated otherwise. Ingredients listed as “as needed” are omitted from the analysis. Corn oil and whole milk are used throughout for “vegetable oil” and “milk,” respectively. In cases of a range of ingredient quantities or numbers of servings, the average was used.



Throughout this book the MyPlate symbol, shown at left marks various recipes. This symbol identifies dishes that are particularly low in calories, fat, saturated fat or sodium; if appropriate, they may also be a good source of vitamins, protein, fiber or calcium.

Bakeshop products are often challenging to produce from start to finish in a single two- to three-hour class session. Formulas that can be produced in a limited amount of time are printed in blue in the master recipe list on pages xxiii through xxx. If a dough, pastry or frozen dessert base needs to chill overnight before using, it will not be highlighted even if the preparation can be made quickly. Should components such as tart dough or puff pastry be available, additional formulas in this book may be prepared in a two- to three-hour class time. As in restaurant and bakery settings, however, many breads and pastries will need to be made in stages. For example, puff pastry can be produced one day, then refrigerated for baking and assembly during a subsequent day. This reinforces the component approach to pastry preparation, in which fillings, doughs, toppings, icings and such can be prepared in advance and assembled in various ways to complete desserts and pastries. Similarly, starters for yeast breads, doughs for Danish pastries and many dessert sauces can be prepared days in advance of final use.

Baking is both an art and a science. It is best learned through hands-on experience combined with study of the principles that underlie each technique. You should rely on the knowledge and skills of your instructor for guidance. Although some skills and an understanding of theory can be acquired through reading and study, no book can substitute for repeated, hands-on preparation and observations. We hope you enjoy *On Baking!*

ACKNOWLEDGMENTS

This book would not have been possible without the assistance and support of many people. Special thanks go to photographer Richard Embery for his talent, professionalism and commitment to quality; to Eddy Van Damme for his artistry with both recipes and photographs; and to Sharon Salomon, MS, RD, for help with preparation of Chapter 16, Healthful and Special-Needs Baking. The nutritional

analysis was prepared by Mindy Hermann, MBA, RD, whose thoroughness and prompt replies were greatly appreciated. Thanks also go to Stacey Winters Quattrone, Bill Ingram and Anna Moreno for their artistry. We are grateful to the many chefs, restaurateurs, writers and culinary professionals who provided recipes and essays for this book. We extend our special thanks to the baking and pastry professionals who took time out of their busy schedules to contribute to this edition. Among them: Dan Fox, Gale Gand, Will Goldfarb, En-Ming Hsu, Emily Luchetti, Alex Miles and Craig Nielsen.

Sarah offers her sincere thanks and appreciation to her co-authors for adding their expertise, insight and artistry to this edition. She is especially grateful to Priscilla Martel for her friendship as well as her many contributions to this project, including her ability to synthesize mountains of information and express a clear vision for the book.

Eddy would like to thank his parents for gently guiding him into the amazing field of baking, Patricia for being the best sister anyone could ask for and Kyle for being the greatest. He would like to sincerely thank Dr. William Harmon, President, Dean Genevieve Stevens and Chair Suzette Brimmer for their support, dedication and vision of excellence for the academic and Culinary-Pastry Arts Program at Houston Community College, and Dr. Cesar Maldonado, and other members of the College for their relentless commitment to making the College superb. He thanks the entire fantastic team of culinary and pastry professors at HCC, Chef Younes Kay for being the very best colleague and Alex Bremont Diaz for the tremendous help in the pastry lab. He also would like to thank Hyuna Lee, Quynh Luu Ha and the Imperial Sugar Company for their generous support to the HCC pastry program.

Priscilla would like to recognize the personal and professional support of Victor Frumolt, Jacques Pépin, Carole Pierce, J. Patrick Truhn, Sylvia Barnes and James Trimble with this project. She would also like to thank Dennis Hibdon, Technical Service, Bunge Corporation; Beth Hillson, President, American Celiac Disease Alliance; Stuart A. Hirsch; Warren Patterson, General Mills; Bill Weekley, CMB, General Mills; and William “Bill” Yosses, former White House Executive Pastry Chef, for their professional help with this project. And special thanks to Charlie van Over for always keeping the wood oven stoked.

The authors wish to thank Houston Community College, Houston, TX for the use of its kitchens.

Finally we wish to thank everyone involved in this project at Pearson Education, including Daryl Fox, Executive Editor; Kris Roach, Project Manager; Susan Watkins, Program Manager; Lara Dimmick, Editorial Assistant; David Gesell, SVP Field Marketing, NA; Darcy Betts, Senior Marketing Manager, Careers and Associations; and Alicia Wozniak, Senior Marketing Coordinator.

We also remain indebted to Robin Baliszewski, Acquisitions Editor of the first edition of *On Cooking* and current Managing Director, Higher Education North America at Pearson, for her support and friendship.

We would like to offer our sincere thanks to the following chefs and instructors who took the time to provide their detailed feedback on the content in our book.

Leslie Bartosh CEC, FMP
Alvin Community College

Dorothy Chen-Maynard
California State University – San Bernardino

Elizabeth Dickson
Bossier Parish Community College

Kate Fisher
The Art Institute of Ohio – Cincinnati

Debbie Foster
Ball State University

Wendy Gordon
Rockland Community College

Jeff Hamblin
Brigham Young University – Idaho

Robert Hansen
Bob Jones University

James Haynes
Central Arizona College – Coolidge

Dorothy Johnston
Erie Community College

Cynthia Kruth
Naugatuck Valley Community College

Joseph LaVilla
Art Institute of California – San Francisco

Marilyn Lowers
Cape Fear Community College

Allan Okuda
Hawaii Community College

Virginia Olson
Anne Arundel Community College

Anthony Pisacano
Ogeechee Technical College

Cindy Schwanke
College of the Canyons

Armando Trujillo
Pima Community College

We would like to extend our thanks to the following chefs and instructors who took the time to review the accuracy and relevance of the content, as well as those who participated in our recipe testing program. Their feedback has contributed greatly to the production of our text's accuracy, level of difficulty, and appropriateness.

Maurietta Amos Gwinett Technical College	Debbie C. Kern Delgado Community College
Beatrice C. Beasley Santa Rosa Jr. College	Cynthia Kruth Naugatuk Valley Community College
Sheila Beckley Front Range Community College	Julie K. Lee Western Kentucky University
Carol Bennett Central Arizona College	Laura Marone Jefferson College, St. Louis Community College
Frank Benowitz Mercer County Community College	Fiona McKenzie Sand Hills Community College
Jeffery Alan Bricker Ivy Tech Community College - Indianapolis	Prema Monteiro J. F. Drake State Technical College
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Kristen Grissom Daytona State College	Jim Switzenberg Harrisburg Area Community College
Brandon Harpster Southeast Community College	Daniel Taylor The International Culinary Schools at the Art Institutes – Raleigh-Durham
Eunice Alicia Harris County College of Morris	Paul Vida Ivy Tech Community College
James Haynes Central Arizona College - Coolidge	Chris Villa Wallace State Community College - Hanceville
Michael Herbert Northern Virginia Community College	Katrina Warner Tarrant County College
Deborah A. Hutcheon Bob Jones University	Robert Weir Allan Hancock College
Dorothy Johnston Erie Community College (SUNY)	

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ON BAKING



“ The ranks of every profession concerned with the sale or preparation of food, including cooks, caterers, confectioners, pastry cooks, provision merchants and the like, have multiplied in ever-increasing proportions. . . . New professions have arisen; that, for example, of the pastry cook—in his domain are biscuits, macarons, fancy cakes, meringues. . . . The art of preserving has also become a profession in itself, whereby we are enabled to enjoy, at all times of the year, things naturally peculiar to one or other season.

—JEAN-ANTHELME BRILLAT-SAVARIN,
FRENCH WRITER, POLITICIAN AND PHILOSOPHER (1755–1826)

CHAPTER ONE

PROFESSIONALISM





After studying this chapter, you will be able to:

- discuss the origins of the baking and pastry professions
- understand the evolution of the professional restaurant and bakeshop
- explain the organization of the professional kitchen brigade
- understand the attributes a student chef needs to become a professional
- recognize how to maintain a safe and sanitary work environment

LIKE ANY FINE ART, GREAT COOKERY REQUIRES TASTE AND CREATIVITY, an appreciation of beauty and a mastery of technique.

Like the sciences, successful cookery demands knowledge and an understanding of basic principles. And like any successful leader, today's bakery and food service professionals must exercise sound judgment and be committed to achieving excellence in their endeavors.

This book describes ingredients and baking equipment, explains baking and culinary principles and confectionery techniques and provides formulas using these principles and techniques. No book, however, can provide taste, creativity, commitment and judgment. For these, you must rely on yourself.

BAKERS, CHEFS AND RESTAURANTS

The student studying the baking and pastry arts is entering a world rich in cultural heritage. Knowledge of this heritage is an important part of a culinary education, one that serves as a source of professional pride. Bakers and pastry chefs tap this long history for inspiration for recipes, ingredients and techniques.

Bread Making since Ancient Times

The first bread products humans consumed were firm porridges made from grasses and grains cooked on flat stones heated by an open fire. The earliest form of wheat used for bread making, *Triticum diocum*, thrived in the fertile basin of the Nile River valley. The use of a stone oven for bread making dates to the Neolithic period (4000 B.C.E.). Remarkably, the ovens discovered in archaeological ruins from that time closely resemble the domed beehive-shaped ovens still used today. It is believed that the Egyptians discovered the effect of wild yeast organisms in leavening bread and perfected bread making to achieve consistent results. (This discovery also led to the development of beer.) What historians interpret as organized bakeries are depicted in hieroglyphics, sculptures and tomb paintings discovered throughout Egypt, where as many as 70 kinds of bread were consumed in the first millennia B.C.E.

Most historians believe that the development of organized societies began with the evolution of agriculture. Once plants and grains could be consistently produced and animals raised systematically, humans were no longer forced to hunt and forage for food. The time saved allowed them to concentrate on perfecting other skills and crafts such as the way food was prepared. Bread making and **confectionery** were the first labor activities organized into specialized trades. Pharaohs employed skilled bakers to provide bread for their private consumption. Among the trades recognized by the highly organized Greek society of the fourth and third centuries B.C.E. were the wafer makers (*oblaten*) and the pastry cooks. The religion of ancient Greece focused on the worship of multiple deities and included the offering of gifts to these gods, especially around critical times, to ensure plentiful harvests, adequate rain and prosperity. As is customary today, certain breads and sweets were eaten to commemorate special occasions. Historians credit the ancient Greeks with spreading the profession of the skilled baker throughout the Mediterranean basin. According to the Greek historian Herodotus, writing in the fourth century B.C.E., bakers accompanied roving Greek armies on their raids. When Roman armies conquered them, Greek soldiers and bakers remained in what is now Italy. Roman occupation then helped spread the techniques for cultivating grains, milling and baking bread products throughout the western world. Bread rapidly became the staple food essential for human survival, a position it held in most western societies until the 20th century.

Bread baking and pastry making found a fertile home on the European continent. In the northern regions including Austria, Germany, the Netherlands, Scandinavia and Great

confectionery transforming sugar into sweets; also refers to the trade of candy making



Ancient Egyptian wall painting depicting the preparation of batter for bread.

Britain, where a cool, damp climate was inhospitable to wheat growing, rye grain products took hold. In the 17th century, the Dutch and British debuted the use of pans in which to bake bread, paving the way for the development of the sandwich.

Until the process for milling flour was perfected in the 1830s, white flour was expensive and most bread was made from assorted and relatively coarse ground grains. These grains, such as emmer and spelt, baked into rough-textured solid loaves quite unlike their light and crusty descendants eaten today. The milling process was labor intensive, involving grinding the grain between millstones and then sifting the flour manually through cloth to remove the coarse bran. The finest and whitest flour, the smallest quantity produced after many stages of sifting, made the softest products and was available only to the wealthy.

In the mid-19th century, advances were made in the production of a stable form of yeast to leaven bread. Once perfected by a Viennese distiller, this yeast paste popularized the production of a wider variety of breads. Simultaneously, improved mechanical kneading machinery appeared, making the task of large-scale bread mixing possible.

Refined Sugar and the Art of Confectionery

Humans share a strong appetite for sweet foods; it is the only universally innate taste preference. If, for millennia, the consumption of bread ensured sustenance and survival, eating sweet foods ensured satisfaction and pleasure. For much of prehistory, historians assume that fruits were humans' primary source of sweet foods. Sweet pastes made from dates and figs and syrups made from the juices of fruits such as grapes and berries were also used to sweeten foods. Tree sap from maple and birch trees sweetened foods as did syrups from cooked grains such as sorghum. Honey was the first concentrated sweetener to be widely used. In ancient Egypt, Greece and Rome, honey was used to season both savory and sweet dishes and as a preservative. Egyptian hieroglyphs from the 15th century B.C.E. depicting clay beehives document the cultivation of bees for their honey.

Though many candies and sweet confections can be made from honey, not until refined sugar became readily available did the pastry and confectionery trades evolve. Without refined sugar, many of the candies and sweets widely consumed today would not be possible. **Sugarcane** produces a liquid syrup that hardens and crystallizes when boiled. Sugar's ability to be both a liquid and solid, discussed at length in the chapters in this book, makes it indispensable for candy and pastry making.

sugarcane (*Saccharum officinarum*) a tropical grass native to Southeast Asia; the primary source of sugar

MARIE-ANTOINE (ANTONIN) CARÊME (1783–1833)

Carême, known as the “cook of kings and the king of cooks,” was an acknowledged master of French *grande cuisine*. Abandoned on the streets of Paris as a child, he worked his way from cook’s helper in a working-class restaurant to become one of the most prestigious chefs of his (or, arguably, any other) time. During his career, he was chef to the famous French diplomat and gourmand Prince de Talleyrand, the prince regent of England, Tsar Alexander I of Russia and Baron de Rothschild, among others.

His stated goal was to achieve “lightness,” “grace” and “order” in the preparation and presentation of food. As a pâtissier, he designed and prepared elaborate and elegant pastry and confectionery creations, many of which were based on architectural designs. He is credited with the invention of croquembouche, millefeuille and pulled



sugar work. As a saucier, he standardized the use of roux as a thickening agent and devised a system for classifying sauces. As a culinary professional, he designed kitchen tools, equipment and uniforms.

As an author, he wrote and illustrated important texts on the culinary arts, including *Le Pâtissier royal Parisien* (1825), containing fanciful designs for *les pièces montées*, the great decorative centerpieces that were the crowning glory of grand dinners; and his five-volume masterpiece on the state of his profession, *L’Art de la cuisine au XIXe siècle* (1833). Carême’s writings almost single-handedly refined and summarized 500 years of culinary evolution. But his treatises were not mere cookbooks. Rather, he analyzed cooking, old and new, emphasizing procedure and order and covering every aspect of the art known as *grande cuisine*.

sugar beet (*Beta vulgaris*) a plant with a high concentration of sucrose in its root; a major source of refined sugar

RESTORATIVES

The word *restaurant* is derived from the French word *restaurer* (“to restore”). Since the 16th century, the word *restorative* has been used to describe rich and highly flavored soups or stews capable of restoring lost strength. Restoratives, like all other cooked foods offered and purchased outside the home, were made by authorized guild members.

The process of extracting sugar from a large tropical grass now known as sugarcane began in India around 500 B.C.E. Arabs perfected the cultivation and refining of sugar around 600 C.E. Arab conquests of the Mediterranean region, international trade and the travels of the crusaders spread the use of refined sugar throughout Europe during the 13th through 15th centuries. (The island of Crete takes its name from the Arabic *quandi*, meaning “crystallized sugar”; it was the site of possibly the world’s first sugar refinery, built by the Arabs around 1000 C.E.) Sugar remained an expensive luxury until the ability to extract and refine sugarcane became more common. (See Chapter 4, Bakeshop Ingredients.) Venice was one of the first European cities to set up its own sugar refineries in the 15th century, making refined cane sugar available throughout the region. Many confections from that time, such as sugared fruits, sugared almonds and marzipan, are still prepared in the same manner today.

During his travels to the New World, Columbus carried sugarcane from the Canary Islands to Santo Domingo, where it flourished in the tropical climate of the island that now comprises the Dominican Republic and Haiti. As sugarcane became more dispersed geographically, the cost of production dropped, causing sugar to lose status as a luxury item while increasing its importance as a basic nutrient. During the 16th through 19th centuries sugar confectionery began to take hold in Europe.

Another source of refined sugar is the **sugar beet** (*Beta vulgaris*), the second most important source of sugar in the world. In the 18th century, German chemists discovered how to extract sugar from the root of beets and built a refinery to do this commercially in 1800. When cane sugar supplies were cut off during the Napoleonic Wars, Napoleon ordered the cultivation of sugar beets on a large scale, creating a viable sugar beet industry. Today, much of the sugar consumed in northern countries comes from sugar beets, and about half of the sugar produced in the United States comes from sugar beets.

The Birth of the Bakery and Restaurant

The culinary crafts evolved during the Middle Ages under the European guild system. The **guild system** was a method of organizing the production and sale of goods produced outside the home. Guilds ensured quality manufacturing methods and consistent pricing. Each guild had a monopoly on preparing certain items. For example, during the reign of Henri IV of

AUGUSTE ESCOFFIER (1846–1935)

Escoffier's brilliant culinary career began at age 13 in his uncle's restaurant and continued until his death at age 89. Called the "emperor of the world's kitchens," he is perhaps best known for defining French cuisine and dining during La Belle Époque (the "Gay Nineties"). Unlike Carême, Escoffier never worked in an aristocratic household. Rather, he exhibited his culinary skills in the dining rooms of the finest hotels in Europe, including the Place Vendôme in Paris and the Savoy and Carlton Hotels in London.

Escoffier did much to enhance the *grande cuisine* that arguably reached its perfection under Carême. Crediting Carême with providing the foundation for great—that is, French—cooking, Escoffier simplified the profusion of flavors, dishes and garnishes typifying Carême's work. He also streamlined some of Carême's overly elaborate and fussy procedures and classifications. For example, he reduced Carême's elaborate system of classifying sauces into the five families of



sauces still recognized today. Some consider his refinement of *grande cuisine* to have been so radical as to credit him with the development of a new cuisine referred to as *cuisine classique* (classic or classical cuisine).

His many writings include *Le Livre des menus* (1912), in which, discussing the principles of a well-planned meal, he analogizes a great dinner to a symphony with contrasting movements that should be appropriate to the occasion, the guests and the season. But his most important contribution is a culinary treatise intended for the professional chef entitled *Le Guide culinaire* (1903). Still in use today, it is an astounding collection of more than 5000 classic cuisine recipes and garnishes. In it, Escoffier emphasizes the mastery of techniques, the thorough understanding of cooking principles and the appreciation of ingredients—attributes he considered the building blocks professional chefs should use to create great dishes. Escoffier's most famous recipe was Peach Melba, created for Australian opera star Nellie Melba (1861–1931) when she was staying at the Savoy in 1893. Dame Nellie also liked her toast made in the way that today bears her name: Melba toast.

France (1553–1610), there were separate culinary guilds for *rôtisseurs* (who cooked *la grosse viande*, the main cuts of meat), *pâtisiers* (who cooked poultry, pies and tarts), *tamisiers* (who baked breads) and *traiteurs* (who made ragoûts). By the end of the 17th century, according to culinary historian Barbara Wheaton, Paris bakeshops sold a remarkable variety: "rye bread and milk rolls, fine bread and coarse bread, soup breads, a variety of little rolls . . . leavened with brewer's yeast (*pain de levure*), others with a sourdough starter (*pain de levain*)."

The French claim that the first modern **restaurant** opened one day in 1765 when a Parisian tavern keeper, a Monsieur Boulanger, hung a sign advertising the sale of his special restorative, a dish of sheep feet in white sauce. Boulanger's establishment differed from the inns and taverns that had existed throughout Europe for centuries. These inns and taverns served foods prepared (usually off premises) by the appropriate guild. The food—of which there was little choice—was offered by the innkeeper as incidental to the establishment's primary function: providing sleeping accommodations or drink. Customers were served family style and ate at communal tables. Boulanger's contribution to the food service industry was to serve a variety of foods prepared on premises to customers whose primary interest was dining.

The French Revolution (1789–1799) had a significant effect on the budding restaurant industry. Along with the aristocracy, guilds and their monopolies were generally abolished. The revolution also allowed the public access to the skills and creativity of the well-trained, sophisticated chefs and **pâtisiers** who had worked in the aristocracy's private kitchens. Although many of the aristocracy's chefs either left the country or lost their jobs (and some their heads), a few opened restaurants catering to the growing urbanized middle class.

As the 19th century progressed, more restaurants opened, serving a greater selection of items and catering to a wider clientele. By midcentury, several large, grand restaurants in Paris were serving elaborate meals, decidedly reminiscent of the **grande cuisine** (also known as *haute cuisine*) of the aristocracy. *Grande cuisine*, which arguably reached its peak of perfection in the hands of Antonin Carême, was characterized by meals consisting of dozens of courses of elaborately and intricately prepared, presented, garnished and sauced

pâtissier French for *pastry chef*; the person responsible for all baked items, including breads, pastries and desserts

grande cuisine the rich, intricate and elaborate cuisine of the 18th- and 19th-century French aristocracy and upper classes. It is based on the rational identification, development and adoption of strict culinary principles. By emphasizing the how and why of cooking, *grande cuisine* was the first to distinguish itself from regional cuisines, which tend to emphasize the tradition of cooking

GASTON LENÔTRE (1920–2009)

Gaston Lenôtre started in the baking trade in the heart of Normandy in the 1930s. By age 15, he had passed his professional exams and set off to work in his hometown. In 1947, he bought the boulangerie/pâtisserie of his boss in Pont Audemer. His bakery became a destination for sophisticated Parisians on their way to their country estates. In 1957 he was enticed to open a shop in Paris at 44 rue d'Auteuil in the 16th arrondissement, one of the city's most stylish sections. It was the first of more than a baker's dozen of locations, plus a vast catering business, which literally catered to "le tout Paris."

Lenôtre chose the village of Plaisir outside Paris for his third location—a vast production kitchen that became the heart of his expanding empire. He saw that to realize his expansion plans, he needed to train workers in his methods, and he began an in-house school, L'École Lenôtre. But here is where Gaston Lenôtre demonstrated his talent as both baker and businessman: There was a crisis in the trade at the time due to a lack of qualified bakers, so Lenôtre opened the school, a few years



later, to the entire professional community. For a fee, even his competitors could come and learn from his *Meilleurs Ouvriers de France*—chefs recognized by the French government as the best artisans in the trade.

As befitting a native of Normandy, the heart of France's dairy industry, Lenôtre's innovations came in the area of Bavarians,

charlottes and fruit mousses. Many of his cakes and tortes became modern classics, copied by pastry chefs worldwide. La Feuille d'Automne, Le Concorde and L'Opéra were ubiquitous in Parisian bakeries in the 1980s. Lenôtre mastered the technique of freezing, using it with respect to protect the quality of his products without adulterating them. He used the latest technology to maintain the integrity of his products. Proper freezing preserves the product, extending its shelf life without having to use chemicals and preservatives common in industrial food production. Many professionals believe that Lenôtre single-handedly saved the pastry profession when it was threatened by mass production.

Lenôtre is considered by many the father of modern French pastry, and his impact is worldwide. By the early 1980s he had 18 stores in Japan as well as outposts in Germany, Switzerland and England. Today, whether you go to Rio de Janeiro, Disney World in Florida, Lebanon or Las Vegas, you will find Lenôtre's name on the marquee.

—ALEX MILES, Pastry Chef and Culinary Educator, Dijon, France

foods. Carême was known for advancing the art of the pâtissier by creating elaborate showpieces made with pastillage and pulled sugar. A great innovator, he is credited with perfecting nougat, meringue, croquembouche and millefeuille.

The Late 19th Century—Escoffier and *Cuisine Classique*

Following the lead set by the French in both culinary style and the restaurant business, restaurants opened in the United States and throughout Europe during the 19th century. Charles Ranhofer (1836–1899) was the first internationally renowned chef of an American restaurant, Delmonico's in New York City. In 1893, Ranhofer published his "franco-american" encyclopedia of cooking, *The Epicurean*, containing more than 3500 recipes including recipes for flannel cakes and brandy snaps.

One of the finest restaurants outside France was the dining room at London's Savoy Hotel, opened in 1898 under the direction of César Ritz (1850–1918) and Auguste Escoffier. Escoffier is generally credited with refining the *grande cuisine* of Carême to create *cuisine classique* or **classic cuisine**. By doing so, he brought French cuisine into the 20th century.

The Mid-20th Century—Point and *Nouvelle Cuisine*

The mid-20th century witnessed a trend toward lighter, more naturally flavored and more simply prepared foods. Fernand Point was a master practitioner of this movement. But this master's goal of simplicity and refinement was carried to even greater heights by a generation of chefs Point trained: principally, Paul Bocuse, Jean and Pierre Troisgros, Alain Chapel, François Bise and Louis Outhier. They, along with Michel Guérard and

classic cuisine a late 19th- and early 20th-century refinement and simplification of French *grande cuisine*. Classic (or classical) cuisine relies on the thorough exploration of culinary principles and techniques and emphasizes the refined preparation and presentation of superb ingredients

LIONEL POILÂNE (1945–2002)

What many bakers don't realize is that good wheat can make bad bread. The magic of bread baking is in the manipulation and the fermentation. What has been lost . . . is this method.

—Lionel Poilâne

Called a true visionary and an ambassador of bread, Lionel Poilâne is credited with elevating the craft of bread baking and the appreciation of traditional artisan ways of making bread in our time. At age 14, he began working in his father's small bakery on a project that would become his life's passion. His father had started making a large dark rustic loaf, like that which was common in Paris before the light baguette-style bread captivated the city in the 1920s. Enchanted by this old-style bread, Poilâne dedicated himself to reviving traditional regional breads. Renowned for his attention to detail and appreciation of the craft of



the baker, in the early 1980s he set out to document regional bread recipes. Captured in his book, *Guide de l'Amateur de Pain*, these breads were fading memories before

he rediscovered them. His book is used as a reference text in schools throughout France to this day.

Thousands of loaves of *pain Poilâne*, the name for his singular crusty round loaf, are made each day in a production bakery outside Paris. This bread is sold in restaurants and shops throughout Paris and flown to the United States and more than a dozen other countries daily. Though the production is large, it is not industrialized. He believed in what he called “retro-innovation,” combining the best of the old techniques with modern advances. Two bakers work at each of 24 wood-fired stone ovens, forming the loaves by hand. The original shop at 8 rue du Cherche-Midi is situated on the site of an 18th-century monastery and houses ovens dating from that time. The shop, which still sells fresh *pain Poilâne* and a limited selection of other baked goods, is a Mecca for serious bread lovers from around the world.

Roger Vergé, were the pioneers of **nouvelle cuisine** in the early 1970s. In the world of the pâtissier, Gaston Lenôtre made inroads by taking the classic pastries of *grande cuisine* and adapting them to a brighter, fresher style of pastry making.

Their culinary philosophy was principled on the rejection of overly rich, needlessly complicated dishes. These chefs emphasized healthful eating, using high-quality fresh ingredients and simple cooking methods. The accompaniments and garnishes must be light and contribute to an overall harmony; the completed plates must be elegantly designed and decorated. Following these guidelines, pastry chefs began to plate desserts in the kitchen, mimicking the creative and fanciful style of the chefs' savory food presentations. These early plated desserts often paired fresh fruit sorbets and sauces with artfully presented cakes, mousses or tarts.

nouvelle cuisine French for “new cooking”; a mid-20th-century movement away from many classic cuisine principles and toward a lighter cuisine based on natural flavors, shortened cooking times and innovative combinations

Return to Craftsmanship and the Artisan Bread Movement

During this period, a number of Parisian bread bakers, notably Lionel Poilâne, sought to return simplicity to quality bread making. The bread most often associated with France—the long, golden-brown baguette with the white fluffy interior—is a 20th-century invention. In the 1920s a new mixing technique was introduced, which produced lighter, softer bread than what had been available previously. During World War II, severe shortages forced bread rationing in France. The scarce bread that was available during the war was made from whole grains extended with inferior ingredients such as ground beans. According to French historian Jérôme Assire, this bread's offensive taste made the longing for pure white bread even more intense. Following the war, the demand for fluffy white bread was greater than ever. New dough-mixing methods and rack ovens capable of handling large numbers of loaves produced plenty of bread to meet this demand.

In the 1960s Lionel Poilâne began working at his father's bakery, where he learned to make an old-style loaf of bread like that sold by bakers in 18th-century Paris. Using a blend of whole-meal flours and long fermentation (rising) times, he learned to bake breads on the stone floor of a wood-fired oven. Following his lead, other bakers in Paris were similarly