THE STORY OF THIS BOOK

Browse any bookstore, online or brick-and-mortar, and you’ll find a large selection of culinary reference books that offer step-by-step instructions for preparing classic French cuisine. Many of these books are wonderful, and we highly recommend a number of them for any cook’s library. Unfortunately, although these texts often encompass Nouvelle and New International methods, they include few (if any) of the exciting new techniques that have been developed in the last 30 years.

Many Modernist chefs have written their own books, and these generally do a great job of elucidating aspects of each chef’s personal culinary style. Chefs don’t usually aspire to write a book that is more comprehensive than their own vision—after all, a chef operating a restaurant probably doesn’t have the time to produce a lengthy reference text like those that exist for French cuisine. Chefs are too busy running their kitchens and creating new dishes.

In a sense, cookbook writers face similar barriers. Many of the greatest cookbooks are written by people who write for a living, like Paula Wolfert, Patricia Wells, Michael Ruhlman, Mark Bittman, James Peterson, Wayne Gisslen, and dozens of others. Authors such as these tend not to write large-scale reference books, which require large staffs working full-time for a matter of years. For context, consider that the production of these five volumes required the combined efforts of several dozen people over the span of three years. That level of effort is the norm for a major reference work or college textbook. Resources on this scale are generally not available to independent food writers, however.

Of course, Julia Child is one notable exception to this rule, but she had two counselors, and even then, they undertook an arduous nine-year journey to the publication of Mastering the Art of French Cooking. In addition, Child’s masterpiece was mostly text—it originally contained no photos and only minimal illustrations. That kind of book worked in 1961, but it wouldn’t be competitive in today’s market, where numerous visual elements are expected in a book of this size.

Child’s story is a cautionary tale to writers who would attempt a book on a similar scale. Indeed, for people who write for a living, it makes more sense to publish less comprehensive, more specialized cookbooks on a regular basis.

Who, then, would spend the time, energy, and money to create a large-scale culinary reference book? Certainly not mainstream publishers, because such a book would be extremely expensive to produce and would not have any proven market. Who would be foolhardy enough to step forward? We decided it would be us.

The origins of this book date back to 2004, when I started exploring and explaining sous vide cuisine in eGullet’s online forums (see page 59). As a result of that experience, I resolved to write a book on sous vide. At the time, there was no book in English about the technique, and the only recent text on the subject was Joan Roca’s excellent Sous Vide Cuisine, which I struggled through in Spanish (before the English version came out and before Thomas Keller published his book Under Pressure: Cooking Sous Vide). There was clearly a need for a comprehensive book on sous vide in English, so I decided to write it.

But as I worked on the book, I kept seeing reasons to expand its scope. Food safety is intrinsically linked to sous vide; misunderstandings about the safety of the method have long prevented its widespread adoption. So, with the help of several research assistants, I dug into the scientific literature and discovered that much of what chefs are told about food safety is wrong. Mostly it is wrong in a way that ruins the taste of food without providing any meaningful improvement in safety. Sometimes it is wrong in the other direction, producing results that could be unsafe. It became clear to me that cooks need some guidance.

This idea was driven home when chef Sean Brock contacted me for help convincing his local food inspector that it would be safe to serve food prepared sous vide at his restaurant, McCrady’s, in Charleston, South Carolina. A few days later, the food inspector for that area also contacted me. He was fascinated by the data I had passed along to Brock and wanted to learn more. Brock got approval to go ahead, and I resolved that my book would cover microbiology and food safety as well as the core aspects of sous vide techniques.
Next, inspired by the questions that people had posted in the eGullet thread on sous vide, I decided that my book would also include information about the basic physics of heat and water. Chefs hailing from many of the best kitchens in the world, as well as amateurs of all sorts, had questions about heat transfer. When making traditional cuisine, you don’t need to understand precisely how heat moves into and through food—you just need to know that you turn the burner to medium-high, for example, or set the oven to 375 °C / 350 °F and roast your food until it’s golden brown. Unfortunately, this approach gives you little intuition that’s any help when you try to use a technique like sous vide, in which a more precise knowledge of the heating process is required to achieve consistently good results. For the most part, experience from conventional cooking does not apply.

But this raised a question: wouldn’t people like to understand how traditional cooking actually works? Aside from its intrinsic interest, the science of cooking would also help chefs apply Modernist techniques. Before long, I was sliding down a slippery slope toward a book of epic proportions.

Why not add a section on hydrocollidos? What about foams? At that stage, my ideas were more daydreams than practical reality, so it was easy to convince myself that it all made sense.

How could such a technical book be made accessible to readers? I decided that photography—another passion of mine—could make the difference by presenting technical concepts in a highly visual manner. My hope was that seductive, bright, and beautiful clear photos would both draw readers in and provide a clear demonstration of what the text told them. This decision made the book much more challenging to create but also that much more compelling if it was successful.

What I wound up with was what you see now, a multivolume book with three main goals: to explain key aspects of food science in a new way; to show how traditional cooking really works; and to provide detailed, step-by-step photos and instructions for every major technique and ingredient in Modernist cooking. A saner man might have treated that as three distinct projects, but to me they seem to hang together as a unit. This account of the book’s history has been written in the first person singular, because in the beginning it was just me, Nathan. But it couldn’t become a reality until I had a team. I had been very lucky to have met Chris Young at The Fat Duck (see page 49) and, when I heard he was moving back to the U.S., I jumped at the chance to hire him for the project.

Chris quickly recruited Maxime Bilet, another Fat Duck alumnus, as head chef, and from there we were off. Initially, I had planned to take all of the photos myself. Ryan Matthew Smith joined the team as a photo assistant and digital photo editor. Soon Ryan was taking most of the pictures, and we hired an assistant for him.

At first, the work was done in my home kitchen, but soon we decided to move to part of a science laboratory and invention workshop that my company was building. This allowed us to work all hours of the day and night, which we promptly proceeded to do.

In those early days, very little of our work was devoted to developing recipes. In most cookbooks, recipes make up 90% or more of the content—but that is possible only because almost all of the techniques and equipment discussed in such books are old hat. People know what sauté pans and ovens are, so writers don’t need to spend pages describing these tools. But people may not have the same basic knowledge about combi ovens, water baths, or freeze dryers, so we knew we had to explain what they are and, more important, to discuss why you’d use them. As a result, this book devotes more pages to discussing new tools and technology than a traditional book does; recipes make up a much smaller fraction of our text.

Indeed, we had not planned initially on including recipes at all. Over time, however, we decided that we needed to provide some recipes as examples, since theory alone would be too hard to apply. But then we got carried away. We developed not only small examples but also numerous plated dishes. The style of these dishes is eclectic, and that is a deliberate choice. The goal of most cookbooks is either to showcase a chef’s personal style or to explore a certain type of cuisine (Korean, New American, vegetarian, etc.). In contrast, our goal is to showcase the techniques and technologies of Modernist cuisine across all of their potential applications.

As a result, there is no single style represented in this book. We explain how to use Modernist techniques to create the ultimate cheeseburger (see page 5-11), sunny-side-up egg (see page 2-174), and Indian curries (see page 5-89). But we also discuss highly technical dishes and processes, such as constructed creams (see page 4-236), reverse spherification (see page 4-386), and spray-drying (see page 2-438). Many of the leaders of the Modernist movement were kind enough to give us recipes to use as examples. In some cases we developed our own examples using the work of other chefs as an inspiration or point of departure.

These volumes are dedicated to the Modernist revolution in cuisine discussed in this chapter, but many readers will be more traditionally minded. That’s fine—our mission is to teach techniques, not proselytize for Modernism. People interested in traditional food will still find much here of value. We explain how traditional techniques work in chapter 7, and we have many recipes and techniques that involve purely traditional ingredients. Want to make perfect omelets for a crowd? See page 5-215. Would you like to make your own tofu or mozzarella? Check out page 4-110.

For traditional chefs who are ready to walk on the wild side and experiment with some new ingredients, we have recipes for an invincible beurre blanc that can be made ahead of time and held without congealing (page 4-200), a sauté pan that can be made to order with a whipping siphon (page 4-284), and a perfect risotto that can either be made largely ahead of time or prepared rapidly in a pressure cooker (page 3-304).

This book, in five volumes plus a kitchen manual, is enormous by nearly any standard. Yet I am certain that there will be people who think we left something out. I am sure that we have! There is no way, even in books of this size, to cover every issue, or even every important issue. If your favorite technique, ingredient, or recipe is not covered, I apologize. We’ll try to do better next time.

One omission is deliberate: we have no treatment of pastry, dessert, or baked goods. We expect to cover these topics in the future, but we had to draw the line somewhere, so we limited ourselves to savory cuisine.

Conversely, there will be people who argue we
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We decided that we could not create the book we wanted to make on that kind of budget—just as Per Se and L’Arpège have decided that to achieve the level of quality they are interested in, they need to charge more than McDonald’s or the strip-mall diner.

Another criticism people may have of this book is that the material is too complicated for readers to understand. We made a rule that we wouldn’t dumb down the content. We have tried to make the text as easy to understand as possible, and we have gone to great lengths to illustrate the content with photos and to lay out the key information in an accessible and engaging way. We hope you’ll agree. Of course, you can always skip the science and go right to the step-by-step techniques and recipes. We have tried to make the material self-contained enough that you can either take the full-Monty approach and learn it all or cherry-pick the techniques you want to use.

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ways, including with meat-cutting band saws. The cutaway photos are all real. We arranged food in our cut-in-half equipment and then took the pictures. In most cases, the food really is being cooked as shown or was cooked in an identical uncut pan, then swapped in. The pad thai shown on page 2-50 is cooked in a cutaway wok (with about one-third of the side removed so the pan could still hold some oil), which is sitting on a wok burner that is also partially cut away (but with enough left to burn gas).

It turns out there is a reason people don’t cut their woks like this! We had problems with oil falling into the burner and the whole thing catching fire, so it was a bit dangerous and very messy. But the picture really is a shot of what it looks like to stir-fry noodles in a wok that’s been cut apart. In a few cases, we couldn’t actually cook in the cutaway—for example, the whipping siphon shown on page 4-261, the pressure canner on page 2-90, and the microwave oven on page 2-186 couldn’t function after we bisected them. A technique we used to create many of the cutaways was to glue a piece of heat-resistant borosilicate glass to a cut pot with silicone caulking. Then we digitally edited the image to remove evidence of the caulking and the glass. It’s some-what like the technique used in Hollywood movies to make people look like they’re soaring through the air: film them “flying” while supported by wires, then digitally remove the wires. Creating cutaways to illustrate the process of deep-frying was a particular challenge. We built a special frying tank out of Pyrex borosilicate glass so we could photograph food as it was fried. Twice we burned up or shattered the tank, but ultimately we were able to get the shots (see page 2-118).

We often created composite shots by editing multiple images together. For example, when making the photo of hamburgers sizzling on a cutaway grill, Ryan had difficulty finding a photographic exposure to capture the coals and the meat simultaneously; camera sensors capture a far smaller range of brightness than human eyes do. So for each image of this kind, we took multiple shots with different exposures and combined parts of them together to make the final image. In other cases, we did this using a technique called high-dynamic-range imaging, but more often we created the composites directly in software. As a result, purists will argue, each of these is a “photo illustration” rather than a single photograph. That comes with the territory—a magical view that shows you what is happening inside a pressure cooker as if it were cut in half is technically not a pure photo, nor can it be. These photos are as close to real as we could make them.

Aside from the cutaways, the other images are all real photos of real food. Food photography and styling are well-developed arts that often make appetizing photos by using tricks—like mixing up fake ice cream that won’t melt, using plastic ice cubes instead of real ones, or faking a roast chicken by painting a browning compound on a nearly raw bird. We generally did not use these techniques in the book. Our goal was to show how cooking works, in as realistic a way as we could. In a few cases we did have to resort to some extra work to achieve the effects we wanted.

One of the questions we get is “Who was your food stylist?” The answer is, nobody. Or, alternatively, one could say that everyone on the team was a stylist. Part of the art of Modernist cooking is styling and presentation; we see it as an integral aspect of cooking this type of cuisine. We also want to focus more on the food than on the table settings, so our shots are generally made without plates or silverware in the frame.

We shot the photographs primarily with Canon digital cameras, including the EOS-1Ds Mark II, EOS-1Ds Mark III, and EOS 5D Mark II, outfitted with a variety of lenses. A broncolor studio flash was used for most of the photos, with a variety of soft boxes or other light modifiers. We used Nikon microscopes for the microscopy shots, along with custom-made servomotors and computerized controls for taking shots with extensive depth of field. We also used a number of objective lenses and condensers, including bright field, dark field, differential interference contrast and Hoffman modulation contrast. For a few shots, we used a Vision Research Phantom V12 video camera that
stunning, such as a bullet passing through the air—in the blink of an eye—as well as video to capture cooking processes that would otherwise be invisible. We used high-speed photography and software, including Helicon Focus.

A Guide to Modernist Cuisine

The first volume is about the fundamentals—foundations on which to build an understanding of the techniques described in the other volumes. This first chapter covers the history and philosophy of Modernist cuisine and the techniques used in it. The next chapter, Microbiology for Cooks, addresses the ways microbes interact with food. So much of food safety revolves around microscopic pathogens that it is valuable to understand the basic science of microbiology. For example, many chefs can’t tell you why a common foodborne malady is called “food poisoning” or explain the differences between viral, bacterial, and parasitic infections. Chapter 2 demystifies these things.

Chapter 3 addresses food safety itself. Our analysis is likely to be controversial, because we point out how much of the conventional wisdom is just plain wrong. First, we found that many food-safety guidelines taught to both home and restaurant chefs are out of date when compared to the latest official regulations. For example, today there is no food-safety reason to cook pork for any longer than beef or other meats. In addition, the official government regulations have their own problems. We found a number of errors in the U.S. Food and Drug Administration regulations, but perhaps worse, we also found that government food-safety regulations take positions that are based as much on politics and lobbying as on science.

That controversy pales in comparison to what we’re likely to stir up with chapter 4 on Food and Health. People have strongly held beliefs about which foods are good for you and which are not. These beliefs are usually justified by scientific research—studies linking particular foods to heart disease and certain kinds of cancer, for example. Unfortunately, it turns out that the actual scientific results from the latest research contradict most of the conventional wisdom.

The remainder of volume 1 covers the basics of the conventional wisdom. The first is heat (chapter 5). So much of cooking is about heating food that it seems invaluable to really understand the basics of heat transfer. When heat flows into food, what happens next depends a lot on the physics of water. Most of our food, after all, is composed primarily of water. So that is the subject of chapter 6, the final chapter in this volume.

Volume 2 covers techniques and equipment, starting with chapter 7 on Traditional Cooking, which explains visually how the various processes long used to prepare food in the traditional kitchen work. Next, Cooking in Modern Ovens (chapter 8) covers combi ovens and water-vapor ovens that cook with low-temperature steam. These are very important pieces of kitchen equipment that are widely available but not widely understood. Chapter 9 on Sous Vide Cooking covers that invaluable technique in detail.

The last and largest chapter in the second volume, The Modernist Kitchen (chapter 10), offers an in-depth look at the equipment—much of it repurposed from science laboratories—that Modernist chefs use to work their magic in the kitchen. These special tools include centrifuges, rotary evaporators, freeze dryers, and many more gadgets and appliances.

Volumes 3 and 4 are about food ingredients. In Volume 3, Meat and Seafood (chapter 11) covers all aspects of using animal flesh—whether fish or fowl, mollusk or mammal—in cooking. Plant Foods (chapter 12) discusses the biology and preparation of all manner of vegetables, fruits, grains, and other plant-derived products. These two large chapters include both visual explanations of the ingredients and numerous recipes.

Volume 4 addresses the most important new ingredients in Modernist cooking. Our chapters on Thickeners (13), Gels (14), Emulsions (15), and Foams (16) all explore the ways in which Modernist techniques can be used to create new forms of food that would be impossible to produce with conventional ingredients. Eggs and dairy ingredients are also covered in this volume.

The two final chapters of volume 4, on Wine (17) and Coffee (18), cover the two most important beverages in a meal. In each case, we take a different approach from most cookbooks. In Wine, we discuss some of the latest research on flavors and terroir, and we offer new techniques for using wine, including “hyperdecanting.” The Coffee chapter discusses both how to brew great coffee and how to make outstanding espresso drinks, both of which are often neglected arts in restaurants as well as in home kitchens.

Volume 5 contains our recipes for plated dishes. In that sense, this volume is more like a traditional cookbook than any of the others. As discussed above, these recipes run the gamut from hamburgers and barbecue to Indian curries to multicompartment, restaurant-style Modernist dishes. Each of these recipes combines multiple smaller recipes to create an entire plated dish or set of related dishes.

We hope you enjoy reading this book as much as we’ve enjoyed writing it, and we look forward to hearing your feedback. Visit www.modernistcuisine.com to share your thoughts, ask the authors questions, see videos of selected techniques (as well as the exploding eggs shown on the previous page), and much more.
HISTORY

ABOUT THE RECIPES

Modernist Cuisine, both the culinary movement and this book, is dedicated to looking at cooking from new angles. We cover topics ignored by other culinary books, so it stands to reason that our recipes look somewhat different from those in other cookbooks. Our goal is to break down recipes in such a way that you can better understand not just the what (ingredients) and the how (methods), but also the why. To accomplish this, we needed a new format for presenting recipes.

The compact, modular form of our recipes makes them a broader resource for instruction and inspiration. They're meant to help you both understand the practical applications of culinary principles and visualize how you might apply those principles in other contexts.

In these five volumes, you'll find a huge variety of recipes and foods. Although we are telling the story of Modernist cuisine, our recipes are not limited to cutting-edge dishes—we cover everything from American regional barbecue to innovative flavored gels. The point is not to tout modern techniques; it is done "to taste," following the cook's experience.

An important thing to consider when following recipes in this book is that details matter, often to a great degree. In traditional cooking, there's a common precept that exact measurements don't matter much (at least in savory dishes)—we cover everything from American regional barbecue to innovative flavored gels. The point is not to tout modern techniques; it is done "to taste," following the cook's experience.

That is not the case with pastry, where precision counts. You don't add yeast or baking powder to taste, and proportions of leavening to flour aren't left to creative impulse. Modernist cuisine tends to lean more toward the pastry chef's approach. In Modernist cooking, carefully measuring ingredients ensures consistent results.

In part, that is because the specialized ingredients used in this form of cuisine can be quite powerful. A little too much of a gelling agent, for example, can result in a tough, rubbery product, while too little will not produce the desired gelling effect. So measuring is a critical factor, at least if you'd like to attain the end result that we intended.

Ingredients and Equipment

You might be surprised to learn that although many people equate Modernist cooking with something akin to laboratory science, the majority of recipes here can be made with tools available in most standard kitchens. Even the recipes that involve sous vide techniques can be made without specialized gadgets: you can just use a simple pot on the stove and a thermometer (see page 2.240). At the other end of the spectrum are the recipes that do require a centrifuge, combi oven, freeze dryer, or other specialized tool. If you're interested in investing in such equipment, there are now many places to find it, including eBay and other purveyors of secondhand equipment, scientific-equipment catalogs, and a growing number of cooking stores.

Very few kitchens on Earth have all the equipment featured in this book (I know of only two: one at my house and another at our cooking lab). Our recipes were designed under the assumption that the optimal tools and equipment are on hand. If you don't have those tools at your disposal, those particular recipes will be more informational than practical, but they will still serve their purpose as an educational medium. Indeed, many recipes in cookbooks end up functioning primarily to provide information and inspiration. Not everyone who owns a copy of Auguste Escoffier's Le Guide Culinaire has made all his triple stocks and complicated forcemeats, for example, but there remains great instructional value in seeing his examples and reading the recipes.

What you won't find in our recipes is much attention to the most basic equipment, such as bowls and sauté pans. We presume that you'll know what equipment you need to use when we call for blending or simmering or sautéing. Recipes here use a number of unusual ingredients, like xanthan gum, sodium alginate, gelatin, essential oils, and glucono delta lactone. Our glossary of cooking terms at the back of volume 5 provides information and inspiration. Not everyone who owns a copy of Auguste Escoffier's Le Guide Culinaire has made all his triple stocks and complicated forcemeats, for example, but there remains great instructional value in seeing his examples and reading the recipes.

Recipes here use a number of unusual ingredients, like xanthan gum, sodium alginate, gelatin, essential oils, and glucono delta lactone. Our glossary of cooking terms at the back of volume 5 describes each of these ingredients, and you may be surprised at how easy they are to acquire. Well-stocked supermarkets and health food stores sell many of them, because they are used in certain regional dishes or as substitutes for more routine
products. People with wheat allergies, for instance, often use xanthan gum to replace the gluten protein found in wheat flour. Agar is often available where you’d find other Asian specialty products. The rise in popularity of the Internet, like many other things, is a great time to buy a good scale and begin applying a bit more precision to your recipe measurements.

In fact, you might want to consider getting two different scales if you’re committed to cooking a range of recipes from this book. One would be your general-purpose scale, good for measuring weights from one gram to 1,000 grams or more. The second scale would be for finer measurements, accurately weighing items down to 0.01 gram. Such scales often max out at 100 grams or so and thus are not as widely applicable as the first type of scale.

Keep in mind that the final yield of a recipe will not necessarily be a simple sum of the weights of the ingredients. Some things get trimmed along the way, liquids evaporate, and unmeasured ingredients come into play (for example, the water used to soak dry beans will add weight to the finished dish). We provide yield information based on the real weight of the final results, as measured in our test kitchen.

Temperatures in the book are given in both Celsius and Fahrenheit. In general, where precise temperature is less critical, we do some rounding. It doesn’t help much to know that 57 degrees Celsius equals 134.6 degrees Fahrenheit; 135 °F will work fine. Kitchen thermometers typically don’t operate well at more than one to two full degrees of accuracy anyway (see page 269), and the controls of ovens and deep-fryers often jump by five-degree intervals.

But one of the central themes of Modernist cooking is that exact temperature control is called for under certain circumstances. Water baths used for sous vide cooking (see page 2·336) are a means of precisely controlling temperature. Accuracy is particularly important in the lower range of cooking temperatures. Typically, the higher the temperatures, the less critical it is that they be precise. But when you’re cooking salmon mi-cuit (literally “partially cooked”), the color of the flesh shouldn’t change from the raw state, which requires very tight temperature management. Whatever you need to cook the fish within a very narrow range, to no more than 40 °C / 104 °F; above that, it becomes difficult to control the results. Many gelling agents are effective up to 85 °C / 185 °F, but if they are heated to higher than that temperature, the gel can fail.

Another issue to consider is that some of the newer ingredients, like hydrocolloids, come in a range of grades, brand names, and proprietary blends. We list the specific brands we used in developing the recipes as a point of reference and to provide some guidance about the properties that other brands may have. Don't let these slight variations intimidate you; once you get the hang of it, these details become second nature.

Sometimes a recipe will go away for any number of reasons. Perhaps you’re using a flaky hydrocolloid like gellan, which might gel prematurely if your tap water has a particularly high mineral content. Or perhaps your sous vide bags are leaking. We have tried to offer plenty of troubleshooting notes and examples of various scenarios to help you diagnose the most common problems, but we surely haven’t caught them all. Unfortunately, there are many more ways to do something wrong than to do it right. When all else fails, try to treat these outcomes as a learning opportunity.

Weights and Measures

You’ll see in these recipes that we measure ingredients by weight. Most cookbooks sold in America use U.S. weights and volumes for ingredients: ½ cup of sugar, one teaspoon of salt, two cups of milk, etc. We find that these volume measurements are not sufficiently accurate in many instances.

Modernist recipes often require great precision in measuring ingredients. If you use a fraction of a percent more or less of certain gelling agents or thickeners—for example, one extra gram of the compound per liter of liquid—that imprecision will ruin the recipe. So rather than using more general volume measures in some cases and precise gram weights in others, we choose to use gram weights for all ingredients in the book.

We even list water by its weight rather than by its volume, unless the quantity needed is undefined. Salt is usually relegated to the vaguer notion of “to taste,” but where practical we provide it as a precise measurement. Water baths used for sous vide cooking (see page 2·336) are a means of precisely controlling temperature. Accuracy is particularly important in the lower range of cooking temperatures. Typically, the higher the temperatures, the less critical it is that they be precise. But when you’re cooking salmon mi-cuit (literally “partially cooked”), the color of the flesh shouldn’t change from the raw state, which requires very tight temperature management. Whatever you need to cook the fish within a very narrow range, to no more than 40 °C / 104 °F; above that, it becomes difficult to control the results. Many gelling agents are effective up to 85 °C / 185 °F, but if they are heated to higher than that temperature, the gel can fail.

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Baker’s Percentage

You’ll often want to scale a recipe up to higher yield or down to make a smaller quantity than it is actually written. You can do this by multiplying the ingredient quantities by a given factor or by doing some division to figure out the ratios of the ingredients.

The best system that we have found for making a recipe easy to scale is called baker’s percentage, a method of measurement that is widely used in pastry and baking books. In a recipe that uses baker’s percentage, one reference ingredient—such as flour—usually the ingredient that most affects the yield or the cost of the recipe—is set to 100%. The quantity of each other ingredient is then cited as a percentage of the reference ingredient’s weight.

For example, our recipe for Sous Vide Instant Hollandaise (see next page and page 4·228) sets egg yolks as the reference ingredient at 100% and calls for 75 grams of yolks. It calls for vinegar at a scaling of 4%, meaning 4% of the weight of the egg yolks—not 47% of the yield or 47% of the sum of all ingredients, just 47% of the weight of however much the yolks weigh.

For more on where to purchase items mentioned in these volumes, see Sources of Equipment and Ingredients, page 5·30.
### Example Recipes

#### Ingridents Quantity Scaling Procedure

- **White wine (dry)** 100 g 13%. Combine.
- **Shallots, finely minced** 50 g 67%. Reduce to syrup-like consistency.
- **White wine vinegar** 35 g 47%. Strain.

#### Procedure

1. Measure 20 g of wine reduction.
2. Egg yolks 75 g (sour-large) 100%. Blend thoroughly with some reduction.
3. Stock or water 20 g 27%. Combine.
4. Cook sauce over 65 °C / 149 °F for 3 minutes.
5. Unsalted butter, method 221 g 300%. Blend into yolk mixture until fully emulsified.
6. Salt 4 g 5.3%. Season.
7. Make acid 1 g 1.3%. Transfer to 1 l / 1 qt siphon.
8. Charged with two nitrates cartridges. Hold up to oven at 65 °C / 149 °F for 1 h 15 minutes.

#### Two-stage fried egg:

1. Reduce to syrup-like consistency.
2.** Text:

   "The key difference between a parametric recipe and a master recipe is that the latter is general in order to encompass its many variations, which get most of the space. A parametric recipe, in contrast, simply summarizes the variations in a compact form."

#### Three Kinds of Recipes

- **Example recipes**, **parametric recipes**, and **plated-plate recipes**. Each serves a different purpose: to illustrate how particular ingredients or techniques can be applied in the kitchen. For ingredients that come in standard sizes, approximate numbers (%) are given as well. In many cases, a special scaling percentage (%) is given to aid in substitutions to provide greater precision when needed, such as when using scaling agents. The special scaling is calculated in a percentage of some combination of all ingredients, as explained by a note at the end of the recipe. When an ingredient is itself the product of a recipe or a step-by-step technique, a parenthetical reference (‘C’) is given to the instructions for making it.

---

**Example recipes and components of plated-plate dishes have similar formats. In cases where a recipe is inspired by, or adapted from, another chef's attribution is given after the recipe title. The date of the recipe is that of the bottom of the recipe.**

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>QUANTITY</th>
<th>SCALING</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>White wine (dry)</td>
<td>100 g</td>
<td>13%</td>
<td>Combine.</td>
</tr>
<tr>
<td>Shallots, finely minced</td>
<td>50 g</td>
<td>67%</td>
<td>Reduce to syrup-like consistency.</td>
</tr>
<tr>
<td>White wine vinegar</td>
<td>35 g</td>
<td>47%</td>
<td>Strain.</td>
</tr>
</tbody>
</table>

So if you’re using 75 grams of egg yolks to make the recipe, you need 35 grams of vinegar, because 75 grams times 47% equals 35. But say you only have 65 grams of egg yolks. How much vinegar should you use? This is where the scaling percentage really simplifies recipes. Just multiply the same 47% for vinegar times the actual weight of egg yolks available—65 grams—to get the answer:

$$30.5 \text{ grams of vinegar.}$$

Keep in mind that the percentages of the minor ingredients will not add up to 100% because scaling percentages give the weight as a proportion of the weight of the reference ingredient, not of the total weight of all the ingredients in the recipe.

One challenge in using baker’s percentages is that they can be difficult to follow when you want to omit or add an ingredient, or if you substitute several ingredients of different quantities. This issue comes up most frequently in recipes that involve small quantities of potent thickeners or gelling agents. But it also arises for more common ingredients such as salt. In the hollandaise recipe above, for example, if you decide to use a more flavorful wine and stock, you may choose to reduce it a bit less than the recipe indicates to achieve the balance of flavors you want. But how should you then adjust the quantity of egg yolks to preserve the texture of the sauce?

We provide a special scaling percentage in many cases to help with such situations. A note at the bottom of the recipe explains how the special percentage is calculated. Often it is a proportion of the weight of all ingredients in the recipe or of all other ingredients (omitting the weight of the ingredient that has the special percentage listed). In the example above, we added the weights of the wine-shallot-vinegar reduction, the stock or water, and the butter, which came to about 268 grams when we made the recipe. The weight of the eggs, at 75 grams, suggests for how to serve them, but the fundamental goal is to discuss the tofu itself, a core ingredient that can then be used in myriad dishes. These example recipes often are building blocks rather than complete recipes (although our silken tofu made with GDL is so good you could eat it straight).

The parametric recipes, the second of the three kinds, are quite unlike usual recipes—and, in our view, much more interesting. Parametric recipes refer to the fact that these recipes have parameters that are set by one key ingredient or characteristic.

This idea echoes that of the master recipe, which many successful cookbooks have used as a foundation. Examples include books by editors of Cook’s Illustrated, Sauces and Splendid Soups, by James Peterson; and Raymond Sokolov’s The Saucer’s Apprentice. Master recipes illustrate a basic technique in its purest form first, then use variations to elaborate the theme. The key difference between a parametric recipe and a master recipe is that the latter is general in order to encompass its many variations, which get most of the space. A parametric recipe, in contrast, simply summarizes the variations in a compact form. So, for example, our parametric recipe for purred fruits and vegetables cooked sous vide, page 3-288, lists cooking times and temperatures for a wide variety of ingredients. At a glance, you can see that shabu shabu puree should be cooked at 88 °C / 190 °F for one hour, whereas mango puree needs to be cooked at 75 °C / 165 °F for 30 minutes.

When recipes get more complicated, the parametric format really shines. Our parametric recipe for hot gels on page 4-160 summarizes the differences between 10 approaches to creating this dish, each of which uses different hydrocolloids that have their own scaling percentages.

We feel the parametric recipe is a strong concept for an instructional cookbook. Such a recipe does more than merely suggest methods for making one dish the same way again and again—it reveals the pattern and reasoning behind the chosen ingredients and methods, and thus makes it clearer how to apply those lessons in other circumstances. The parametric recipe thus makes the master recipe to a more detailed level, and serves as a launching point that allows you to change ingredients and quantities in a number of ways to produce dozens of variations. A single page of parametric recipes in the Gels or Thickener chapters, for instance, might point the way to hundreds of different preparation options. The parametric approach also makes scaling the yield of a recipe up or down simpler than any other approach we know.

In parametric recipes, we are frequently concerned only with minor ingredients; often the only major ingredient is whatever liquid is being thickened. That liquid is the ingredient that sets the reference quantity, and the amount of other ingredients is given as a percentage of the reference. For example, our recipe for ham consomme with melon beads (see page 4-66) simply lists xanthan gum at 0.24 %, which would mean using 2.4 grams for every 1,000 grams of base liquid.
Making a Smooth Puree

1. Prepare the vegetables by cutting them into evenly shaped, small pieces, as indicated in the table below.
2. Combine the vegetables with the liquid or seasoning indicated in the table. Set the weight of the produce to 100%. For example, use 12 g of butter for every 100 g of mushrooms.
3. Cook as indicated. Suggested methods, temperatures, and times are listed in the table.
4. Puree by using the tool indicated. Optionally, process with a rotator, which is a high-speed homogenizer suitable for a fine texture. For large quantities, a colloid mill is an ideal tool.

Best Bets for Vegetable and Fruit Purees

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Prep</th>
<th>Method</th>
<th>‘(°C)’</th>
<th>‘(°F)’</th>
<th>Liquid</th>
<th>scaling*</th>
<th>Tool</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>apples</td>
<td>peeled, quartered</td>
<td>sous vide</td>
<td>90</td>
<td>212</td>
<td>25%</td>
<td>15 blenders</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>asparagus</td>
<td>thinly sliced</td>
<td>sauté</td>
<td>high heat</td>
<td>10</td>
<td>vegetable stock</td>
<td>25%</td>
<td>15 blenders</td>
<td>341</td>
</tr>
<tr>
<td>artichokes</td>
<td>hearts, thinly sliced</td>
<td>sous vide</td>
<td>80</td>
<td>176</td>
<td>45</td>
<td>vegetable stock</td>
<td>5%</td>
<td>15 blenders</td>
</tr>
<tr>
<td>beets</td>
<td>peeled, thinly sliced</td>
<td>sous vide</td>
<td>80</td>
<td>176</td>
<td>1 h</td>
<td>cooked beet</td>
<td>15%</td>
<td>15 blenders</td>
</tr>
<tr>
<td>broccoli</td>
<td>stems, peeled and sliced</td>
<td>sauté</td>
<td>medium heat</td>
<td>12</td>
<td>neutral oil</td>
<td>3%</td>
<td>15 blenders</td>
<td>426</td>
</tr>
<tr>
<td>spinach</td>
<td>stems, sliced</td>
<td>boil</td>
<td>high heat</td>
<td>4</td>
<td>neutral oil</td>
<td>3%</td>
<td>15 blenders</td>
<td></td>
</tr>
</tbody>
</table>

In many cases we have example recipes tied to entries in the parametric recipe table. These cross-references let you see a full example of how the parameters and formulas work in practice. The final kind of recipe we use in this book is the plated-dish recipe. This comes closest to the recipes found in traditional cookbooks. Our plated-dish recipes offer instructions for creating an entire restaurant-style dish, including main ingredients, multiple garnishes, and details about how to assemble everything for serving. We describe the entire context of the dish in detail; thus, some of these recipes are quite involved, with many component parts. You can always opt to simplify things a bit by using only certain parts. Plated dishes come in a wide variety of styles.

Parametric recipes typically contain three parts: an introduction that explains some of the underlying principles of work (not shown in this example), steps, and notes. The general procedure for making the recipe, and one or more tables, typically organized by main ingredient, that present the parameters—ingredients, quantities, preparation steps, cooking times and temperatures, etc.—for making a large number of variations. Ingredients for each variation are grouped together horizontally. In the example below, the recipe for asparagus puree calls for blending broth vegetable stock and unsalted butter together with the pureed asparagus. When no new variation is given for a main ingredient, it is sometimes indicated as added by an indented line. If a parameter is listed for a variation, it indicates that we don’t consider any additional ingredient necessary for this case. A value of ‘0’ indicates that the value is not applicable for a given parameter.

Cooking instructions: Typically include both temperatures and times, given in minutes (mi) or hours (h), as indicated by the unit at the top of the columns. When a time is unusually short or long, the abbreviated unit is included with the number. Quantities in parametric recipe tables are often given as percentages of a liquid or a main ingredient, as indicated by a note at the bottom of the table. References to related example recipes, plated-dish recipes, or step-by-step procedures are often given in a “See page” column.

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Kinch, and Joan Roca, have their own styles exemplify all of those styles.

The other plated dishes are no less stylistically diverse. It might come as a surprise to everyone that we’ve devoted so much attention to American barbecue, but we’re big fans of this cuisine. Indeed, we find that barbecue exhibits enormous depth and complexity that is rarely appreciated outside of its home region (and too frequently ignored outside the United States). Initially we set out to create one barbecue recipe, but the idea soon grew to include sauces and barbecue styles from every region of the country (see page 5-46). Perhaps we were overambitious, but our goal is to serve up a broad range of experiences.

After our test kitchen had made its way through the barbecue recipes, a member of the kitchen team, Anjana Shanker, suggested developing Modernist versions of some Indian curries. She reasoned that Indian curry dishes, like American barbecue, come in a vast variety of regional styles. The recipes she came up with were so good that we had to put them in the book—you’ll find them on page 5-59. These recipes illustrate how even culinary traditions stretching back hundreds (or in some cases, thousands) of years can be revisited and given a delicious and thought-provoking effect.

Credit Where Credit Is Due

Because we selected recipes to illustrate important concepts in the development of Modernist cuisine, it is only natural that many originated as contributions from the chefs who first used the given technique in a fine-dining context. For example, Ferran Adrià was the first to introduce spherification to a restaurant setting, and we have included example recipes that cover two of his iconic creations: imitation caviar and faux olives.

It is not always the case that the example recipe we have is from the chef who did it first; however, we chose some recipes simply because they seemed to best exemplify the topics explained in the book. Although we have gone to some effort to document history in this chapter, the rest of the book is first and foremost about teaching technique.

Every recipe included here was tested in our kitchen laboratory after a tremendous amount of development work. But we’ve also had a great deal of help from leading chefs around the world, and we believe it is important to give credit where it is due. Some of the people who inspired recipes in this book don’t know or necessarily endorse the fact that we’ve used their recipes as a launching point for one of our own. That is particularly true of historical recipes, from chefs who are no longer with us but who, we hope, would be pleased to play a role in this historical re-creation of recipes.

A few of the recipes that we’ve included are inspired by a particular chef, and we’ve modified the recipe in substantial ways. We may have applied Modernist ingredients or techniques to a basic recipe idea that was first developed in a traditional context. For example, we include a recipe for spot prawns in a fine grass napé, inspired by a dish from Thierry Rautureau, a French chef in Seattle with whom I apprenticed for some time. This version is a fantastic dish, but it is entirely unique in its techniques and ingredients. Our version uses a Modernist emulsifier—propylene glycol alginate—to keep the nage from separating, and we cook the prawns sous vide with low-temperature steam. On one hand, ours is very different from Rautureau’s recipe, but on the other, it is completely inspired by a truly memorable meal at which he served this dish more than 10 years ago.

Another reason we might note that a recipe is “inspired by” a particular chef is that we are using only a single component from a dish that chef created. The goal in this case isn’t to showcase the chef’s cuisine and the original dish in its full form but simply to use part of the recipe as a teaching tool, somewhat out of context. We’ve deeply grateful to all those chefs who—whether they know it or not—have inspired the development of recipes. So we decided that, as a rule, we would assign credit to individuals.

Of course, we recognize that the development of recipes is often a team effort. So when we credit chefs like Blumenthal or Adrià, that credit should be interpreted as going to the culinary teams they lead. Many of the innovations likely have been developed, honed, or improved by many people on the team, not just the chef who leads the group.

The word chef, of course, is French for “chief, manager, or leader.” The very best chefs are exactly that: leaders who inspire and manage a team. It is customary to attribute any team’s effort to the group leader, particularly in the kitchen, but we all know that the leaders would be a lot less productive without their teams’ support. This book, by the way, is no different; without an incredible team of talented people, it would have been impossible to create it.

As for the photographs that accompany our recipes, most are images that we took ourselves, though in a few cases we do include an image that was supplied by the chef who created the dish. We recognize that the way we’ve assembled and presented each dish may or may not be done exactly as it would have at the chef’s restaurant; but the intent is to exemplify the chef’s inspiration. We have no expectation that this book duplicates chefs’ recipes and culinary styles as they would express them in their own cookbooks. After all, that is why they write them. Our book is instead a repository of culinary technique, with many ideas that most cookbooks don’t have the space or resources to provide.

The remaining recipes are those that we developed from scratch on our own. For example, we wanted to figure out how to make an instant soufflé, but we really had no starting point to work from. We just began working through a range of ideas and options without a clear path, eventually creating a recipe that calls for appalling a pre-made soufflé mixture from a whipping siphon into a ramiken, then putting it in the oven. It’s a method we’re quite pleased with. For all we know, someone else out there had already done the same thing—we just weren’t able to find it. If we’ve inadvertently missed someone who feels she or he developed a dish that we have not given that person credit for, we apologize.

Safety

Physical safety is always an important consideration in the kitchen, and it can be especially so with certain aspects of Modernist cooking. Some items in the Modernist toolbox, such as liquid nitrogen, are unusual, and you need to learn unique safety precautions in order to handle them. But we’d also point out that many elements of traditional cooking can require special precautions as well. Oil heated to 205 °C / 400 °F for deep-frying is a pretty dangerous liquid, too. Food safety is important as well—so much so that we devote chapters 2 and 3 to the subject. In addition to these specialized sections, we have provided safety-related notes in many of the recipes. These notes are not meant to be exhaustive—cooks should exercise the appropriate care and caution in every dish they make—but they may call attention to cases where safety issues are not necessarily obvious.