

MODERNIST PIZZA



History and Fundamentals





MODERNIST PIZZA

Volume 1

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FOREWORD BY TONY GEMIGNANI	vi
FOREWORD BY ENZO COCCIA	vii
OUR CULINARY JOURNEYS BY NATHAN MYHRVOLD BY FRANCISCO MIGOYA	viii
THE STORY OF THIS BOOK	x
ABOUT THE RECIPES	xi
	xx
HISTORY AND FUNDAMENTALS	
CHAPTER 1: HISTORY OF PIZZA	3
What Is Pizza?	4
Searching for the Origins of Pizza	6
The City That Created Pizza	12
Pizza Arrives in America	25
Pizza in Argentina	40
Pizza in Brazil	43
Industrial America and New Haven	48
Pizza Marches Across the United States	53
Back in the Old Country: 20th-Century Naples	67
Pizza in Postwar America	77
Pizza in Italy Today	86
CHAPTER 2: WORLD OF PIZZA	91
Our Pizza Mission	92
What Constitutes a Style?	94
Quality Transcends Style	113
But That's What I Grew Up On!	115
The Close Associates of Pizza	123
Pizza Styles	125
CHAPTER 3: PIZZA TRAVELS	149
Choosing the Pizzerias	150
Naples and Campania	154
Rome	168
Northern Italy	179
São Paulo	190
Buenos Aires	200
Tokyo	208
New York	214
New Haven	228
Chicago	234
Quad Cities	248
Old Forge	249
Detroit	250
Portland, Oregon	254
Rest of the United States	262
CHAPTER 4: PIZZA DOUGH INGREDIENTS	271
Flour	273
Water	288
Yeast	292
Preferments	298
Salt	313
Sugar	315
Fats and Oils	316
Improving Pizza Dough	322
Inclusions	331
CHAPTER 5: PIZZA OVENS	345
The Physics of Baking	346
The Physics of Dough and Sauce	362
The Gel Layer Problem	370
Selecting a Pizza Oven	375
INDEX	396

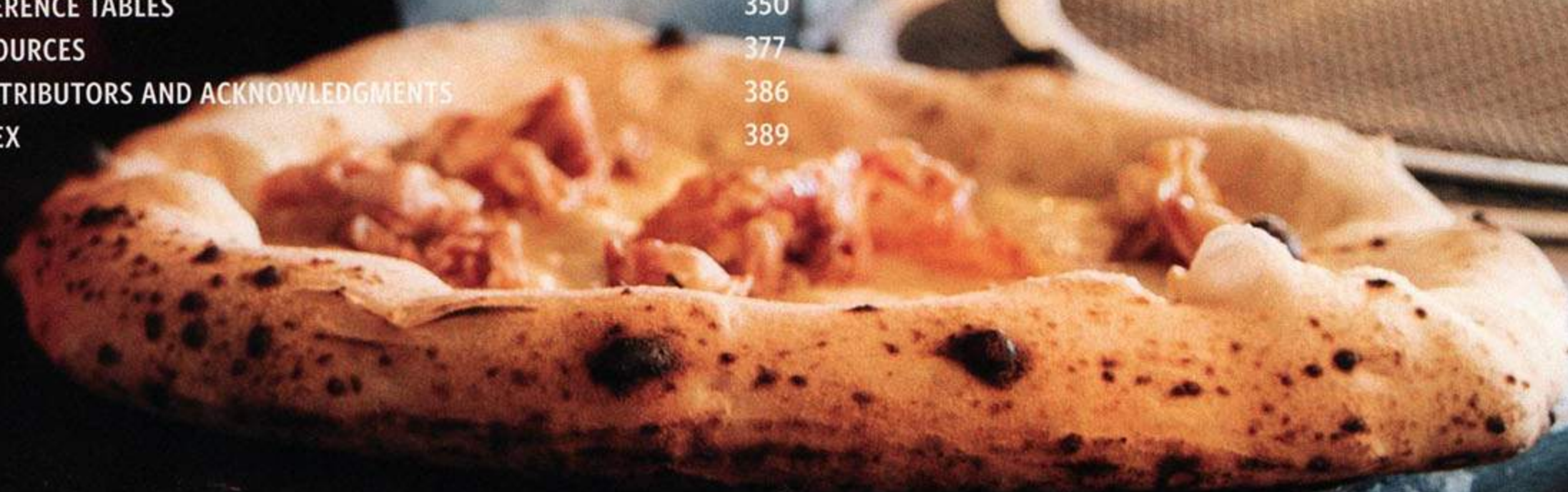
Volume 2

TECHNIQUES AND INGREDIENTS	
CHAPTER 6: MAKING PIZZA DOUGH	3
Naming the Parts of a Pizza	4
The Quality Characteristics of Pizza	8
Planning to Make Pizza	15
Mixing	23
Bulk Fermentation	48
Dividing and Preshaping	52
Final Proofing	65
CHAPTER 7: PIZZA DOUGH RECIPES	81
Pizza Styles	82
Our Variations	100
Thin-Crust Pizza Dough	110
Brazilian Thin-Crust Pizza Dough	114
Deep-Dish Pizza Dough	118
Neapolitan Pizza Dough	124
New York Pizza Dough	132
Artisan Pizza Dough	142
Focaccia Dough	148
New York Square Pizza Dough	152
High-Hydration Al Taglio Pizza Dough	158
Detroit-Style Pizza Dough	166
Our Variation Recipes	172
CHAPTER 8: SAUCE	203
Why We Put Sauce on Pizza	204
Applying Sauce	205
Tomato Sauces	210
Thickening Sauces	242
Dairy-Based Sauces	250
Emulsion-Based Sauces	259
Stocks, Soups, and Pasta Sauces as Pizza Sauce	268
Vegetable- and Fruit-Based Sauces	278
CHAPTER 9: CHEESE	285
Milk	286
Cheese Making	290
Preparing Your Cheese	296
Applying Cheese to Your Pizza	303
Mozzarella	315
Ricotta	338
CHAPTER 10: TOPPINGS	343
The Science of Pizza Toppings	344
Topping Payload	346
Topping Application	349
Fruits and Vegetables	356
Precooking Techniques	360
Meats	375
Finishing Your Pizza	382
CHAPTER 11: BAKING PIZZA	387
Transferring Your Dough	388
Transforming Dough into Pizza	392
Pizza Baking Methods	395
INDEX	423

Volume 3

RECIPES

CHAPTER 12: ICONIC RECIPES	3
Our Iconic Pizzas	4
Thin-Crust Pizza	10
Neapolitan Pizza	34
Medium-Crust Pizza	60
Deep-Dish Pizza	86
Thick-Crust Pizza	106
Prebaked Pizza	130
Pizza Cousins	156
CHAPTER 13: FLAVOR THEMES	173
Our Favorite Flavor Combinations	174
CHAPTER 14: SERVING AND STORAGE	293
When to Serve Pizza	294
Serving Pizza	298
Holding Pizza Hot	305
Reheating Pizza	312
Storing Leftover Pizza	328
FURTHER READING	335
PHOTOGRAPHY AND ILLUSTRATION CREDITS	338
GLOSSARY	339
GRAIN COOKING HOW-TOS	342
REFERENCE TABLES	350
RESOURCES	377
CONTRIBUTORS AND ACKNOWLEDGMENTS	386
INDEX	389



FOREWORD

Ask a question, do background research, construct a hypothesis, test your hypothesis, analyze your data, and share the results. That's the scientific method. I witnessed this in action when I stepped into The Cooking Lab in October 2014. I was testing pizzas with the Modernist Cuisine team for part of the book *Modernist Bread*. I've dedicated 30 years of my life to pizza and, in that visit, I questioned myself and my life's work.

When I stepped into their lab, I knew just a little about Nathan Myhrvold and chef Francisco Migoya. They are not yet well known in the pizza industry, but they are recognized as experts, technologists, and teachers in whatever they do. When it comes to food, both Nathan and Francisco are rigorous, creative, and inventive.

Since that first visit to The Cooking Lab, I've worked with them multiple times on pizza. I still remember, like it was yesterday, when Francisco first made a Neapolitan pizza in my pizza class. His first attempt was average. I asked him, "So what do you think?" Chef Migoya analyzed the pizza like it was a Rubik's Cube, paused, and said, "I will do it again." The next pizza that came out of that 900-degree oven was not what I expected. It was magnificent. I realized then that Francisco takes the time to analyze what he's doing as he looks for improvement at every step, seeking to master and push the boundaries of whatever he puts his mind to. I looked at the pizza and I looked at the class and said, "We can always be better." I believe that, and the search for improvement is imbedded into this book.

Modernist Pizza will transform your pizza-making skills and knowledge, whether you're a home cook or a seasoned professional. It delves deep into pizza culture like no other book. Experts, skeptics, gastronomes, and pundits may question the formulas, results, or conclusions in this groundbreaking book. Innovation backed by the hard work of study and experimentation is so often resisted by people who have long-standing practices or beliefs or who do not understand or want to accept facts. It's like comparing science to religion.

This book may push the boundaries of what a New Yorker, Neapolitan, or Chicagoan may think is the best way to make a pizza. They grew up believing how pizza should be made and what it should taste like; it's their tradition—like a religion—and often they don't recognize that their take is subjective. People practice, praise, and preach about the pizza they grew up with. They think it's the best and they're territorial about it.

When you read *Modernist Pizza*, you may still maintain your belief about your favorite pizza, but it will open your eyes both to making that pizza better and to how many other great pizzas are worth studying and baking. If you study this book, you will have a greater appreciation for the elements of pizza and you will bake a better pizza. Not through faith or divinity, but through facts and science, and you'll see that facts and science both respect the craft and can elevate the art of pizza.

—TONY GEMIGNANI



With *Modernist Pizza*, Nathan Myhrvold and Francisco Migoya have created a true encyclopedia of pizza: a book that encompasses all of the main styles of pizza that exist. This three-volume collection builds its foundation on science and provides a complete and engaging overview that shows the breadth and depth of the universe of pizza. Nathan and Francisco were able to catalogue the world of pizza, translating their first-hand knowledge into a book that is accessible.

Modernist Pizza traces a path that tells pizza's story and its traditions, all the while explaining the techniques for preparing a variety of pizza styles. But this collection goes beyond the borders of a classic cookbook. It gets more in depth and uncovers all of the secrets that are hidden within the different types of pizza all over the world. The result? A voyage where readers learn the art of the preparation of pizza, studying its history and discovering its recipes, from the traditional to the innovative.

The unifying theme that spans across the volumes is the photography. *Modernist Pizza* is full of wonderful photos, which more than anything show the reader the core of what pizza should be. They are real culinary portraits through which readers will learn every step of pizza's preparation. The photographs do not omit any details so that you can achieve the best possible result in your pizza.

This book is a collection not only for the pizzaioli and pizzeria operators, but also for many serious pizza aficionados and beginning pizza makers, for whom this is a first step. Anyone who wants to learn or who is curious about what is hidden behind this fantastic world will glean something from *Modernist Pizza*.

I, like other master pizzaioli, can only admire the job done by Nathan and his team. They have illuminated the world of pizza through studying what I and my colleagues have done and continue to do each and every day to arrive at pizza perfection.



Modernist Cuisine has succeeded in creating a complete and exhaustive guide for pizza. It's a book that will win over its readers from the very first page. They have distilled the idea that there is much more to pizza than just a simple dough. Beyond the steps of mixing and baking pizza, there is a pizza macro-cosm to understand, study, and explore, and Nathan and the Modernist Cuisine team have achieved that goal in this opus.

—ENZO COCCIA

OUR CULINARY JOURNEYS

What's a technology and science guy like me doing writing a book about one of the world's most popular foods? The short answer is that I've loved food and I've loved science for as long as I can remember. Consider, too, that baking is technology and cooking is science.

My culinary path began a little over 50 years ago with youthful inquisitiveness. It included a foray into competitive barbecue, a long stint as a stagiaire at a storied Seattle restaurant, and a diploma from *École de Cuisine La Varenne*, a culinary school in France. In 2011, I was the lead author and publisher of a successful book on avant-garde cooking and science, *Modernist Cuisine: The Art and Science of Cooking*, before publishing *Modernist Cuisine at Home* and *The Photography of Modernist Cuisine*. I then returned to a hallmark of my youth: bread. I spent years baking bread, experimenting with bread, enjoying bread, and finally writing an even bigger book called *Modernist Bread*, along with my coauthor of this book, Francisco Migoya.

That book not only provided a detailed description of bread but also blazed new trails with advanced techniques and included staggering discoveries.

In some parallel universe, perhaps I could have become a cook or a baker. Instead, I wound up getting deeply involved in science. I went to college at age 14 and devoured mathematics and the sciences. By the time I was done at age 23, I had a PhD in mathematical physics. I then became a postdoctoral fellow at the University of Cambridge, working with Dr. Stephen Hawking on the quantum theory of gravitation.

At the same time, some friends from graduate school were working on a software project, and after arranging a summertime leave of absence, I joined them. We had created a start-up by the end of the summer and, two years later, our company was acquired by Microsoft. I would go on to become Microsoft's first chief technology officer, working directly for Bill Gates.

We traveled all over Italy to research the different types of pizza being made there today. Our journey took us down the narrow corridor that leads to Pepe in Grani in Caiazzo (left), Enzo Coccia's pizzeria in Naples (top right), Gabriele Bonci's Pizzarium in Rome (bottom right), and numerous points in between.



In 1999, I retired from Microsoft to found Intellectual Ventures and pursue several interests, including a lifelong interest in photography, cooking, and food science. By the 2000s, I had become immersed in Modernist cooking, a field that lacked any central texts. Even though I was neither a TV chef nor the owner of a Michelin three-star restaurant, I founded Modernist Cuisine to create those missing books as a way of making the new Modernist techniques more widely available.

Our collection of books has won nearly every top award, including the 2012 Cookbook of the Year award from the James Beard Foundation, the International Association of Culinary Professionals (IACP) award for Design and Professional Kitchens, and the 2011 Gourmand World Cookbook Awards Hall of Fame Inductee for *Modernist Cuisine*. We won the IACP Food and Beverage Reference/Technical award for *Modernist Cuisine at Home*. And *Modernist Bread* won the James Beard Award for the Restaurant and Professional category, the IACP Jane Grigson Award for Distinguished Scholarship and Depth of Research in Cookbooks, and was a 2017 Gourmand World Cookbook Awards Hall of Fame Inductee.

Following the publication of *Modernist Cuisine* in 2011, the book also won top honors for visual design. The photography of *Modernist Cuisine* has been exhibited worldwide, including at the Smithsonian Institution and the Natural History Museum in Le Havre, France. In 2014, *The Photography of Modernist Cuisine: The Exhibition* was created, and the traveling exhibit illuminates the fascinating,

accessible science at work every day in the kitchen. The exhibit has traveled to the country's leading science and culinary museums in Seattle, Boston, Silicon Valley, and New Orleans. Repeated requests to buy the art paved the way for my next venture: Modernist Cuisine Gallery, with locations in Las Vegas, Nevada; New Orleans, Louisiana; Seattle, Washington; and La Jolla, California.

All of the books that we have published have helped make the concepts behind avant-garde cooking, photography, and food science even more widely available. Each of these books is enormous because we approach these topics trying to find the most important stories, techniques, and developments, particularly those that aren't widely known. We have a very comprehensive and in-depth approach.

I have the same aspirations for *Modernist Pizza*. My first experience with pizza was eating at a chain (Shakey's Pizza Parlor in Santa Monica, California), but since then I have had pizza all over the world, including Naples. Not surprisingly, it's always been a favorite of mine.

Our team brings the same love of food, the same inquisitiveness and inventiveness, and the same dedication to science to this publication as we did to our earlier publications. And we apply these motivations to a food that's eaten every day by many people around the world. For me, pizza is endlessly fascinating—it's a combination of art and alchemy, history and creativity, discovery and invention. This book is a reflection of that passion.

—NATHAN MYHRVOLD



L'Industrie may be a tiny pizzeria, but it packs a punch in terms of its pizza. It was easily one of our favorite slice shops in New York City.

Pizzerias weren't the only thing that we were interested in visiting during our travels. We wanted to learn more about the ingredients that went into the pizzas, like the wheat in this field near Arezzo, Italy.





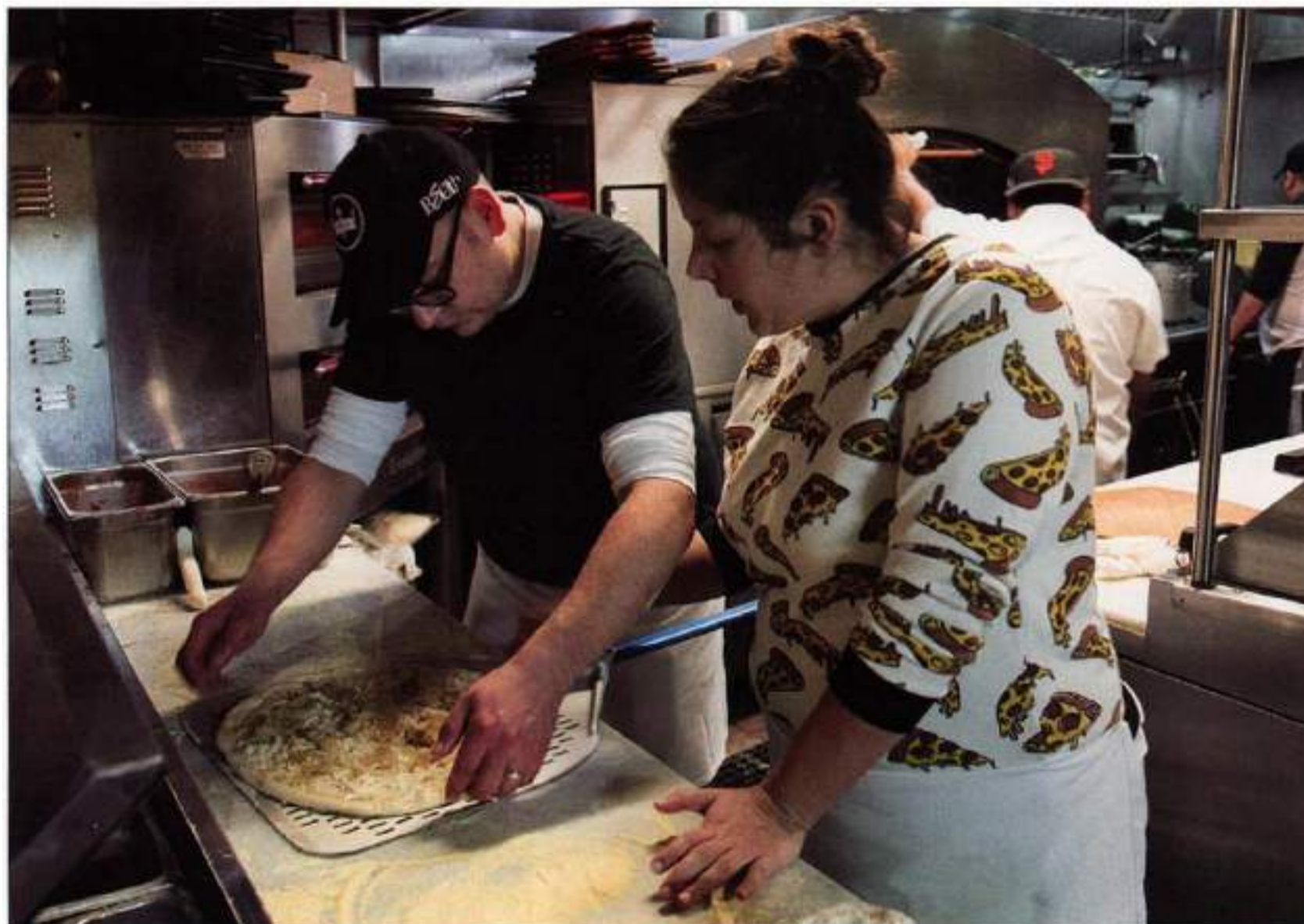
We started working on *Modernist Pizza* just as we were winding down production on our previous book, *Modernist Bread*. It felt like a natural progression to shift from bread to pizza (they are both based on yeast-leavened doughs, after all). We found that while they do have some similarities, they have enough differences that we ended up spending almost four years taking a deep dive into researching pizza and writing three volumes about it.

Pizza has always been a part of my life, from a quick grab-and-go lunch to a destination meal. But to write about it is a different story. To do it justice, we had to do a lot of research, and I had to take numerous classes with renowned professionals and make thousands of pizzas on my own to be able to properly write authoritatively on the subject. I gained a deep respect for the craft, specifically when I learned how to make Neapolitan pizza. There's so much science, technique, and know-how needed to execute this pizza that it appealed to me almost instantly.

Once I eventually made what I would consider a very good version of this style of pizza, one that looked like it came from a pizzeria, I was hooked. Although sometimes you can have beginner's luck, I can honestly tell you that you will be good at making most pizza styles (and definitely Neapolitan-style pizza) only after you have had a lot of practice. Fortunately, even mistakes are good enough to eat.

I consider myself very lucky because part of our research involved extensive travel to many parts of the world beyond Italy (which we visited three times). This included Argentina, Brazil, France, and every part of the United States where a distinctive style of pizza is made or where there is really good pizza, no matter the style.

As often as we could, we made pizza with the experts in their pizzerias in order to learn from the best, including Laura Meyer at Tony's Pizza Napoletana in San Francisco, California.



Having tasted so many pizzas and so many different styles, I find it very difficult to imagine picking one style as the “best.” It is my hope that those of you who use this book can look beyond your favorite style or the style that you grew up on. While there are one or two styles I could do without, the majority have their place on the table, and I personally could not pick one over the others. I don't think that you can compare a Detroit-style pizza with a Neapolitan pizza; even though they have similar components, they are dramatically different, and each has its own reasons to be loved. All pizzas deserve a chance.

Our team is unique because we are not bound by tradition or a set of rules to make our pizza, so we were free to experiment as we saw fit to make the best pizzas possible. It is for you to reap the benefits of our many tests (and pounds gained). There were many breakthroughs and very satisfying discoveries that resulted in great pizzas of all kinds. Some positive results were accidental, while others took hundreds of pizzas to figure out, but that is the process we stick to when we write books and we wouldn't have it any other way. We ate bad pizzas so you don't have to.

Our intent is for this book to be suitable for many types of pizza makers, from absolute beginners to pizza pros. There really is something in here for everyone—actually, there is a lot for everyone. Writing for the pros is not exactly easy because they are a crowd that knows their stuff, so we had to be sure that the information we provided would be useful to them. Writing for home bakers is even harder, because home ovens are notoriously bad at many things and not particularly good at any one thing. Our chefs stayed at home during the COVID-19 pandemic, however, and developed loads of tips and tricks for making great pizza in a home oven. With the methods and hacks we developed, we can practically guarantee you will make great pizza at home.

Even with all of that information, the recipes, and the photos, however, you will have to make lots of pizza before you get good at it. It also helps if you make an investment in a scale and an oven thermometer; they make a huge difference. We'll explain other equipment that will help you make better pizza, but you should at least have these two basics. I hope you enjoy reading and using this book as much as we enjoyed making it. And, in case you were wondering, there is such a thing as too much pizza.

—FRANCISCO MIGOYA

THE STORY OF THIS BOOK

The books that we produce at Modernist Cuisine have historically covered broad swaths of the cooking world. *Modernist Cuisine* explored vast portions of savory cooking and presented them through a Modernist lens. Our next project, *Modernist Cuisine at Home*, tackled many of the main topics from *Modernist Cuisine* (plus a few extra), but the scope was still wide. Following the publication of those books, we came out with a very large-format book dedicated to the photography from *Modernist Cuisine*. Not only did it showcase some of our favorite photos from the book, it told you how we took them. In *Modernist Bread*, we turned to a single subject but still brought a comprehensive approach; it turns out bread is a big enough subject that the book was over 2,600 pages.

Most of our culinary friends thought that we would write next about pastry and dessert, but we decided to cover pizza for a couple of reasons. First of all, it's arguably the world's most popular food. It's multicultural and it's found in virtually every country around the world (see page 93), in part

because wherever pizza goes, it mutates and evolves into something that's local. Pizza is simultaneously the evolution of a 19th-century dish from Naples and a window into the culinary creativity of the people who modified the original pizzas into the many forms we see today.

Why else would we focus on pizza? Because it has so many of the things that we love in a topic. Pizza may seem simple but is in fact highly technological and scientific—pizza crust is basically a type of bread and, like all bread, it's a kind of biotech product involving fermentation. Making pizza (or cheese; see page 2:290) is so technique-intensive that small variations in the method can make huge differences in the outcome. In addition, pizza is often baked at very high temperatures, which can break with the intuition that one might have accumulated from conventional cooking or baking.

There is also a tremendous amount of skill involved, to the point that making pizza can be daunting to home pizza makers and professionals alike (especially if you are making Neapolitan pizza

Pizza can be (and has been) made in a variety of ways by a myriad of pizza makers over the years. The recommendations that we provide throughout the book are the result of extensive testing and experiments.



in a wood-fired oven; see page 2:406). During the baking process, pizza's simple ingredients go through such a mind-blowing transformation that the product that comes out of the oven bears almost no resemblance to the flour, water, yeast, and salt that went in. That's just cool.

Most of the very best cuisines on earth are richly documented. One part of being an esteemed chef with a famous restaurant is that you often publish cookbooks. This is an important career goal, and it is rare these days to find a Michelin three-star restaurant where the chef doesn't have at least one book. Additionally, in the world of haute cuisine, there is substantial learning by doing. Almost every high-end kitchen in the world has apprentices who might be accomplished chefs in their own right, yet they work at making someone else's dishes as a means of education and career development.

In pizza, virtually none of these things are true. In Italy, the concept of the pizzaiolo (pizza maker) is an honored profession, not unlike a chef. But there is little or no tradition of the top pizzaioli having published books. Indeed, to the contrary, the cultural history in the world of pizza is one of

secret knowledge in which the training is typically passed down only within a family line. What makes one pizza better than another was once a jealously guarded trade secret (we found that today's pizzaioli in Italy were largely very open about their recipes).

In the US, being a pizzaiolo is not considered a high-end profession, and most pizza makers have not risen in fame over the last 30 years in the same way that celebrity chefs have, with one or two exceptions. Throughout the US, much of actual pizza making is a minimum-wage job without extensive training. We found that famous pizzerias in the US double down on the idea of secrecy and claim that they have proprietary ingredients, techniques, or suppliers (although some of the top pizza makers have published their recipes in books). In our view, most books on pizza out there don't really capture the level of expertise that pizzaioli have.

In general, pizza has historically been a poorly documented cuisine. That's a function of many things. One is that pizza was considered a food of the poor and wasn't worth writing about (see page 16). Another is the notion that the recipes were written primarily for a home audience. We certainly hope

While we tried to capture the techniques of top-notch pizzaioli around the world through photography, we fully recognize that years (and often decades) of practice is the key to their outstanding pizzas.



that our book is used by home pizza makers, and we put a lot of work into providing tips to help home pizza makers turn out pizzas that can approximate what they find at their favorite pizzeria. But we also explore the very best equipment and ingredients, which are intended for professional pizzaioli and restaurant chefs who make pizza (and likely beyond the resources of most home pizza makers, especially when it comes to commercial ovens or mixers).

Because pizza was so poorly documented, we realized that we had to travel, logging 100,000 miles and visiting over 200 pizzerias (we don't want to calculate the number of calories we probably consumed). The predilection for trying local pizzas or local styles in different areas was another reason that we decided to fly around the world eating pizza (although the COVID-19 pandemic interrupted our travels and didn't allow us to visit every place that we wanted to). Capturing and documenting this exploration of local pizza styles was important because they aren't always widely published, and it was necessary for us to understand pizza in its global form. It's also something that we know that other pizza fanatics have done, so for the first time in our books, we include a travel section that describes some of the things we wish we had been told before we embarked on our journey.

When we started visiting pizzerias, we wondered whether the pizzaioli would actually talk to us. It turned out they were incredibly helpful, especially in Italy. They were very candid about sharing recipes and techniques and were not secretive. They even helped us review parts of the book. A few pizzerias, primarily in the US, were not very forthcoming, but that's okay. We found an interesting correlation: the more secretive a pizzeria was, the worse their pizza tasted. So, even if we could have learned from them, we would have just learned what not to do.

Following our approach to our other books, we include key aspects of pizza that are relevant or interesting. The history of pizza is part of what we cover. It's fascinating for many reasons, one of which is that an appeal to history or tradition is often an explicit part of the marketing message in pizzerias. But we often found that the true history of pizza is quite a different story. In the process of writing this book, we independently found documentary evidence that informs the history of pizza (see pages 23 and 29). And we collaborated with some other folks who were independently and simultaneously making similar and other interesting discoveries.

We covered with extreme interest the Associazione Verace Pizza Napoletana, or AVPN (see page 74), and its historic and unprecedented success in

rebranding the style of pizza made in Naples and how it is viewed around the world. To us, pizza left Italy primarily in two diasporas. The first was in the latter part of the 19th century with the immigrants who traveled to the United States and South America (see page 22), and the second was in the 1990s with the AVPN. That said, we were amused to discover that some features of the "authentic" aspects of the AVPN pizza date from the 1950s to the 1990s. And that within Italy, most AVPN pizzerias don't make a pizza that is fully authentic according to the rules of the AVPN (it's sometimes a little crispier). But to us, what's important about the AVPN is that it brought the Neapolitan style of pizza to the rest of the world, regardless of whether it's exactly what was made in the late 19th century.

As we traveled to cities with distinct styles of pizza, like New York City, Detroit, New Haven, Old Forge, Quad Cities, São Paulo, Buenos Aires, Chicago, and St. Louis, we learned how the various styles both were initiated and grew to popularity. In some cases, we offer instructions for how to make them authentically. Sometimes, however, it turns out that the method in which certain styles of pizzas originate and then become popular and named doesn't really have a filter for quality. It's perfectly valid to say that you like super thin-crust pizza or thick-crust pizza, so when we say that pizza is "bad," we aren't talking about personal preference. We mean that there are places that have a strong tradition of undersalting the pizza so that it tastes like cardboard or burning the pizza so that it's bitter. Or putting incredibly low amounts of water in the dough or using inferior-quality ingredients. But these traditions are ingrained into people's initial impression of eating pizza, so they'll put up with it and often advocate for it (see page 115).

Similarly, a lot of people think of pizza as street food or cheap food or delivery food that doesn't have to be that good. We certainly recognize that there are tons of cheap pizzerias everywhere on earth. And for a hungry college student, those pizzerias play a role (and a significant one in some cases). But pizza doesn't begin and end there. Americans have tended to view some of their own food traditions, like pizza or Southern barbecue, as beloved yet somehow second-class. Whereas European foods, which have become more famous and elevated to superstar status by Michelin three-star chefs, are what people view as serious, worthwhile cuisine. And we couldn't disagree more.

In Italy, we found the same phenomenon. As much as Italy loves its pizza, there is a palpable feeling among some Italians, including many



The Associazione Verace Pizza Napoletana (AVPN) codified the ingredients and procedure for making Neapolitan pizza (see page 3:43). Not everyone follows their rules (ourselves included), but we had to go to the source to get their viewpoint on this iconic pizza.



We met several visionary pizza makers during our travels, including Franco Pepe from Pepe in Grani (top), Dan Richer at Razza Pizza Artigianale (middle), and Sarah Minnick at Lovely's Fifty Fifty (bottom). These pizzaioli push the boundaries of standard pizza to make a style that is unique to them.

pizzaioli in the Naples tradition, of holding pizza down and keeping it cheap and “for the people.” To us, these pizzas are worth more money. The notion that pizzaioli should be criticized for charging 10 or 15 euros for a pizza is absurd. You don’t find Italian couture being criticized for being expensive. It’s fine for pizza to have humble beginnings, but it’s also true that the very finest ingredients deserve their due. In a world where the CEO of a pizza chain can be a multimillionaire or a billionaire, we don’t think it’s untoward to have some economic security for the best pizzaiolo on earth.

Moreover, if we look at the foundations of French haute cuisine, we find that it came from peasant cooking. Many of the key dishes we think of as fancy and rarified are in fact based on French farm and country traditions. The same goes for Italian food. Yet if one eats in the finest Italian restaurants in major cities, the pasta dishes don’t top out at 15 euros.

A focused example of this is the Michelin Guide. Receiving a star is a career maker for many chefs. Over time, Michelin has come to believe what we believe: even if a dish has a humble origin, if executed perfectly, it deserves to be rewarded. As a result, there are street vendors in Singapore who have one or even two Michelin stars. We think this is great, but why are there no Michelin stars for pizzerias? If it were up to us, there are several pizzerias in Naples that would immediately deserve one, two, or even three Michelin stars.

In all of our books, we have embodied the principle that any type of food or dish has an optimum way (or perhaps more than one way) to create it. We don’t draw a distinction between haute cuisine and fast food. Haute cuisine is simply a set of dishes for which someone has worked diligently and carefully to create their ultimate expression. To us, fast food can likewise have an ultimate expression. Pizza is a very complicated thing to make at the highest level of quality. It’s also an incredibly rewarding food for the diner to eat. To us, there is no contradiction in using every high-end trick that you can to make fantastic pizzas.

Along these lines, we were surprised to find that the best pizza city in the United States—and arguably the world—is Portland, Oregon. In fact, we had our favorite, best executed, New York slice in Portland. Our friends in Naples will say, “But what about Naples?” And, sure, for Neapolitan pizza, then Naples wins the crown, which shouldn’t be a surprise to anyone. But the moment that the scorecard includes other types of pizza, it’s really hard to beat Portland. The pizza makers there don’t feel beholden to a particular style that dominates the city

in the same way that New York or Chicago pizzerias sometimes do.

That’s not to say that you can’t have great artisanal pizza in other places. Many pizza fanatics make the pilgrimage to Phoenix, Arizona, to try Chris Bianco’s excellent pizza at his eponymous pizzeria. And while eating his pizza is worth the trip, we can’t say that the Phoenix pizza scene as a whole is outstanding in the same way that Portland’s is (the taco and tamale scene, on the other hand . . .).

We felt that it can’t possibly be true that all the best ideas in pizza making have already been discovered—creative pizzaioli around the world have made some amazing new pizzas, including their own versions of classic pizza styles. Science and technology are not the enemies of great pizza. The laws of nature govern baking just as they govern everything else in the world. Knowing which laws affect your pizza helps; understanding technology helps, too, particularly when it comes to your oven type.

As with bread and other cuisine or gastronomy, in pizza we found a tremendous number of strong “folkloric” beliefs about the process of cooking that were just plain wrong. In the same way that science allows us to realize that many broadly accepted food myths aren’t true, science allows us to analyze and understand a pizza’s aspects a little differently.

As a result, certain parts of this book will be controversial to some pizza makers. For example, within Italy, there is a widespread obsession with the “digestibility” of pizza (see page 133). Arguing that the amount of yeast, how the dough ferments, and how the dough is handled will cause the pizza to be indigestible is ludicrous (as is the belief that bread is completely digestible, though the amount of yeast in pizza dough is significantly lower than what is in bread). There just isn’t evidence of that.

Similarly, some pizzaioli think that wood-burning ovens are the only ovens you can use to make the highest-quality pizza. While you can certainly make excellent pizza in a wood-burning pizza oven, with some practice, we (and scores of other pizza makers) have been able to use gas and electric pizza ovens to make pizzas that are just as good as those made in wood-fired pizza ovens. Additionally, gas and electric pizza ovens are much easier to learn to use and will yield a better outcome for a higher percentage of pizzerias.

So why are digestibility and the usefulness of wood-burning ovens just two of the many myths bound up in pizza making? The pizza world is conservative, that’s why, and especially the pizzaioli who have a long history of making pizza. They are resistant to new flours (even though the ones they

are using now are totally different from the ones available when pizza was first popularized) and hesitate to veer from the techniques that they have always used, even when they don't make sense. There are a few visionaries, like Franco Pepe, Enzo Coccia, Carlo Sammarco, Dan Richer, Sarah Minnick, and many more covered in this book, who are trying to bring pizza into the modern era. It takes more than a few counterexamples to shake the faith of decades of pizza-making dogma, however.

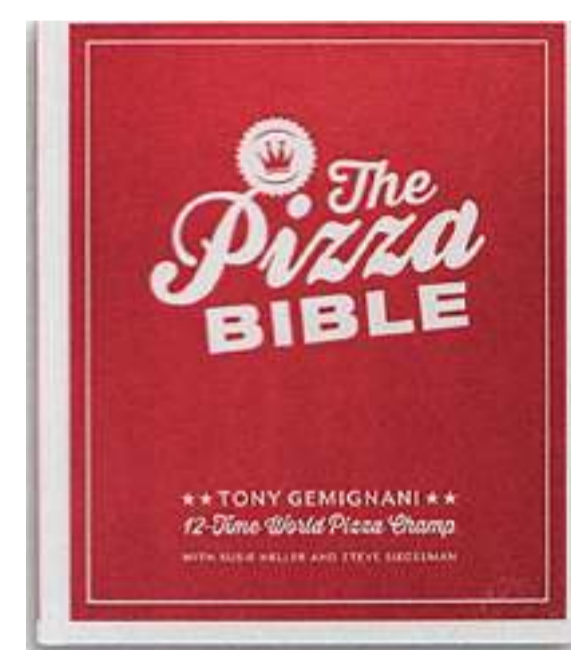
What makes pizza great isn't any single ingredient. What makes it great is using good ingredients consistently, plus lots of skill and attention. If you're a pizza fan, even if you have no intention of making pizza, this book will tell you all about your favorite food in a way that's pretty incredible. If you hanker to make pizza at home or even are slightly intrigued, we encourage you to take the plunge.

As with our other books, we scoured the world to research the aspects of pizza that we found interesting, studied until we understood all of the techniques, and subjected everything to tests, including the flour brands that pizzaioli prized, the types of water they used (it turns out that this ingredient doesn't make much of a difference), the brand of tomatoes that were prevalent and how they were grown, as well as the processes by which common pizza ingredients are made. We distilled our findings into chapters on history, the world of pizza at large (including our travels), ingredients, equipment, techniques, and recipes.

We not only collected the world's knowledge about pizza, we also advanced it. Many of the facts presented here are new. No matter how experienced a pizzaiolo is, there likely isn't a single one that won't be surprised by some of our findings. This follows our other books in that the pizza fan who doesn't cook, the home cook, the chef who wants to add pizza to the restaurant's offerings, and the world's most experienced pizzaiolo will all learn something. While we do everything we can to help the home or casual pizza maker, this book is also aimed at all the people working at restaurants and pizzerias. It's our belief that a better understanding of the process of pizza making and an exposure to new ideas cannot but help lead to better pizza.

All of our Modernist Cuisine books feature new and radical techniques that we learned either through our own experimentation or with the help of and in conjunction with others during our research. We outline techniques and findings that range from the utterly radical to the really useful. In order to make it easier for the reader to find these things, especially if they have a lot of experience making pizza, we've called them out at the beginning of each chapter.

Those explorations opened the door to many discoveries that impacted how we made the components of pizza, from dough to sauce to cheese. We were able to develop mixing and proofing techniques that dramatically reduce the time that it typically takes to make Neapolitan and high-hydration al taglio pizza dough without compromising the quality. We also



We started learning about making pizza from Tony Gemignani back when we were writing *Modernist Bread*. He is one of the most iconic pizza makers from the United States in addition to being a world champion pizza maker 13 times over (see page 265). Tony is also the author of *The Pizza Bible* (above), a go-to text for so many pizza makers.



Portland, Oregon, had the highest caliber of pizzerias across the board (and across a variety of pizza styles) of any city we visited in the US (see page 254).

tested all of our master pizza recipes as alternative pizza styles and came up with a series of “cross-crusting” recommendations that will allow you to make multiple pizza styles from one dough (see pages 2:96–99). Cross-crusting flies in the face of tradition and practice—and, indeed, some of our experiments were not great—but we were pleasantly surprised by how many styles that seem to have rigid constraints can actually be modified with good results.

Creative approaches to the sauces that are commonly used on pizzas have seemed to stagnate and often focus on tomato or white sauce, so we decided to push the boundaries of what you can use as a sauce on pizza. This led us to include tips on adapting pasta sauces and soups as well as deconstructing stews and using them as both sauce and topping for different pizzas.

The realm of cheese is where we made some of our biggest breakthroughs. We were able to simplify some aspects of making your own mozzarella and create luxurious higher-fat versions of mozzarella and ricotta. We also developed a technique for

vacuum-draining mozzarella that can save you the 12 hours it normally takes to drain fresh mozzarella and get you out of a pinch if you didn’t drain enough to get you through service. Our own testing and research also led us to develop new solutions to baking problems. Some of them center on new techniques, while others involve new ingredients—or at least ingredients that are new to the pizza world.

We are aware that there are hundreds of pizza cookbooks on the market, including many very good ones. Beyond that, we know that there is no recognized “Modernist pizza movement.” So what exactly would we be documenting in our book? We took an approach that is fiercely analytic but also deeply appreciative of the artistry and aesthetics of pizza. We researched ingredients and history, dough rheology, cheese cultures and microbiology, bubble mechanics, tomato harvesting and canning practices, pizza delivery technologies, and more. Over time, we became even more convinced that our book could offer something fresh and new.

All told, it took a full-time staff of 25 to produce this book. With the core team in place, we then sought insight from outside experts. We talked to flour millers, tomato farmers, cheese makers, food historians, statisticians, and every great pizza maker we could find. You’ll find a listing of over 80 contributors starting on page 3:386. We were determined to learn from the best—but also to question preconceived notions while simultaneously grounding our work in science.

For nearly four years (and over 200,000 hours put in by our staff and contributors), we baked around 12,000 pizzas, we experimented, and we tested. Our kitchen lab is a unique place, where scientific equipment sits side by side with just about every food-related device you can think of. We measured everything from crust volume to dough structure to the behavior of different flours. Nothing in our lab is left to guesswork.

In the space of three volumes plus a Kitchen Manual, we tell the story of one of the world’s most popular foods in new and different ways. Through this story, we hope to enlighten, delight, and inspire creativity in others who love not only pizza but also the science, history, cultures, and personalities behind it. Not only do we show that the best pizzas do not come from the past, but we cover a number of trends in this book that reveal the creative evolution of pizza around the world. A huge part of our message to pizzaioli, whether at-home or professionals, is to keep evolving. Make your great creations. Our grandparents didn’t necessarily come up with the best recipe of all time—maybe you can.

THE PHOTOGRAPHS

Writing more than 450,000 words on one topic is no easy task. The level of complexity increases further when you add more than 3,700 original photos. But creating compelling visual imagery is a huge part of what we do at Modernist Cuisine because we believe that the way information is presented is just as important as the quality of the information itself.

In *Modernist Pizza*, we use rich photographs, detailed illustrations, lively infographics, and a carefully planned and executed design to convey technical and scientific concepts in a way that's accessible—and that looks pretty cool, too. The aim is to *show* you how things work rather than just explaining the details with words. The more you can see, the more you can understand.

We've included full-color images on nearly every page of *Modernist Pizza*. We've also annotated these with facts, figures, and graphic design to try to make images that both make you want to read them and convey great information.

In some photos, we focus on texture; in others, we play with scale. We did a time-lapse of a baked pizza to show the changes that pizza undergoes in the oven. We also got up close and personal with the crusts, including where the sauce meets the dough, in order to show you what happens at that intersection. These highly creative photos allow readers to see inside pizza in a way they haven't before.

As with our previous books, the majority of our photos were taken in our lab. More so than in other

books, we also traveled the world, visiting over 200 pizzerias and taking detailed photographs of their pizzas on site. Those photos in the travel section are meant to help the reader understand pizza in the same way we came to: as a diverse set of techniques and approaches.

Those of you familiar with our earlier publications will be pleased to know we didn't forget about our signature cutaway shots. Using an abrasive water-jet cutter and other tools, our machine shop cut kitchen gear in half so that you can see how equipment—and baking itself—works from the inside. Our shop also made custom pans in the shape of Italy and the United States for us, which we used in the photos on page 90 and page 262. During the course of the project, we developed several photography robots that helped us capture the sauce splatter photo on page 2:200, among others.

Some of our images, including our exploded pizzas in the Iconic Recipes chapter starting on page 3:3, are composite shots, created by editing several images to merge them. We used this technique when it was impossible to capture in a single photograph what we could see with the naked eye. Another photo, our “Neapolitan pizza man” homage to Arcimboldo (see page 270), didn't require any fancy technology but still took a number of hours to put together. These creative photos help provide insight into scientific processes, plus they're just plain fun. As you'll discover in these pages, the science of baking is visually amazing.

Some of our favorite photos in the book are the ones where we got to be creative and have a little fun in our studio. The photo on the left is our take on Dalí's famous *The Persistence of Memory* while the one on the right showcases the country of Italy made out of pizza and floating in a sea of red wine.



A GUIDE TO MODERNIST PIZZA

We created this book with several principles in mind. For one thing, we weren't going to dumb down the science of pizza making. Instead, we've made the technical aspects approachable by pairing compelling text with fun and intriguing visuals. We think you'll find reading our science-based material enjoyable, but if you prefer skipping straight to the recipes, that's okay, too.

We wanted this book to work for both home bakers and professionals—the way we view it, pizza makers in both groups have the same hands, and flour and water are pretty much the same for everyone. The main difference between home bakers and professionals is the type of oven each uses. That's why we tested all our recipes in several different ovens and included recommendations in each recipe for which oven will work best.

In addition, our intent was to convey pizza's past while also pushing for a fresh future. What does that mean? You can use this book to make pizza that is very traditional in all regards, or you can use it to make pizza that looks traditional but is made with Modernist ingredients. Or—with a little practice and a few additional ingredients—you can make all kinds of inventive pizzas that few have ever made before.

Our story of pizza is told in three volumes, comprising 1,296 pages. Just as we did for *Modernist Cuisine*, *Modernist Cuisine at Home*, and *Modernist Bread*, we have also included a separate Kitchen Manual featuring just the recipes. In volume 1, we lay out the foundation for what's to come, starting with Pizza History in chapter 1.

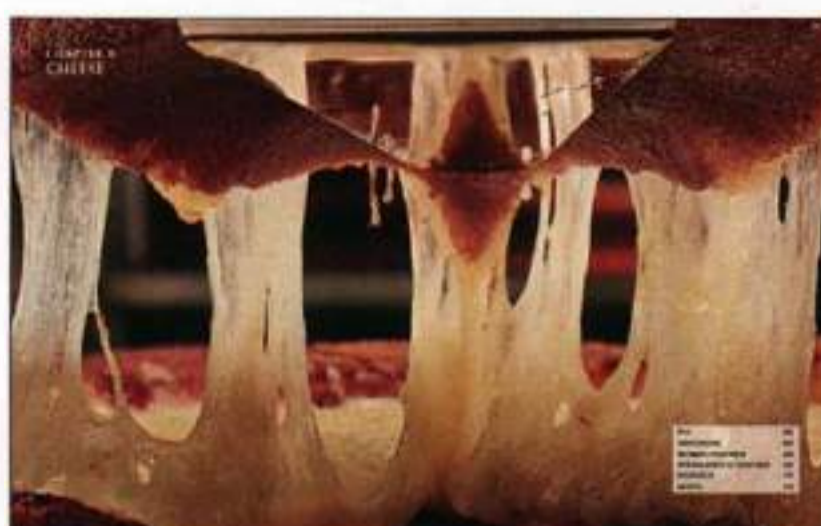
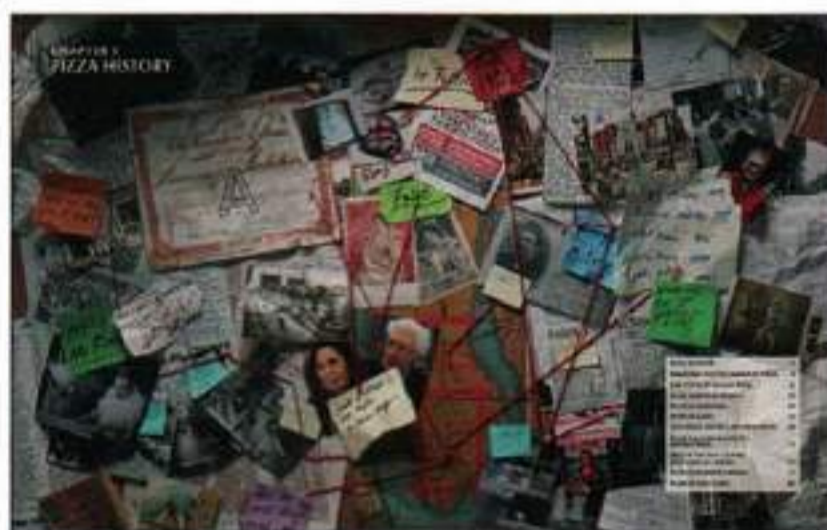
The subject of pizza's history turned out to be more elusive than we thought when we embarked on this project. As we previously mentioned, in the past pizza wasn't well documented because it was considered the food of the people. Despite this, we were able to dig into many of the myths and legends surrounding pizza and explain much of the mystery that enshrouds these stories that have been passed down through the generations.

Looking into pizza's history led us to research the current state of pizza. Our chapters on The World of Pizza and Pizza Travels catalog the different pizza styles that are being made all over the world. Both of these chapters provide extensive photos of what we found when we visited pizzerias around the globe so you can see how styles compare.

In chapter 4, on Pizza Dough Ingredients, we extensively cover flour, pizza's main ingredient, and look at the differences between the types of flours used for different pizza styles. We also explore the other ingredients commonly found in pizza, namely water, yeast (including preferments and levain), and salt. We then cover other ingredients that are integral to some pizza doughs, including fats, sugar, and dough improvers.

The role of heat transfer is just as important in pizza baking as it was in *Modernist Bread*, so in chapter 5, Pizza Ovens, we look at heat and energy and the roles they play in the pizza-making process. We discuss the differences among ovens and what factors matter, as well as what happens during the baking process.

In volumes 2 and 3, we present the lion's share of our recipes—over 1,016 of them in all. This is



also where you'll find detailed information about the techniques for making pizza dough, sauces, and cheeses and how to prepare your toppings.

Pizza making can be broken down into a series of discrete steps, and we devote the chapter on Making Pizza Dough to covering the majority of them. We dive into mixing and bulk fermentation, dividing, preshaping, and final proofing. We also cover how to incorporate making pizza into your schedule.

Our Pizza Dough Recipes chapter offers the foundational master recipes upon which the majority of our pizzas are built, as well as some variations that we developed based on our research and travel.

Three sauces dominate the pizza landscape: tomato sauce, white sauce, and pesto. To be sure, we cover all of these in our Sauce chapter, including tomato sauces that are customized for multiple styles of pizza. But there are so many more sauce possibilities that can elevate your pizzas into something sublime, including our out-of-the-box sauces that are based on pasta sauces and soups (see page 2:256).

Making your own cheese isn't a requirement for baking great pizza, but we find it a rewarding experience. Learning a few relatively simple techniques will open up a whole new world of options for one of the key ingredients on your pizza. In the Cheese chapter, we describe how we were able to infuse our mozzarella and ricotta with a variety of flavors as well as increase their overall fat percentages to create an indulgent set of cheeses.

Chapter 10, Toppings, delves into the wide world of toppings and general guidelines on how to prepare them. Perhaps more importantly, we explain how much topping you should put on a pizza. The

topping categories we cover include fruits and vegetables, meats, and even crispy toppings like rösti potatoes and frico cheese crisps.

Our Baking Pizza chapter offers a continuation of the scientific discussion in the Pizza Ovens chapter but notably includes practical instructions for baking in each of the standard pizza ovens, along with tips for each piece of equipment. We also cover making pizzas with some alternative methods like a grill or a fryer.

The Iconic Recipes and Flavor Themes chapters kick off volume 3 and offer foundational recipes for every pizza style that we cover in the book, as well as our favorite flavor combinations to inspire your own pizza exploration.

In chapter 14, we cover Serving and Storage. Pizza isn't always served à la minute, like plated entrees served in restaurants, so we offer extensive information with tips for home bakers and professionals alike on how to hold and reheat your pizza. Finally, we provide extensive reference materials and resources in the back of the book.

We hope you'll use this book not only as a resource for recipes and techniques but also as a jumping-off point for creating your own kinds of pizza. Our aim is to elucidate, delight, and inspire. Making good pizza is both an art and a science. During our research, we discovered many things that will help you achieve success more quickly, but even so, successful pizza making is going to take some practice. The best way to learn to make *good* pizzas is to make *many* pizzas. If you're new to baking, your first pizzas may not come out perfect, but the good news is that even a flawed pizza is usually still tasty.



ABOUT THE RECIPES

Modernist Pizza is dedicated to looking at pizza making from new angles. 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 built upon our previous formats for presenting recipes. The compact, modular form of our recipes makes them a broader resource for instruction and inspiration. Experienced pizza makers can dive right into baking, while even beginners can get a good assessment of what's involved with each recipe and how to prepare to take on the challenge.

In these three volumes, you'll find a huge variety of recipes and perspectives. Although we are telling the story of Modernist pizzas, our recipes are not limited to cutting-edge pizzas—we cover everything from classic margherita and New York pizza to al taglio pizza, which can be challenging to prepare in

certain pizzeria environments. We also have variations with Modernist ingredients and techniques that can help improve upon traditional recipes. The point is not to tout science or avant-garde approaches for their own sake but to illustrate how the principles of Modernist baking can be applied across a wide range of recipes.

An important point to consider when following the 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): a handful of this, a few drizzles of that, a pinch of something else. Fundamentally, much of this kind of cooking is done "to taste," following the cook's experience. That is not the case with making dough, when precision counts. You don't add yeast to taste, and proportions of leavening to flour can't be left to creative impulse.



INGREDIENTS AND EQUIPMENT

While there's a science to baking, it doesn't require esoteric laboratory equipment. The majority of recipes in this book can be made with tools available in standard kitchens: our list of essential gear (see pages 2:10–13) includes familiar workhorses such as pizza pans, scales, and timers. Other home appliances can be drafted for double-duty specialties, if desired, such as using a plaster knife to handle very wet doughs, cooling pizzas on wire racks, or drying levain for long-term storage in a dehydrator. 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. More significant and specialized financial investments, particularly for professional pizza makers, come when choosing ovens—one of the most important factors in producing quality pizza—or when selecting commercial tools such as a mixer or a meat slicer.

While we'll guide you through the best choices for your own situation, we'll also show you how to make the most of whatever you've got to work with. Certain recipes do require specialized tools, such as the vacuum sealer used for our vacuum-infused mozzarella or the rotary evaporator we employ to make the Rotavap Tomato Sauce on page 2:236 (we also offer a variation that doesn't employ this machine).

If you're interested in investing in such equipment, there are many places to find it, from eBay and other purveyors of secondhand equipment to

scientific-equipment catalogs and a growing number of cooking stores. 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, some recipes will be more informational than practical, but they will still serve their purpose as educational context.

Our recipes, however, don't micromanage your selections of the most basic equipment, such as bowls and bench knives. We assume you'll know what equipment you need to use when we call for mixing or proofing or baking.

Some recipes require unusual ingredients like xanthan gum or propylene glycol alginate (see Resources, page 3:377). You may be surprised at how easy they are to acquire. Well-stocked supermarkets and health food stores sell many of these ingredients 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 internet has made finding such items much easier, as they are available from a number of online stores.

Seeing ingredients like propylene glycol alginate in an ingredient list may take some getting used to, but it should be no stranger than a meringue recipe that calls for cream of tartar or a quick bread recipe that calls for baking powder.



RECIPE NOTES

This overview provides substitutions for certain ingredients such as salt and flour, which you can use when you are making the dough recipes in the book. The general notes below apply to virtually all of the recipes in

the book. You'll also find a breakdown of our recipe format on page xxvi that highlights key aspects of our recipes.

Flour Substitutions

We tested a number of different flours, including common consumer brands and professional brands. Ultimately, we chose a few that would work well for each category of pizza. The substitutions that we list below

may vary in protein content from the recommended flour by 1% or 2%, but our tests showed that they will still produce great pizza.

Pizza style	Recommended flour(s)	Other good substitutes
Thin-Crust Pizza Dough see page 2:110	Ceresota/Heckers Unbleached All-Purpose Flour	Giusto's High Performer High Protein Unbleached Flour King Arthur Special Patent Flour/Unbleached Bread Flour King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour
Brazilian Thin-Crust Pizza Dough see page 2:114	Central Milling Organic Artisan Bakers Craft Bread Flour (40%) any cake flour (60%)	any combination of bread flour and cake flour
Deep-Dish Pizza Dough see page 2:118	Ceresota/Heckers Unbleached All-Purpose Flour	Giusto's High Performer High Protein Unbleached Flour King Arthur Special Patent Flour/Unbleached Bread Flour King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour
Neapolitan Pizza Dough see page 2:124	Le 5 Stagioni Pizza Napoletana 00 Flour Caputo Pizzeria 00 Flour Polselli Classica 00 Flour	Central Milling Organic Artisan Bakers Craft Bread Flour Caputo Nuvola 00 Flour
New York Pizza Dough see page 2:132	Tony Gemignani California Artisan Type 00 Flour Blend	General Mills All Trumps Bakers High Gluten Enriched Flour Bouncer Premium High Gluten Flour Pillsbury Balancer Hi Gluten Flour Grain Craft Power High Gluten Flour King Arthur Special Patent Flour/Unbleached Bread Flour General Mills Gold Medal Harvest King/Better for Bread Flour Caputo Americana 00 Flour/Manitoba 0 Flour
Artisan Pizza Dough see page 2:142	Giusto's High Performer High Protein Unbleached Flour	Tony Gemignani California Artisan Type 00 Flour Blend Central Milling Organic Type 00 Normal Flour King Arthur Special Patent Flour/Unbleached Bread Flour King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour Le 5 Stagioni Pizza & Tradizione Flour
Focaccia Dough see page 2:148	General Mills All Trumps Bakers High Gluten Enriched Flour	King Arthur Sir Lancelot Flour/High Gluten Flour King Arthur Special Patent Flour/Unbleached Bread Flour Pillsbury Best Unbleached All Purpose Flour
New York Square Pizza Dough see page 2:152	General Mills All Trumps Bakers High Gluten Enriched Flour	King Arthur Sir Lancelot Flour/High Gluten Flour General Mills Gold Medal Harvest King/Better for Bread Flour
High-Hydration al Taglio Pizza Dough see page 2:158	Polselli Super 00 Flour	General Mills All Trumps Bakers High Gluten Enriched Flour Le 5 Stagioni Ciabatta Romana Flour Pillsbury Best Bread Flour Caputo Nuvola 00 Flour
Detroit-Style Pizza Dough see page 2:166	Central Milling Organic Artisan Bakers Craft Bread Flour (85%) any semolina flour (15%)	Ceresota/Heckers Unbleached All-Purpose Flour King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour

Yeast Substitutions

Use the table below to convert measurements of one type of yeast into another. These conversions are based on weights of yeast, not volume measures. Our recipes are based on instant yeast, so if you don't have that on hand, you'll use the conversions to figure out how much yeast to use.

Original yeast type	For instant, multiply weight by	For active dry, multiply weight by	For fresh, multiply weight by
instant	n/a	1.33	3
active dry	0.75	n/a	2.28
fresh	0.33	0.44	n/a



Salt Substitutions

All the recipes in this book use fine salt unless otherwise specified. We recommend using fine crystal salts because the smaller the crystals are, the faster and more effectively they will disperse and dissolve in the dough. The table at right outlines volume conversions for a few different brands so that you can convert the weight measures for the brand you have. Ultimately, we recommend weighing your ingredients.

Salt type	Weight per 1 Tbsp	Weight per 1 tsp
Diamond Crystal kosher salt	9.6 g	2.9 g
La Baleine sea salt (coarse)	18.74 g	5.57 g
La Baleine sea salt (fine)	16.63 g	5.13 g
Morton kosher salt (coarse)	17.63 g	5.33 g
Morton sea salt (coarse)	17.63 g	5.33 g
Morton Mediterranean sea salt (fine)	16.33 g	5.07 g
Morton table salt (iodized)	18.23 g	5.57 g
Morton table salt (plain)	19.5 g	5.67 g

General Notes

- We highly recommend weighing all the ingredients for our recipes. This is the best way to achieve consistently successful results.
- In some of our recipes, you will notice that some ingredients are measured in tenths of a gram, like salt and yeast. It helps to have a precision scale to weigh these types of ingredients with accuracy. For amounts this small, you can mix powders in with the flour or dilute liquids in the water portion of the recipe. This will help them to disperse evenly. Ingredients that require less precise amounts, like flour and water, are rounded to the nearest gram.
- If you are using the volume measures for the dry ingredients in the recipes, measure the volume first, and then sift the ingredient.
- The most important goal when mixing any kind of yeast into a dough is to disperse it evenly so that it can achieve its full fermenting power. The second objective is to fully hydrate the yeast cells (if using dry yeast).
- You should always use granulated sugar when we call for “sugar” in the ingredient list.
- We used unsalted butter with 82%–83% fat to formulate some of the recipes. In many of the recipes in this book, it is best to add the butter to the dough when it is room temperature so that it is pliable and easy to mix.
- Many flours are malted, which means they have a small amount of diastatic malt powder (DMP) added to them. These flours will have an enhanced amylase count, which means that there is more sugar for the yeast to consume. We add a small amount of DMP to doughs with long fermentation times even if we are using malted flour. This ensures that the yeast will never run out of food.

WEIGHTS AND MEASURES

Our recipes provide ingredient measurements both by weight and by volume. While professional pizzaioli generally use weight measurements, and we believe they produce the best outcomes, we want pizza makers of all backgrounds and experience levels to feel comfortable using this book. We personally prefer weight measurements because they are exact and will yield more consistent results than using cups and measuring spoons. (Ingredients that come in distinct units, such as eggs or basil leaves, are also listed using the rough equivalent units for reference. And some ingredients are called for “as needed,” when there simply is no single correct amount to use.)

As pizza makers become more familiar with weight measurements, we hope they will lose any sense of intimidation at seeing them in a recipe. Digital gram scales are widely available in cooking stores around the world. They’re common enough now that a good basic model is not an expensive investment. If you’ve measured ingredients only by the cup and teaspoon until now, this is a great time to buy a good scale.

In fact, you might want to consider getting two different scales if you’re committed to making a range of recipes from this book. One would be your general-purpose scale, good for measuring weights from 1 g to 1 kg or more. The second scale would be for finer measurements, accurately weighing items down to 0.01 g. Such scales often max out at 100 g 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 dough gets stuck to the dough hook, liquids evaporate, and unmeasured ingredients come into play (for example, the water used to soak grains can add weight to the finished dough). 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, when precise temperature is less critical, we do some rounding. It doesn’t help much to know that 57°C equals 134.6°F; 135°F will work fine. Kitchen thermometers typically don’t operate at more than one to two full degrees of accuracy anyway, and the controls of some ovens often jump in five-degree intervals.

Sometimes, despite a pizza maker’s most careful measurements and diligent attention to detail, a recipe will still go awry. 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. We also hope you’ll see these unexpected outcomes as a learning opportunity rather than a disappointment, an educational return on your investment of time (the ingredients, after all, didn’t cost much), and an inspiration to try again. Practice is often the only path to making great pizza; it can take time for beginners to master steps like shaping a pizza or determining when it is properly baked. Fortunately, it’s also rare to bake a complete failure.

For the dough recipes, we use baker’s percentage, where the flour represents the 100% value. For all other recipes, we use a scaling percentage, and the ingredient representing the 100% value will change based on the recipe.

Because volume measurements given in the recipes are often rounded to the nearest convenient spoon or cup measure, you should not multiply or divide volumes when scaling a recipe up or down. Instead, scale the weights as described here, and then weigh the ingredients.

HOW TO Scale a Recipe

Our high-hydration al taglio pizza dough recipe (see page 2:158) makes 1.4 kg of dough, but maybe your largest pan will fit only 1 kg. You are in

luck: we’ve made it easy to scale the recipes in this book up or down as needed. Just follow these simple steps.

1 Look in the baker’s percentage (%) column of the recipe, and note that the weight of the flour is 100%.

2 Calculate the recipe conversion factor (RCF) by dividing the desired yield by the recipe yield.

Example: The recipe yields 1.4 kg of dough. You want to make 1 kg of dough. Divide 1 kg by 1.4 kg to determine the RCF of 0.71.

3 Calculate the weight of the flour by the RCF from step 2.

Example: Multiply the original 630 g of flour by 0.71 to obtain the new weight of 447 g.

Example: The weight of the water would be $447 \text{ g} \times 76.19\%$, resulting in a new water weight of 340 g. Similarly, you would multiply $447 \text{ g} \times 2.94\%$ to obtain the weight of the salt (13.1 g).

4 Calculate the weight for every other ingredient in the recipe by multiplying its baker’s percentage by the new weight of the flour from step 3. You can ignore the weights and volumes given in the recipe—just use the baker’s percentages.

5 If no scaling percentage is given for an ingredient, multiply the volume or number of pieces listed by the RCF from step 2 (0.71 in this example).

MASTER RECIPES AND VARIATIONS

This book spotlights master recipes for each type of pizza we investigated, as well as related variations and Modernist improvements for each one. Master dough recipes illustrate a basic technique in its purest form. Located throughout the Pizza Dough Recipes chapter, these recipes provide step-by-step directions and photos to walk you through the pizza-making process from mixing to proofing. Along with empirical ingredient lists and baker's percentages, the master recipes include extensive options for adjusting the recipe to the user's kitchen and detailed directions for different mixers.

For all our master recipes, we provide noteworthy Modernist versions developed through extensive experimentation. These enhancements improve different aspects of our pizzas, from the crispiness of the crust to the quality of the crumb to the ease of handling the dough. Beyond the Modernist additions, many variations involve adaptations for time, including direct and emergency versions of the master recipes if they are not same-day dough. We also offer extensive variation tables that give you options to explore using levain (sourdough) instead of commercial yeast, ancient grains, and flavor variations for each master dough. In some cases, we offer variations in technique, generally using the master dough but changing one or more procedural steps.

We mentioned that we explain the mixing through proofing steps for each of our doughs in the Pizza Dough Recipes chapter. We don't take

you through the baking steps for the master recipes because many of them require extensive proofing times, so you'll be coming back to the book up to 48 hours later to bake your pizza. Our recipes in volume 3 will walk you through how to finish each of the master pizza styles. Additionally, the master doughs can be used to make a variety of finished pizzas, so we wanted to give you the option to create your dough and then make any number of pizzas from it.

Variations grouped with the master recipe tend to have similar characteristics, such as types of ingredients (for example, the flour blends in our country-style pizzas) or hydration levels (as with our high-hydration pizzas). These additions might also be related to the master recipe but offer their own special characteristics.

In a handful of cases, we found it helpful to provide parametric recipes as well, which are quite unlike typical recipes. "Parametric" refers to the fact that these recipes have parameters that are set by one key ingredient or characteristic. The difference between a parametric recipe and a master recipe is that the latter must be very general 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 tomato sauces made from canned tomatoes on page 2:224 lists ratios for a wide variety of tomato sauces. At a glance, you can see that al taglio tomato sauce is simply seasoned tomato puree, while New York square pizza tomato sauce is more complex.



1 → MASTER RECIPE

ARTISAN PIZZA DOUGH

5 → INGREDIENTS

6 → WEIGHT VOLUME

9 → For the Poolish

High-gluten bread flour, 13%-14% protein*	75 g	½ cup	100
Water	75 g	⅓ cup	100
Instant dry yeast	0.08 g	**	0.11

For the Dough

Water, 21°C / 70°F	375 g	1½ cups	68.18
Instant dry yeast	2.6 g	1 tsp	0.47
High-gluten bread flour, 13%-14% protein*	550 g	3¾ cups	100
Diastatic malt powder	13 g	1 Tbsp + ¼ tsp	2.36
Fine salt	12.5 g	2¼ tsp	2.27
Extra-virgin olive oil	20 g	1 Tbsp + ¼ tsp	3.64

11 Yield: ~1.1 kg

For salt, flours, and other notes, see page 1:xxii. For notes on substitutions, see page 1:xxiii.

12 → *We recommend using Giusto's High Performer High Protein Unbleached Flour.

**You can approximate this small amount of yeast by measuring ⅙ tsp yeast and dividing it into four equal parts. Use one part to make the poolish.

13 → GENERAL DIRECTIONS

14 → PREP

mix the flour, water, and yeast for the poolish 12-16 h before using; ferment at 21°C / 70°F, covered

15 → MIX

combine the water, yeast, and poolish in the mixer's bowl, and whisk to dissolve the yeast; add the flour and malt powder, and mix on low speed to a shaggy mass; mix on medium speed to low gluten development; add the salt, and mix on medium speed until it is fully incorporated; add the oil while the machine is running on medium speed, and mix until the dough reaches full gluten development; perform the windowpane test to assess gluten development (see page 30); transfer to a lightly floured worktable

16 → BENCH REST 20 min; cover well

17 → DIVIDE 360 g

18 → PRESHAPE ball (see pages 61-62); place in a tub or on a sheet pan; lightly mist with water; cover well

19 → PROOF 1-2 d at 4°C / 39°F, covered; for shaping instructions, see page 3:66; for assembly and baking instructions, see page 3:77

2 → TOTAL TIME

4 → YIELD/SHAPE

3 → Active 15-20 min / Inactive 48½ h

three 35 cm / 14 in pizzas

10 → NET CONTENTS

Ingredients	Weight	%
Flour	625 g	100
Water	450 g	72
Fat	20 g	3.2
Diastatic malt powder	13 g	2.08
Salt	12.5 g	2
Yeast	2.68 g	0.43

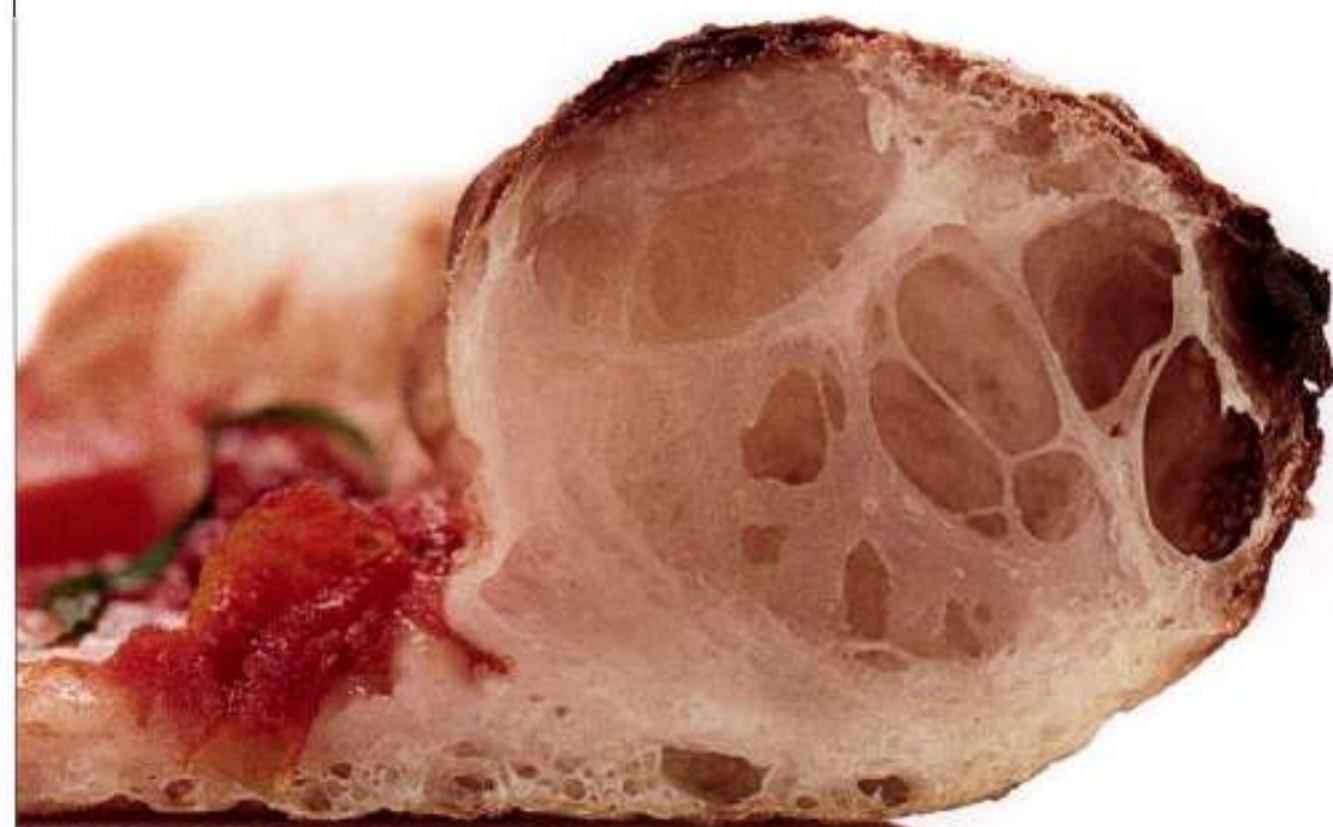
The 1 kg yield of the base recipe is not enough for the dough hook to catch all the ingredients and mix a uniform dough in an 8 qt bowl.

This is an easy-to-work-with dough and an excellent choice for home cooks.

21 → Yield/Size Table

Multiply each ingredient in the Artisan Pizza Dough master recipe by the number below to obtain the amount of dough to yield three pizzas in different sizes. For ingredients in small amounts (such as salt, yeast, or diastatic malt powder), precision is key. You should round to the nearest hundredth of a gram.

PIZZA DIAMETER	DOUGH WEIGHT	MULTIPLIER
40 cm / 16 in	400 g	1.1
45 cm / 18 in	470 g	1.3
50 cm / 20 in	500 g	1.4
55 cm / 22 in	580 g	1.6
60 cm / 24 in	620 g	1.7




- ① This header indicates the recipe category for each of the dough recipes and the iconic assembled pizza recipes.
- ② This section will give you a close approximate time of how long it will take you to make the dough up through the proofing step. It does not account for the advance time it takes for a preferment to ripen.
- ③ The time in the dashboard includes actual active work time and inactive time (time where you are simply waiting for the dough). We include both of these times not only for the dough recipes but for the recipes for sauces and cheeses. We don't provide specific baking times for the assembled pizzas but we do have an overview of the baking times for different styles of pizza on page 3:8.
- ④ Here we list the various possibilities for dividing and shaping.
- ⑤ We list ingredients in the order in which they are added into the dough (or any recipe) to provide a clear way to guide the user through the recipe.
- ⑥ Weight will always be in grams or kilograms. Use a scale that can weigh as little as one-tenth of a gram. Alternatively, use a scale that weighs in 1 g increments for bulk ingredients, such as flour, water, and preferments, and use a small precision scale for small quantities, such as salt, yeast, and purified ingredients.
- ⑦ Although we list volume conversions throughout the recipes, we highly recommend weighing your ingredients.
- ⑧ We use a combination of baker's percentage and scaling percentage in the recipes in this book. They function the same way in the recipes (see page 2:18); with baker's percentage, the flour is always the 100% value, and with scaling percentage, the ingredient representing the 100% value will change based on the recipe.
- ⑨ In recipes that utilize commercial yeast preferments, we include the recipe for that preferment within the recipe ingredients because it has to be made well in advance for that dough. For recipes that use wild yeast preferments (levains), we call only for the amount needed in the recipe because it is assumed you already have one in process.
- ⑩ The Net Contents table will give you a snapshot of the composition of the dough. This flour amount includes all the flour in a recipe, including the amount used in the preferment. If there is a mix of different types of flours, each will be shown individually.
- ⑪ Most of our dough recipes will yield about 1 kg / 2.2 lb of dough (there are some exceptions for pan-baked pizzas). The yield is slightly imprecise because some of it is lost to the bowl, table, hook, and your hands, so you will never have exactly 1 kg / 2.2 lb when you scale the dough. The amounts we give you for the assembled pizzas will make a single pizza so that you can scale the recipes to suit your needs.
- ⑫ We offer flour recommendations for virtually all of our dough recipes.
- ⑬ The General Directions provide all the key steps that you need to take the dough recipes through the proofing stages. When applicable, there are cross-references to pages that provide more in-depth information.
- ⑭ The Prep step can include anything from mixing a preferment to tempering sauce or cheese before assembling a pizza.
- ⑮ We provide basic mixing instructions in the General Directions section and then give you multiple machine mixing options with suggested mixing times for each master recipe.
- ⑯ Some doughs get a simple bench rest after mixing but others, namely our Neapolitan master pizza dough and most of our pan-baked pizza doughs, go through bulk fermentation (see page 2:48).
- ⑰ Divide your dough (when applicable) into even portions so that they proof and bake evenly.
- ⑱ Preshaping degasses the dough but also makes it stronger by producing tension. It provides the foundation for optimal crust and crumb formation.
- ⑲ The majority of our doughs are proofed at room temperature but some recipes offer instructions for proofing in a proofer. These final proofing times are general recommendations rather than hard rules. The ultimate test is your touch and feel as you perform the fingertip test (see page 2:76) to determine a dough's proofing stage.
- ⑳ The shaping, assembly, baking, and serving instructions are provided in the two recipe chapters in volume 3 along with step-by-step photos. Baking times are specified for each type of oven in the master assembly recipes.
- ㉑ Some pizzas, like New York pizza or artisan pizza, typically come in multiple sizes, so we offer conversion tables to allow you to make them all. We also rigorously tested multiplier tables for converting the amounts of dough, sauce, cheese, and toppings between different pizza style (see page 3:355).

GENERAL DIRECTIONS


PREP	preheat the oven; temper the dough 1½–2 h before shaping	SERVE	cut into 6–8 triangles
SHAPE	medium-crust pizza (see pages 67–68); 35 cm / 14 in round	FINISHING	distribute the prosciutto and figs over the Manchego; cover the pizza with the arugula; spoon the goat cheese over the arugula; drizzle the balsamic glaze over the pizza; shave the Parmigiano-Reggiano over the pizza using a vegetable peeler or truffle slicer
CHEESE	distribute the Manchego evenly inside the rim		
BAKE	slide the dough onto a peel or slide the peel under the dough; load into the oven with a quick pull-away motion; see the Artisan Pizza Baking Times and Temperatures table (see page 78); check the doneness of the bottom of the pizza; remove the pizza and place on a serving tray		

PREP




1 Preheat the oven. Temper the dough 1½–2 h before shaping.

CHEESE



3 Distribute the Manchego evenly inside the rim.

BAKE



4 Slide the dough onto a peel or slide the peel at about a 5° angle under the dough, using quick, jerking back-and-forth motions, until it is completely on the peel.

5 Load into the oven with a quick pull-away motion.

6 Bake according to the Artisan Pizza Baking Times and Temperatures table (see page 78).

For more on converting this pizza into a different size or style, see *The Math for Converting to Different Pizza Styles* on page 355.

77

CREDIT WHERE CREDIT IS DUE

Because we selected recipes to illustrate important concepts in the development of pizza, it is only natural that many originated as contributions from the pizzaioli who popularized techniques, shapes, or ingredients in a pizzeria. We learned from the legacies of pivotal figures such as Tony Gemignani and Enzo Coccia and from the innovations of people like Franco Pepe, Sarah Minnick, and Dan Richer, who have elevated the definition of pizza perhaps more than anyone else.

Every recipe included here was tested in our kitchen laboratory with a tremendous amount of our own recipe development. But we've also had a great deal of help from leading pizzaioli 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 recipe as a launching point for one of our own.

Thus, if we cite a recipe as being "inspired by" a particular chef or pizza maker, it means we 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.

We're deeply grateful to all the pizzaioli who inspired the development of recipes in this book.

In other cases, we started by creating a pizza or an element of a pizza and then sought out a traditional recipe in which to embed our new creation. These recipes have at least one element that was inspired by the pizza maker or chef we name, but the rest of the components may be quite different. We say that a recipe is "adapted from" a particular person when it is closer to how that person might actually make it. In most such cases, we made some adjustments to techniques or ingredients, and we may have rearranged instructions a bit to explain things more clearly.

The remaining recipes are those that we developed from scratch on our own. For example, we initially created our higher-fat fior di latte mozzarella to mimic mozzarella di bufala. But then we decided to push the envelope to see how high the fat percentage in the cheese could go. The results, including mozzarella made with heavy cream, crème fraîche, or ghee, might be the most decadent mozzarella you've ever eaten.

If we've inadvertently neglected to give credit to someone who feels she or he developed a pizza in this book, we apologize.

There were dozens of phenomenal pizzas that we ate when we were visiting pizzerias across the globe. We re-created our own versions of some of these pizzas and highlight the pizza makers who inspired us in our Iconic Recipes and Flavor Themes chapters (see pages 3:3 and 3:173).

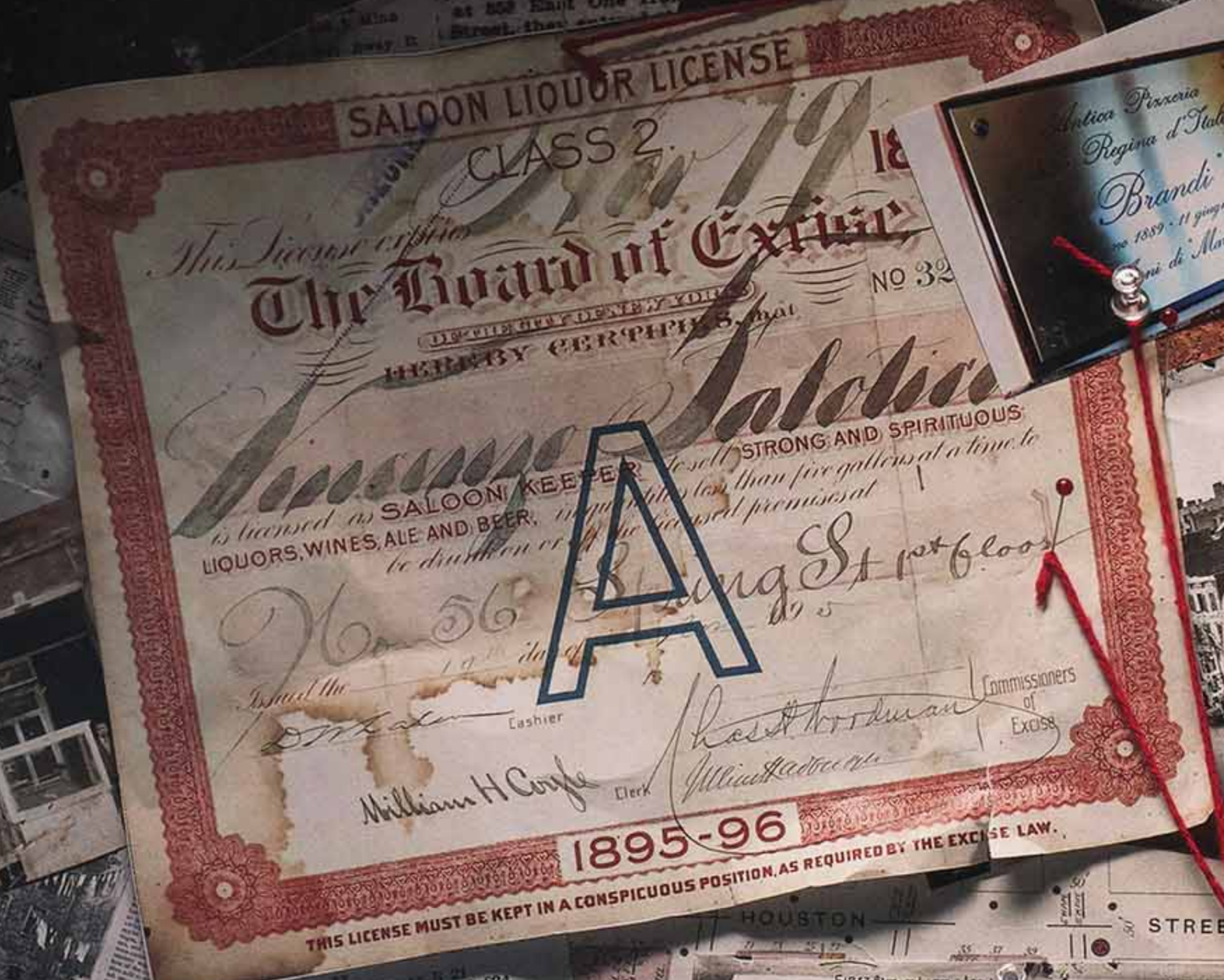




CHAPTER 1 PIZZA HISTORY

MURDER OVER A PIE
Parrell's Berry-Stained Clothes Found to
Baker Leo's Arrest
...the police believe...
...the police believe...
...the police believe...

QUI 100 ANNI F
NACQUE LA PIZZA MA
1889
...RAM...

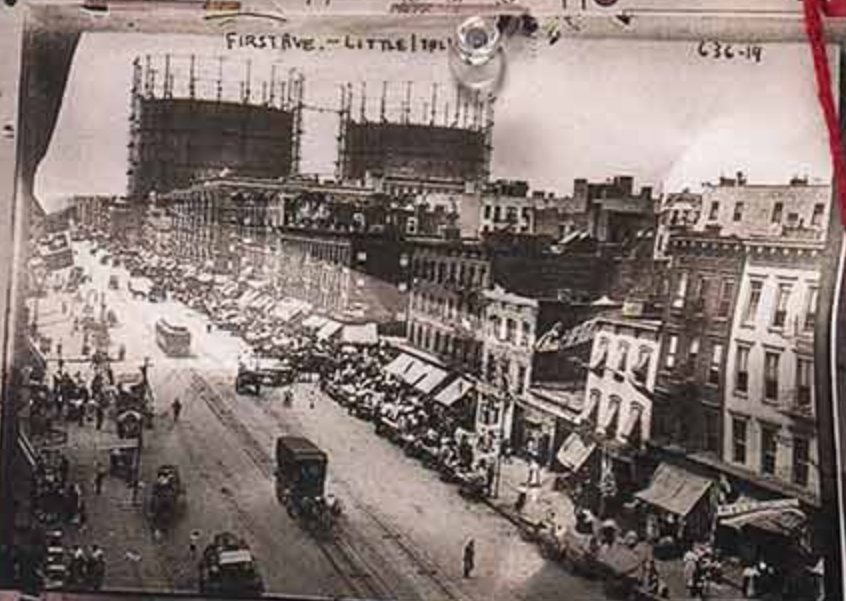


Sbas liato

Was pizza
sold on the
Street first?



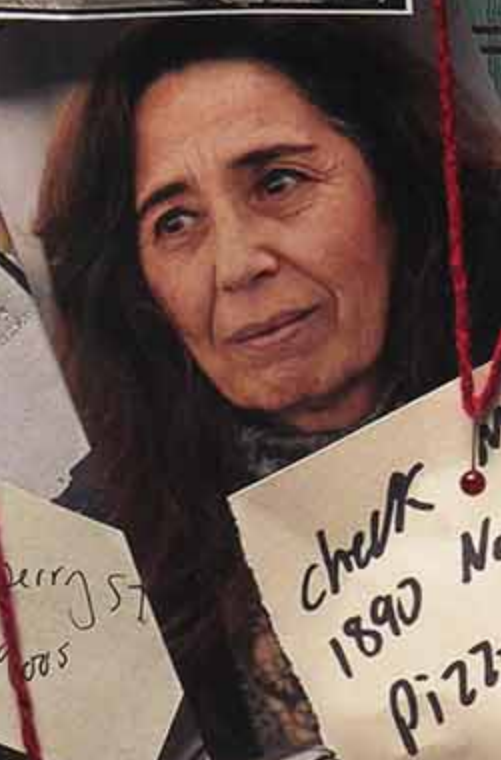
"HOT CAKES" IN NORTH STRE
Toothsome Dainties, Favorites with Neap
Palates, Are Pizzo Cavite and Taraluccio
-Beer, Not Wine, They with.
Scattered through the city are many aromatic herb wh
streets and other portions of the city, in which a
lan colony who have little shops in which they
gate are...
the words mean simply...
the Neapolitan dialect...



1940's
No Rim.



Bandi says
Mulberry St
Bend Alley
1888



check Matorzi's
1890 Naples
Pizzeria map



Was The
first Pizza
fried



THOMAS DIMO



PIZZA HISTORY

Researching the history of pizza meant sifting through a combination of the normal confusion that exists with typical historical topics and a bunch of made-up, self-serving stories. Authenticity and being true to tradition have long been part of the pizza sales pitch, but we're here to tell you that pizza's real history is not what you've heard. We encountered more propaganda and truth stretching in the history of pizza than in any other topic we have researched to date. And, like many food histories, some details are simply murky and lost to time. To make sense of it all, we leaned on documentary evidence to piece together the framework for the story of the development and spread of the topped, leavened flatbread specific to 19th-century Naples.

First, we'll take you to the place that gave birth to pizza as we know it today. Picture streets that are loud and congested, teeming with shoppers and vendors, beggars and thieves. They are dirty with horse manure, fetid with sewer stench, and populated, at times, with dying cholera victims. This is 18th- and 19th-century Naples, which provides both the

where and the why of modern-day pizza (see page 12). As you might expect, it wasn't an immediate hit among the well-to-do. But in an odd way, you could say that if it wasn't for cholera, poverty, and political upheaval, pizza may not have become known outside of Naples for many more years.

From there, pizza spread around the world not through cookbooks but through Neapolitan people leaving for a better life, carrying recipes in their heads and resourcefulness in their genes. Cities on the Northeastern Seaboard of the United States, plus Buenos Aires and São Paulo in South America, were key locations. There pizza morphed and evolved, becoming far more popular than its early history might suggest. Local styles emerged, and with them big arguments about which was authentic and which was best. The evolution of these local styles is part of why pizza has been so globally successful—it changes to meet the needs and expectations of the local population wherever it goes.

The huge success of pizza in the United States allowed pizza to travel back across the Atlantic after

NEW DISCOVERIES

The history of pizza is a recent one (see page 6)

Cholera and a massive urban renewal program are responsible for the spread of pizza throughout the world (see page 21)

The murky story of the origins of the Neapolitan margherita (see page 23)

Untangling the story of the first pizza in the US (see page 29)

19th-century pizza was significantly different (see page 38)

How the Industrial Revolution brought pizza to New Haven (see page 48)

Pepperoni is an American invention (see page 52)

The myth of pizza-proselytizing GIs (see page 54)

The long relationship of beer and pizza (see page 61)

The hidden figures of deep-dish pizza history (see page 64)

"Authentic" Neapolitan pizza dates to the 1990s (see page 74)

The Palace of Capodimonte in Naples figures into several stories in pizza's history. The royal palace was built by the Bourbons, who ruled Naples in the 18th century.



To answer the question of what pizza is, we had to make a distinction between the dish that descends from Naples and the innumerable topped flatbreads that span history.

When is a dish a topped flatbread and when is it a pizza? This is a question we had to give some deep consideration. Al taglio pizza made by Gabriele Bonci (below) straddles the line, but in the end its lineage connects it back to pizza (see page 110).

World War II and reinvade Europe (Italy included) in a big way. During this period, pizza lost a little of its mojo, becoming a homogenized product, either frozen or mass-produced, though that helped introduce it to even more people and places.

Next, we'll take you to the 1980s and the birthplace of artisan pizza (see page 82), and show you what that transformative time meant for both pizza and its admirers. For starters, let's just say the pizzaioli (pizza makers, in Italian) of Naples weren't exactly keen on the notion that their creation had been co-opted, changed, and fancified into something else entirely. In the early 1990s they took the remarkable step of setting aside age-old jealousies about secret recipes to create a second pizza diaspora of "true" Neapolitan pizza—both within Italy and around the world (see page 74). As we will see, historical truth has been stretched a bit, but this new injection of energy from its home base has reinvigorated pizza and provided additional variations.

When you get right down to it, pizza is a rather unlikely hero. It made the leap from inexpensive street food in an insular Italian city to upscale gourmet fare served worldwide. It was maligned by writers. It was made by immigrants who initially were reviled in their new homes.

And yet millions of people have come around to saying essentially the same thing: "I'll have what they had."

WHAT IS PIZZA?

Before we get into all this history, we have to set some ground rules. For starters, what *is* pizza? Answering this question took some serious historic research and thought.

In technical terms, pizza is a microbially leavened flatbread baked with toppings, often including tomatoes, cheese, or both (or neither) that's intended to be eaten hot, either directly from the oven or reheated. That's quite a broad definition. Topped flatbreads go back to ancient history. Virgil's *Aeneid*, a 1st-century-BCE epic depicting events leading up to the founding of ancient Rome, talks of wheaten cakes topped with other morsels. Today, virtually every culture has flatbreads with baked-on toppings. We could spend paragraphs listing examples. Turkey has Bafra-style pide. Armenia and Syria have lahmacun. The Alsace region of Germany has flammkuchen. Other parts of Germany have zwiebelkuchen. The country of Georgia has khachapuri. Each of these would fit the definition above, but few would argue they qualify as pizza, and we're in agreement: they're not pizza.

On the other hand, there are several topped flatbreads that have recently emerged in parts of Italy that are called pizza but don't *precisely* fit our definition. Rome's Gabriele Bonci (see page 110), for example, is a famous pizzaiolo, yet his product involves baking what is essentially a focaccia and then topping it later. One could make a case that



it's a kind of open-face sandwich—a sort of Italian smørrebrød. Numerous pizzaioli in the Veneto region of Italy also use a bake-and-then-top method to make an entirely different sort of dish (see page 141). Some of them even have a top crust, making the sandwich case even stronger. But they're all called pizza, and in the end we agreed they actually *are* a kind of pizza.

Just to make things more complicated, the origin of the word “pizza” has divided etymologists (see page 7). It's generally been used to describe a flat, round food item, savory or sweet, which, obviously, could include a lot of things. Italian cookbooks from the 1500s (see page 6) use the term “pizza” to describe what we would today call tarts. Think sweet rather than savory (though sometimes both sweet *and* savory), with squab, cinnamon, and honey among the ingredients. Others are more like cakes. These are worlds apart from what we understand today as pizza.

So, back to our original question: what is pizza? It isn't solely about the technical definition, and it doesn't hinge on whether or not something is called pizza. Instead it's about historical lineage, and we're tracing that history like a forensic genealogist might. In the field of genealogy, your family tree is just that—your family tree. It extends backward in time through your direct ancestors. There were people your ancestors knew well, perhaps even their best friends, but to whom you are not related. Many of the people in your lineage may have a different last name than you do, even close relatives. Conversely,

there are people who have your last name but who aren't part of your family lineage. Every country has regional specialties, including many flatbreads. Often, these foods are only made in one very specific place. That's especially true in Italy where food traditions are hyperlocal, not national (see page 19). That's in part because Italy is a young country, only coming into existence in 1861.

The global phenomenon we know as pizza is about a regional flatbread that originated in Naples, Italy, in the 18th and 19th centuries. Looking back, we can understand why it was natural for the Neapolitans to call this dish pizza like the tarts in those 15th-century recipes because it was, in a sense, a kind of pie. Still, there is no lineal relation between the 15th-century dishes and the Neapolitan flatbread.

What we call pizza in this book includes the extended family of descendants of 19th-century Naples pizza. This covers the vast majority of pizza variations around the world, including preparations like Bonci's. Even though they can seem like open-face sandwiches, they arguably can trace their inspiration back to 19th-century Neapolitan pizza. It also includes cheeseless vegan pizza and pineapple-topped Hawaiian pizza, barbecue chicken-topped artisan pizza, and chain pizza with a drizzle of ranch dressing because they all were developed as variations on the Naples original. It does not include flammkuchen, khachapuri, or other flatbreads with toppings because they represent independent culinary traditions.

For more on pizza-like things, see page 96.



Neapolitan pizza seller, Italy, 19th century



New York City, 1935



Naples, 1953



Pizza as a sweet dish might not sound that crazy to some people given how common dessert pizza is today. While we don't cover them in detail in this book, pizzas with sweet toppings such as Nutella, fresh fruit, and cinnamon streusel are often found on pizzeria menus. Generally, we don't find them all that successful (either as a dessert or as a pizza), but we did sample a few tasty versions during our travels (see page 146), notably at Pizzeria Montegrigna Tric Trac, Pepe in Grani (above), and Pizzeria La Notizia.

The foods of ancient Rome bear little resemblance to Roman cuisine as we now know it. In fact, they had more in common with the cuisine of modern-day Thailand.

SEARCHING FOR THE ORIGINS OF PIZZA

There's a tendency to think of Italian cuisine as having ancient roots, but this is not the case. Rather than long-standing traditions, the story of Italy's cuisine involves repeated wholesale replacements of favored foods with new ideas.

Certainly, Rome was one of the most important cities of the ancient world, but from a culinary perspective, this ancient history is mostly irrelevant. One of the first cookbooks in recorded history, *De Re Coquinaria*, was compiled in 4th- or 5th-century Rome, but you won't find anything that resembles what we now know as Italian food. The book is commonly known as *Apicius* because it was mistakenly attributed to the 1st-century Roman epicure by that name. Imported spices were heavily used, including cumin and coriander, neither of which is common in modern Italian cooking, as well as a fermented fish sauce called *garum*, similar to today's Thai fish sauce. Meanwhile, neither pasta nor tomatoes, Italian staples today, are in the book. It would be 1,000 years before the tomato was brought to Italy from the Americas (see page 9). Basil is mentioned once. Pizza is entirely absent.

Moving into the Middle Ages, dishes continued to be heavily spiced, with lots of pepper, cinnamon, and ginger. National food customs all but disappeared, replaced by a pan-European cuisine. The

food eaten in France was similar to that in England and across the regions of Italy, and so on. For example, the 14th-century English cookbook, *The Forme of Cury*, included a recipe for something called "Loseyns," with wide, flat noodles and cheese much like today's Italian lasagna.

When we begin looking for mentions of the word "pizza" in historical texts, it further underscores the dish's surprisingly short history.

Scholars say the first time the word "pizza," or its variant "pizze," appeared in print was in 997 CE. It turned up in a document from Gaeta, a town between Rome and Naples, that appears to be a deed of sorts. The text, written in Latin, roughly translates as, "Every year, you and your heirs will give us twelve pizze and one pig at Christmas and twelve pizze and two chickens at Easter." While historians believe that these "pizze" were baked goods, later clues suggest they were unlikely to be savory flatbreads.

The term continued to pop up in manuscripts over the next few centuries with little elaboration. At last, in 1524, we find the first recipes for something called "pizza" in what is known as the *Lucano Manuscript*, a book written in Southern Italy. But aside from the name, these dishes bear no resemblance whatsoever to modern-day pizza. For *picza figliata*, layers of dough are alternated with cheese slices and a filling made of pine nuts, sugar, egg yolks, and rose water. For *picza bianca*, the dough is filled with a mixture of ricotta, egg yolks, sugar, and almond milk, and then covered, like a tart, with more strips of dough. *Un'altra picza* is another pie-like dish, this one with borage and a boiled lettuce heart added to the filling, along with a good dose of cinnamon and sugar. As for the dough mentioned in all of the recipes, it's something called *torta bianca*. To make it, you mince together sugar, cheese, pine nuts, and half the breast of a capon. Add eggs, nutmeg, and more sugar, and then bake. To us, most of these recipes sound like tarts, and moreover, they're all very sweet.

A 1549 cookbook written by Cristoforo di Messisbugo tells a similar story of Renaissance-era "pizza." Messisbugo writes of *picza sfogliata*, in which a dough is made from soaked bread crumbs, flour, egg yolk, butter, and rose water. The dough is rolled thin, brushed with melted butter, and then twisted into a spiral shape, sliced into pieces, and fried in butter. What you wind up with sounds more like a buttery puff pastry than a pizza. Clearly, the 16th-century *Lucano* and Messisbugo texts have no connection to modern-day pizza's lineage.



THE ETYMOLOGY OF THE WORD “PIZZA”

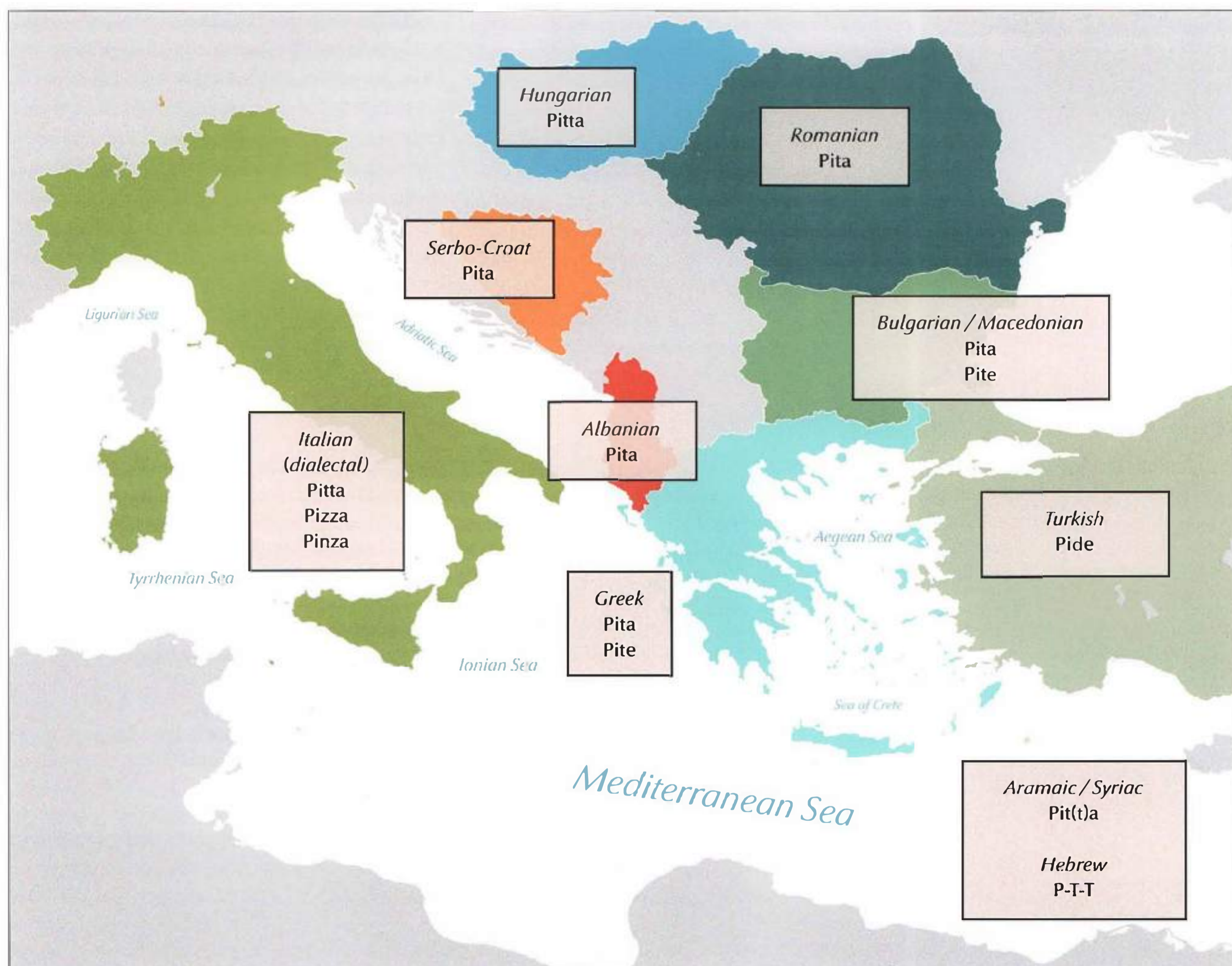
Alberto Capatti, a well-regarded Italian food writer, has written that “the word ‘pizza’ has poisoned etymologists and tormented food historians.”

No kidding. The etymology of “pizza” has been debated for decades. Some say the word derives from the Latin *picea*, which means “cake,” or perhaps *pistus*, which can refer to a rolling pin or the act of spreading out the dough, or even *pinsa*, which means “to pound, squash, or knead.” Others say it comes from the Greek *picea*, a word for the dark coating left on the bottom of dough from burning ashes. Still others claim it comes from the Greek *pitta*, meaning “crushed” or “flat” in reference to the shape of the dough. And there’s another group that says it’s Germanic, a derivation of *bizzo*, meaning a “piece” or “bite.”

Suffice it to say that the origin of the word is uncertain. We’re in the *pitta* camp—it’s interesting that the Mediterranean flatbread we today call *pita* or *pide* and Italian *pizza*, also a sort of flatbread, have common roots. Obviously, flatbreads are ancient, and it shouldn’t be surprising

that terminology was inherited across a wide number of otherwise distinct languages. We checked to see whether we could trace the word back even earlier to a language known as Proto-Indo-European, believed to have been spoken by many peoples as early as the late Neolithic Age. We found some tantalizing similarities—for example, *pinsō*, meaning “crush,” and *plākos*, meaning “flat”—but that’s the closest we got to *pizza*.

Trying to define the word is also a challenging exercise. We know that for centuries, the word “pizza” typically meant a sweet cake or tart, often made with almonds and heavily spiced, that seemed more like *bisteya* (see page 8). It was only in 18th-century Naples that *pizza* started to become the dish we know today—a flat, yeasted dough with toppings, baked in the oven. Today, the term transcends languages. You’ll find shops advertising “pizza” everywhere from Italy to the United States to China and Russia.



The map above shows the etymological links pizza shares with the various flatbreads of the Mediterranean region.



Bartolomeo Scappi was what could only be considered a celebrity chef of Renaissance Italy. His opus *Opera of Bartolomeo Scappi* includes early references both to pizza and mozzarella.

TRACING PIZZA ALLA NAPOLETANA

We turned to the giant tome of Renaissance-era Italian cooking, the 900-page cookbook *Opera dell'arte del cucinare*, published in 1570, which became a culinary reference for the papal court. Its author, Bartolomeo Scappi, was a sort of celebrity chef who supervised the kitchen under Pope Pius V. It included a recipe for something called Neapolitan pizza: Per fare torta reale di polpa di piccioni, da Napoletani detta pizza di bocca di dama. In truncated English, that's "pizza of the lady's lips."

The "lady's lips pizza" includes semigrilled pigeons, beef marrow, dates, marzipan, and sugar, along with heavy doses of cinnamon, cloves, and nutmeg. We immediately thought of modern-day bisteeya, a sweetened Moroccan pigeon-and-almond pie. Scappi's other "pizza" recipes are also sweet and heavily spiced, many featuring eggs, sugar, dates, and rose water. From the 16th century up through to the late 19th century, the term "pizza" was synonymous with a tart (see page 6), and the vast majority of these tarts were sweet. In Scappi's time, this was true even if they had rare grilled doves as a component. Spice-laden and sugar-laden dishes were common in the high-end cuisine of the day. Sugar was often used as a seasoning like salt.

"Pizza" as a word for tart continued all the way into the late 19th century, even as pizza (in the

form we know) was spreading around the globe. Pellegrino Artusi published a much-vaunted Italian cookbook, *La Scienza in Cucina e L'Arte di Mangiar Bene* (*The Science of Cooking and the Art of Eating Well*) in 1891, including a recipe titled "Pizza Napoletana," which called for sugar, almonds, flour, milk, eggs, and lemon zest. By this point, Neapolitans had been making savory pizza for nearly 100 years, yet the pizza being captured in cookbooks remained a type of Neapolitan tart.

Savory pizza is missing from these seminal books, along with other early books about Neapolitan cuisine, including the *Il Cuoco Galante* cookbook from the 18th century. The simple reason for this is that pizza was not yet a food that captured the attention of the writers of cookbooks. The pizza we know today isn't an evolution of those medieval or Renaissance "pizzas," or even Artusi's more recent recipe. They're totally different foods that share a label—like, say, an Oreó sandwich cookie and a ham sandwich.

The pizza that conquered the world was an entirely new dish that emerged more than 100 years after Scappi. It was created not in the regal kitchens of vaunted chefs, but by and for people who could barely afford to feed themselves. It was invented where something simple and cheap could be easily consumed with neither plates nor forks, and where it really had the potential to take off.

This brings us to 18th-century Naples.

COULD PIZZA BE RELATED TO BISTEEYA?

Grilled doves ground in a mortar, dates, marzipan, beef marrow, and eggs, baked into a two-crust pie are what Bartolomeo Scappi includes in his 1570 recipe for "pizza." This, he wrote, is what Neapolitans call Bocca di Dama, or "lady's lips pizza." To us, it sounded more like bisteeya, the Moroccan dish that today is made with squab, spices, and sugar, all baked in a puff pastry dough.

It made us wonder if there was a connection between Scappi's Italian recipe and this North African dish. In the 7th century CE, Arab Muslims began making inroads into Sicily, and by the 9th century, Italy's southern island was fully in their hands. Like all conquerors, they brought their food traditions with them, including nuts and spices from the East, as well as the technique of puff pastry dough.

Scappi's "lady's lips" made use of ingredients popularized by the Arabs in Sicily, namely puff pastry, crushed nuts, and sugar. Unfortunately, culinary scholars say that no one has yet to find Arabic or Muslim cookbooks from the 15th through the 19th centuries, so we couldn't confirm a direct connection between Scappi's dish and bisteeya.

There isn't even an obvious connection between Scappi's Bocca di Dama and dishes of the same name today. One version is a sponge-like almond cake from Monferrato and the other is a bite-size pastry from Otranto.

We made Scappi's pizza alla Napoletana in our Lab kitchen (below). Its heavy spices and squab brought to mind Moroccan bisteeya. Given the Arab influence in Southern Italy, our curiosity was piqued.



TOMATOES ARRIVE IN ITALY

Today, the image of Southern Italian cuisine is tightly bound up with the tomato. If you picture a stereotypical Italian pasta dish, it's likely to feature tomato sauce. Ditto for pizza.

But the *Solanum lycopersicum*, the Latin name for the tomato, is not native to Italy, or for that matter, anywhere in the Mediterranean region. It originated some 10,000 miles away in the Andes, was probably brought to Italy thanks to the Spanish conquistadors in Mexico, and took 200 years to become popular. First, Italians had to be convinced it wasn't poisonous.

The first known description of the tomato in Italy came in 1544, in an herbal manual published in Venice by Pietro Andrea Mattioli. He described it as a species of eggplant that was green at first, turning a golden color as it ripened. Though he mentioned it was edible, he didn't recommend it, classifying it among the so-called nightshade vegetables, which were believed to be toxic. Ten years later, Mattioli revised the herbal guide, calling the "new species of eggplant" the "pomi d'oro," a name that has stuck. The belief that eating nightshades is dangerous still crops up. Food activists have made similar claims in the 21st century, despite numerous scientific studies showing that tomatoes are safe and nutritious, including the leaves, which we use in sauce (see page 2:225).

In the mid-16th century, records show that Cosimo de' Medici, the Grand Duke of Tuscany, received a basket of tomatoes from his Florentine estate, though they seem to have been used as ornamental plants. This view seems rather common, as there are records of tomatoes in botanical gardens and the like from several sources during this era. Though some of the era's plant specialists mentioned that the fruits were edible, most were against the idea. An English herbalist, for example, called them "highly toxic." Venetian botanist P. A. Michiel said they were "dangerous and harmful," putrefying immediately in the body. Just catching a whiff of one could lead to "eye diseases and headaches."

Fruits and vegetables, in fact, were generally suspect under the prevailing "four humors" theory of health established by the ancient Greek physician Galen. At the time, the anti-produce crowd had something of a point. Fruits and vegetables are often eaten uncooked, and cooking kills pathogens. Back then, water was unclean, public sanitation was crude or nonexistent, and a poor population, already unhealthy and undernourished, was particularly vulnerable to foodborne illnesses. Unfortunately, the poor were exactly the people who were eating

the most fruits and vegetables because they couldn't afford much else.

The Spanish, however, were well-established tomato-eaters by the early 17th century, and they bought and sold them in the marketplace. By this point, notions of health were evolving, and the upper classes were coming around to the idea of eating produce, too.

It wasn't until 1692 that the foodstuff was mentioned in printed recipes in Italy. Antonio Latini's *Lo Scalco alla Moderna (The Modern Steward)*, published in Naples, included the first printed tomato recipes in European culinary literature. The dishes weren't seen as Neapolitan, and instead were labeled, not surprisingly, as Spanish. As for when tomatoes made their debut on pizza, historical records don't provide an answer. But we do know that by the 1800s, tomatoes were one of several possible topping choices.

For more on tomatoes, see page 2:210.

Tomatoes were brought to Italy in the 16th century, but they were grown purely for ornamental purposes and considered highly toxic by many.



TRACKING PIZZA IN ITALY

1500-1900

A large part of our approach to researching the history of pizza was tracking historical references to pizza and its adjacent parts (mozzarella, tomatoes, and others; entries for these are set off in blue). This meant searching archives to find evidence of pizza, its ingredients, descriptions, recipes, and definitions. We found descriptions of pizza in plays, mentions in historical documents, advertisements in newspapers, and more. This deep dive provides a framework for telling pizza's story in Italy and we collect the most notable examples here. We have separated the timeline into two parts: pizza as a tart (see page 8) and pizza in Naples.

One of the most surprising findings was that many of the first or best descriptions and recipes of and for pizza were captured by foreigners. This could be because pizza was seen as so common that it didn't command the attention of Neapolitans or that those records have been lost to time. The earliest Italian references to pizza are in popular plays and literature of the day. The historical references for Italy after 1900 can be found on page 72. For our collection of historical references for pizza in the United States, see pages 34 and 56.

For more on the history of mozzarella, see page 2:316.

For more on the history of tomatoes, see page 2:210.

Pizza in Naples

1618

I Teatri di Napoli

First mention of pizza frita with oil

1634

Lo Cunto de li Cunti

Mention of pizzella (small pizza), taken from the breadbasket

444 *Lo Scalco alla Moderna*
Salsa di Pomodoro, alla Spagnola.
Piglierai una mezza dozzena di Pomodoro; che sieno mature; le porrai sopra le brage, à brustolarse dopo che faranno abbutiscare, gli leverai la scorza diligentemente, e le tritarai minutamente con il Coltello, e v'aggiungerai Cipolle tritate minute, à discrezione. Penarolo muso tritato minuto, Scapollo, o Piccariola

1694

Lo Scalco alla Moderna

First mention of tomatoes in a cookbook, used to make Spanish sauce

SECONDO. 55
S C E N A VII.
FORCA, e PANFARO.

FOR. Noi avemo il bisogno. Ecco le vesti, per vestirti da Raguso. Ecco quelle per lo scbiavo, son ricche, e pompose; almeno se non per la persona, lo torrà per le vesti. Ecco i barriotti, i formaggi, e li confetti.
PAN. Sai tu che propolito ho comperato le vesciche, e le budella?
FOR. Non so.
PAN. Ho fatto il tutto a vostro modo: in questo solo vò, che voi secondate il mio. Ho tolto il barliotto, e gli altri intrighi, per empiergli di varie furtanterie; e ti farò vedere falliccioiti, provature, e mille altre galanterie, che avendogli a fare una burla, non ci vogliamo perdere il presente, e noi restafimo i bustati; ma avverti, acciocchè non abbiammo a fare quistione poi, che ingannandolo con i falsi, mi averò guadagnato i buoni.

1726

Delle Commedie di Giovanbattista de la Porta

Description of provatura, provola, and mozzarella cheeses

1773

Il Cuoco Galante

Second mention of tomatoes as appreciated cooking element

1799

Majello letter

A letter asking for debt clemency from pizzaiolo Gennaro Majello; Majello's stated profession as "pizzaiolo" and mention of his shop are the first concrete evidence of a pizzeria in Naples and suggest that he is not the sole member of profession (see page 12)



1802

Robinson Crusoe overo L'Uomo Solo con Pulcinella

First mention of a "pizzajuolo" in literature

1807

Quadro Statistico della Popolazione di Napoli e Sobborghi

Mention of a list of 55 pizzaioli and pizzerias in Naples

THE NEAPOLITAN PIZZA. "The pizza!" I hear you readers exclaim; "what do you mean by the pizza?" Well, the pizza is a favorite Neapolitan delicacy, which is only made and eaten between sunset and two and three in the morning, and it must be baked in five minutes in the hot oven; at the very moment when it is ordered it is pulled out of the oven and served up piping hot, otherwise it is not worth a grano. The Pizza baker takes a ball of dough, kneads it, and spreads it out with the palm of his hand, giving it about half the thickness of a muffin, then pours over it mozzarella, which is nothing more than rich cream, beaten almost like a cream

1860

London Chronicle

First description of Neapolitan pizza in English, with mozzarella (cream cheese) and tomato as ingredients, from a British newspaper

1861

Tour du Monde

Description of pizza with herbs, anchovies, prosciutto, mozzarella, and spices, from a French guidebook

1861

Globus

Description of pizza with abundant garlic, vegetables, sardines, ham, mozzarella, and spices, from a German magazine

1861

Italy becomes a unified country.

Leggiamo nel *Popolo d'Italia*:
All'edificazione del crescenti, che pazza tra i preli si dirizzano, ne piace riferire seguito avvenuto ieri sera allo 12 (8) in una pizzeria vicino al vico Purgatorio F. Senisi o C. Massari ad un tavolino loro dirimpetto, videro seduti un lungo canalone, un tercio, che faceva riu, ed un giovanetto dal volto mollo dai capelli lunghi, che non era altro che Nina Travasuti. Dopo di aver trincato essendo l'ora tarda, il prete a malincuore

1867

L'Umanitario - Giornale Massonico

Mention of a pizzeria in Vico del Purgatorio, Naples; possibly the first documented mention of pizza in an Italian newspaper

1870

I Primi Anni di Roma Capitale

First mention of a pizzeria in Rome: "the Neapolitan pizzeria behind the Pantheon," from an Italian guidebook

1870

Italians begin to emigrate to the Americas and other parts of Europe in large numbers and would continue to do so until World War I.

1873

Topografia Medica del Comune

First mention of pizza in Northern Italy: pizze or focaccia in Emilia-Romagna region, from an Italian guidebook



1875

Cuisine de tous les pays

First recipe for savory pizza, from a French cookbook

1877

La Stampa: Corriere di Napoli

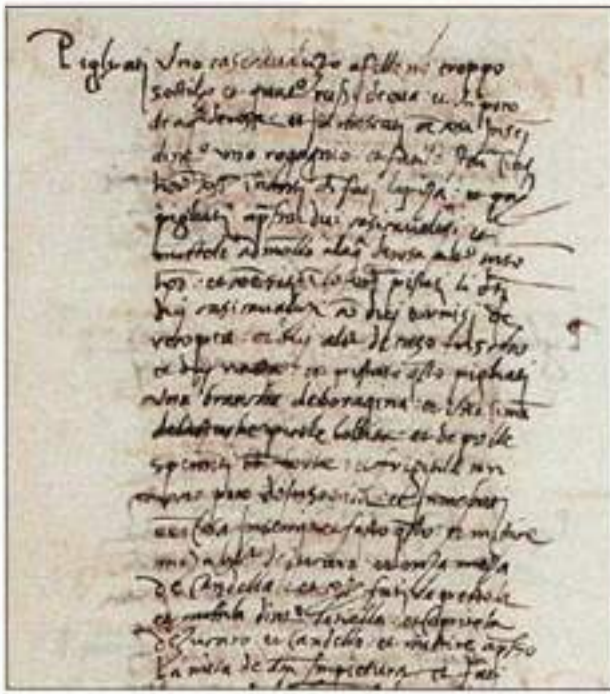
Pizzaiolo, vendor of pizza, covered with anchovies, tomatoes, and cheese

1878

Dolce Napoli

Description of pizza with oil, garlic, anchovy, cheese, bacon; calls it indigestible; from an English guidebook

Pizza as a Tart



1517
Vicende della Coltura nelle due Sicilie
Mention of "pizze sfogliate," "pizze Fiorentine," "pizze bianche," and "pizze pagonazze" in the menu of the wedding feast of Bona Sforza and Sigismund I, King of Poland

1524
Manoscritto Lucano
First mention of pizza (picza) as a kind of cake and lists provatura (mozzarella) among the ingredients

1557
I Discorsi di M. Pietro
Mention of cheese made from buffalo's milk; called mozze in Naples and provature in Rome

1570
Opera di M. Bartolomeo Scappi, cuoco segreto di Papa Pio V
Description of sweet pizza, linking the word "pizza" to Naples; included the first mention of the term "mozzarella"

1789
Vocabolario delle Parole del Dialetto Neapolitano
Neapolitan language dictionary defines pizza as "a generic name given to all kinds of cakes, focacce, or flatbreads"

1875
La Vera Cucina Napoletana
Mention of various types of pizza, all sweet

1891
La Scienza in Cucina e L'Arte di Mangiar Bene
Artusi's recipe for pizza alla Napoletana is a sweet cake

1812
L'Ultimo Inferno Aperto a Favore del Principe Valerio con Pulcinella
Mention of "fella de pizza" or a "slice of pizza"

1824
Le Ridicole Operazioni, o sia Pulcinella Vendicato
First description of savory pizza baked with oil, lard, grated cheese, mozzarella, and caciocavallo

1835
Luci ed Ombre Napoletane
First mention of a pizzeria: "Ntuono 'o pizzaiuolo"

1840
L'Italie Comfortable Manuel du Touriste
First foreign description of pizza from Naples with jam or cheese, from a French guidebook

1841
Le Corricolo
First foreign description of savory pizza as focaccia with oil, lard, tomato, and little fish, by French writer Alexandre Dumas

1845
Vocabolario Napoletano Lessigrafco e Storico
Definition of ciualella as focaccia made by the pizzaiuolo

1847
Napoli in Miniatura: Ovvero il Popolo di Napoli e i suoi Costumi
Description of pizza as focaccia with condiments (tomato) and the first mention of calzone



1848
L'Omnibus Pittoresco
Description of pizza and pizzaiolo and the first mention of both tomato and mozzarella as ingredients

1851
Review Des Deux Mondes
Description of Naples and pizza vendors, pizza as a gâteau topped with fish, from a French guidebook

1851
Pulcinella creduto Donna Dorotea pezza all'uocchio
Play with a character of a pizzaiuolo; includes description of pizza with tomato sauce and mozzarella



1858
Usi e Costumi di Napoli e Contorni Descritti e Dipinti
Description of pizza and pizzaiuolo as distinct from focacce and schiacciate; pizza described as topped with tomatoes, mozzarella, and basil leaves; possible description of pizza margherita



1880
Cincinnati Daily Gazette
Story of "Queen Margaret" sampling pizza at the Palace of Capodimonte in Naples, eight years before the infamous claim by Pizzeria Brandi (see page 23)

1884
Times (London)
Story about the attempted poisoning of Neapolitan pizza at a stall in Via del Purgatorio, Naples, from an English newspaper

1884
Il Ventre di Napoli
Description from an Italian novel of pizza and a pizzaiolo that mentions an unsuccessful pizzeria in Rome that closed

1884
New-York Tribune
Mention of Pizzeria del Giardinetto in Castellammare: pizza described as flat tart with cheese, tomatoes, anchovies, and shellfish; mentions Queen Marguerite's favor of a pizzaiolo (evoking the Margherita story prior to 1889, see page 23)

1889
Storia della Pizza
Story of the birth of pizza Margherita, invented by Raffaele Esposito in 1889

1891
Evening Democrat
Description of pizzeria in Naples, pizza as griddle cakes of dough, baked up with cheese or oil, from an American newspaper



1893
Guida Monaci: Guida Commerciale di Roma e Provincia
Listing for Gran Caffè Rattazzi—Restaurant e Pizzeria Napoletana and Pizzeria delle Terme of Pascoli Luigi, both in Rome, from an Italian guidebook

1894
Naples Contemporaine
Description of pizza as a cake with fat, shallot, tomato, and fish; from a French guidebook

1898
The Encyclopedia of Practical Cookery
First pizza recipe printed in English

PIZZA.—This, a sort of cake, is of Naples, and should be eaten directly if prepared as follows:

Put a pound and a half of light well-floured board or table, flatten it the edge slightly, smear a little oil over tomatoes cut in halves, small fresh salted anchovies, or both together Sprinkle over a little salt and pepper finely-chopped garlic, mixed with ley and sweet herbs, and baste the w of the oil. Put the Pizza into an ov bake it for twenty minutes with the when done put it on a dish, and se

THE CITY THAT CREATED PIZZA

We've established that the word "pizza" dates back at least to the 10th century, and that it (sometimes) referred to a kind of food; we've also established that for much of history, the term referred to an elaborate, sweet dish that was nothing like what we now call pizza. Our focus here is on that transition point—the point at which pizza was understood to mean the savory dish we know today.

The vexing question is, when was it? Different sources have pegged this point to different dates, some as early as the 16th or 17th century, though the evidence is sketchy or even nonexistent.

The most clear-cut early fact that we could find dates to 1799. In the next few pages, we'll explain why we've selected that date. We'll also work both backward and forward from that point to explore even more. But first, picture Naples.

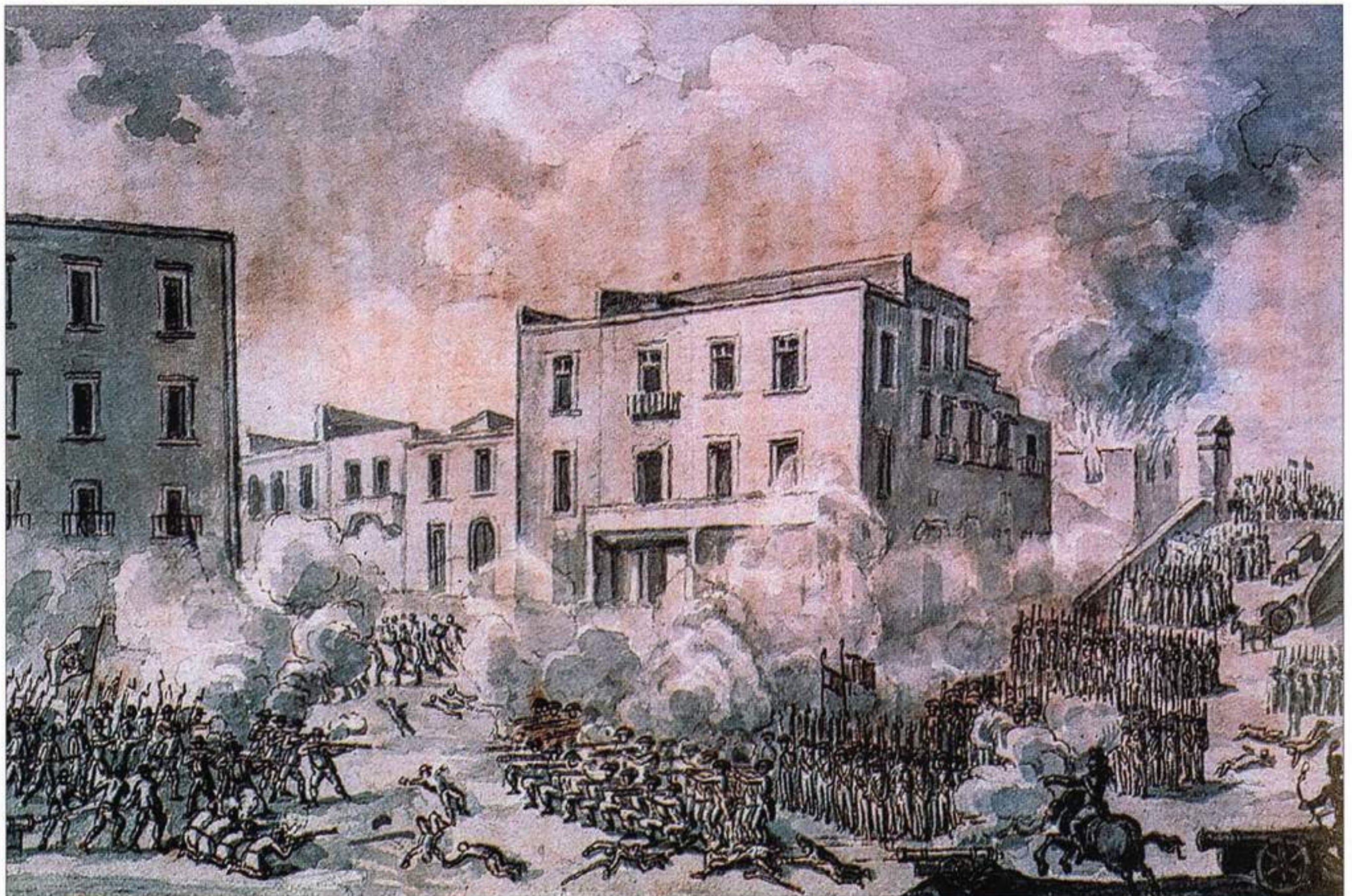
By this point, life there had been sculpted by centuries of conflict, including periods of control by the Byzantine Empire, the French, the Spanish, the Normans, and the Sicilians. For most of the 18th century it was ruled by the Bourbons (of Spain) and became one of the major capital cities of Europe. But

even as the city was influenced by all these outsiders, the Neapolitan people retained an identity that was distinct from the rest of the region. They spoke not Italian but a unique Neapolitan language (clinging to it until nearly the 20th century). They embraced a distinctive cultural symbol—a vividly wrought tragicomic character named Pulcinella (see page 13)—so iconic he was the subject of a later ballet by Igor Stravinsky. A distinct sense of cultural identity has continued to this day.

Over Naples's history, there were periods of prestige, but that prestige was coupled with crushing poverty. When feudalism ended, peasants from the countryside fled to the city in the hope of finding work—and food—amid famine. This is the climate in which pizza as we know it emerged.

The year 1799 was particularly bloody, with a succession of three different rulers. After order was restored that summer, a letter arrived at police headquarters saying a pizzaiolo named Gennaro Majello was asking for debt clemency. As documented by Neapolitan pizza historian Antonio Mattozzi in *Una Storia Napoletana (Inventing the Pizzeria)*, the

The history of Naples is one of repeated conquest, and for many centuries the city was under the rule of a revolving door of invaders.



letter explains that Majello was unable to pay his debts because political turmoil prevented him from operating his shop, where, he noted, people came to eat dinner.

We don't know what happened to his debt. Nor do we know how, exactly, he defined himself as a pizzaiolo. Contemporary documentation is sparse. A 1789 Neapolitan language dictionary defines the word "pizza" rather sketchily as "A generic name given to all kinds of cakes, focacce, or flatbreads," then goes on to list examples: *pizza frita*, *pizza stracciata*, *pizza di cicoli*, and so on. Frustratingly, the dictionary entry doesn't elaborate: "It would have been worthy of our zealousness for our homeland to pass down to our descendants an exact description of the preparation of the various types of pizzas. But given that cuisine is a branch of chemistry . . . we did not think it appropriate to have them in this dictionary."

So we are left with the 1799 letter, the pizzaiolo, and the restaurant that served pizza. (It wasn't until the mid-19th century that these shops were known as pizzerias.) We believe it's significant to our historical research for two reasons: it shows that at that time, there were specialists making pizza who were different from bakers, and it shows there were restaurants dedicated to pizza. Between the dictionary definition and the pleading letter, a picture of pizza begins to emerge.

It shows that at some point prior to 1799, being a pizza maker was an established profession. After all, it's hard to imagine someone opening a pizza restaurant in a hardscrabble city, which probably would require building a cumbersome oven in the hopes of serving a kind of food no one had ever heard of. Therefore, we believe pizza was a Naples specialty well before 1799. What we don't know is for how long.



Pulcinella, evoked in the image above of a man and his three sons eating macaroni, is central to the Neapolitan identity. The poor of Naples were sometimes called "macaroni eaters."

PULCINELLA AND NEAPOLITAN IDENTITY

If you walk around Naples, you'll inevitably notice a familiar face staring back at you from storefronts, statues, and artwork. He's a clownish-looking fellow wearing a black half mask, baggy white clothes, and a floppy hat, with a hunchback and a big beak of a nose. His name is Pulcinella, and he's a mythical figure dating back at least to the 17th-century *commedia dell'arte* and the Neapolitan puppetry tradition. Even today, this trickster is considered a folk hero to the citizens of Naples. And since pizza originated in Naples, he's also come to be associated with it.

In Naples, he is considered a voice of the people and in some sense is symbolic of the culture there, representing the hustle-or-get-hustled nature of life in this unique city. Some consider him a good-luck charm. He is the embodiment of Neapolitan identity, akin to Uncle Sam. Today, Pulcinella is part of the logos of the two Neapolitan pizza accreditation authorities: the *Associazione Pizzaiuoli Napoletani* (APN; see page 75) and the *Associazione Verace Pizza Napoletana* (AVPN; see page 74), which depicts him wielding a pizza peel.





There is evidence of pizzerias in Naples dating back to the late 18th century, and their numbers would grow over the decades. Port'Alba, shown above in this image from 1861, is still in operation (see page 167).

We've considered various possible dates. A book from 1517, for example, describes pizza as "Neapolitan for focaccia." This sounds more like pizza as we know it than sweet Scappi-style pizza, but the definition is too thin to be of real use. A 1634 book of fables, *Pentamerone*, by Giambattista Basile, mentions "pizzella," but again there is no description. The Associazione Verace Pizza Napoletana (see page 74) claims, without citing evidence, that the mastunicola pizza (lard, pepper, cheese, basil) was invented in 1660 and the marinara pizza in 1734. We've seen other dates elsewhere, too. The problem is, none of them cite verifiable evidence (and as we've noticed, there's a thread of the fantastical among the marketers of pizza; see page 23).

The Majello letter provides us with the certainty that there were pizzaioli and pizzerias (enough of them must have existed for the words to be understood) in 1799. We also know pizza grew in popularity after that. An 1807 census counted

68 brick-and-mortar pizzerias in Naples. By 1871, another survey counted 120.

When Majello's letter reached officials, Naples was a rough-and-tumble place. It was one of the most densely populated cities in Europe, and half of the city dwellers had no steady means of earning a living. The masses lived in multistory buildings that lined cobblestone streets as narrow as alleyways. These streets are still teeming today. Life was precarious, but that scarcity also meant its residents were inventive.

"[Naples] was a place," wrote Mattozzi, "where seeing tomorrow meant being talented at the art of survival."

The streetscape was loud, dirty, and chaotic. Located about 140 miles from Rome and 20 miles from the recently discovered city of Pompeii, Naples was one stop on a Grand Tour of ancient sights and high culture that was popular with European gentlemen. The tourists were, by turns, mesmerized and horrified (sometimes both).

THE LONG HISTORY OF MOZZARELLA

Mozzarella is one of about a dozen members of the family of Italian pasta filata cheeses. In Italian, pasta filata means "spun paste." It's descriptive of the way fresh mozzarella is made, using a process of heating and stretching, which results in an elastic and also somewhat fibrous texture. The word "mozzare" means to chop or cut in Italian, which also indicates how the cheese is lopped off from larger pieces as it's made.

This cheese-making technique is ancient, dating back to perhaps 50 CE. Today, the cheese is generally made with the milk of water buffalo (see next page) or of cows, in which case it's technically called fior di latte (though in the United States, you'll often still see it referred to simply as mozzarella).

We see mentions of mozzarella throughout history. It was part of an offering by monks in 12th century Capua, Italy. Documents from the 14th century describe the sale of water buffalo mozzarella at markets in Naples and Salerno. By the 15th century, several recipes using provatura, a cheese similar to mozzarella, appear in Italian cookbooks. But it wasn't until the 16th-century cookbook *Opera of Bartolomeo Scappi* that mozzarella itself appeared in writing, in a recipe for a torte with pine nuts and almonds.

By the 18th century, mozzarella was getting to be big business. In the 1780s, Ferdinand IV, king of Naples, built a palace and farm estate near Caserta called La Reale Tenuta di Carditello that became one of the first industrial agricultural farms in Europe producing fior di latte mozzarella at a commercial scale. At one point, Carditello produced up to 30,000 kilos of mozzarella, or provolha. The grounds also included a mill, a bakery, and hunting grounds for game.

When did mozzarella make its first appearance on pizza? The earliest mention we know is from *Usi e Costumi di Napoli (The Customs of Naples)*, published in 1858. In an essay titled "Il pizzajuolo," author Emanuele Rocco describes "ordinary pizzas" with garlic and oil, and more elaborate ones that included small fish or thin slices of mozzarella.

Mozzarella was likely on some of the earliest US pizzas, too. By 1892, the Alleva Dairy had opened near the corner of Grand and Mulberry Streets in Manhattan. Founded by Neapolitan immigrants, they sold mozzarella and ricotta made from cow's milk from their farm north of New York City.



This depiction of a 16th-century kitchen, found in the *Opera of Bartolomeo Scappi*, includes a dairy works where mozzarella and other pasta filata cheeses were made.

THE CURIOUS CASE OF THE ITALIAN WATER BUFFALO

Mozzarella di bufala is an iconic Italian food, and when made in Campania under strict guidelines, it earns a coveted EU status as a DOP (Denominazione d'Origine Protetta) product, meaning it was produced locally in a specific region following traditional methods.

We wondered, how did a cheese made from the milk of water buffalo become so closely associated with Italy? Water buffalo are not endemic to Italy. They have been there a long time, but they were brought there by humans. The question is when. There are two species of water buffalo, neither of which are native to Italy. *Bubalus bubalis*, the species used to make mozzarella di bufala, is native to India, where it was domesticated around 2500 BCE. Later, the animal was used in China. Even today, the domestic version is sometimes called “the living tractor of the East.” The wild buffalo still thrives in regions around rivers and marshlands.

There is general agreement that there were *Bubalus* from southern Asia all the way through Europe during the Pleistocene Epoch. At some point, the animal became extinct in Europe, but was later reintroduced. The question is, when? Different theories peg the reintroduction anywhere from Roman times to the 12th century.

A mosaic dating to around 300 CE, uncovered in Lod, Israel, offers some suggestion of an early reintroduction, too. This exceptionally preserved floor mosaic has clear references to Rome and depicts a number of animals ranging from songbirds to fish to wild beasts. One looks to us like a water buffalo, suggesting these animals were familiar during Roman times. The Romans traded all over the world; why not water buffalo? Some scholars, however, suspect the creature in the Lod mosaic might be a kind of wild bull, perhaps even an aurochs (which went extinct in the 17th century). In any event, no one can say for sure whether this Lod creature is a water buffalo or something else.

During our trips to Italy, we carefully scanned any archaeological museum for telltale evidence. In Rome we found a 3rd century sarcophagus of a Roman Christian that had both a bull or cow with forward-facing horns and what is likely a water buffalo with sharply backward-facing horns (see images below, left).

Another theory pegs the European introduction of domesticated water buffalo to a later period. As recounted in an 8th-century book, *History of the Langobards*, this theory says the water buffalo appeared after 6th-century battles between the Thuringians (a Germanic group), the Bavarians, and the Avars (nomadic people from the Central Asian steppes who settled in regions in and around Romania). Adding weight to this argument is the fact that water buffalo still thrive today in Hungary, after being introduced via Romania.

A third theory pegs the introduction later, around the 12th century: *Bubalus bubalis* was brought from Palestine to Egypt during the Arab Muslim conquest, moved through Anatolia (modern-day Turkey) by the 9th century, and finally arrived in Campania in 1154.

And yet another one says they were brought to Campania via Egypt and Sicily by Saracens (Arab Muslims) and Moors during the Middle Ages. Today, some people in Caserta still call this animal an “Egyptian cow.”

Whatever the water buffalo’s arrival date, we do know that the landscape was right for its survival. Water buffalo flourished in the marshy lands of Southern Italy, specifically the low-lying areas outside the city of Latina, and the provinces of Caserta and Salerno. They were used both as draft animals and for dairy production. Italy isn’t the only European country with an established history of raising water buffalo. They’re also found in Greece, Bulgaria, and Romania.

For more on the history of mozzarella, see page 2:316; for mozzarella recipes, see pages 2:324-337.



This scene from the Lod mosaic depicts a lion eating what appears to be a water buffalo.



Roman artists depicted cattle with forward-facing horns as shown in the image from Pompeii (bottom), leading us to suspect the animals depicted on the sarcophagus (top) could be water buffalo.



The above lithographs from 1825 (top) and 1830 (bottom) show pizzajuoli, walking pizza sellers common to Naples.

PIZZA'S FOREIGN CORRESPONDENTS

During this period outsiders started to notice this strange food called pizza, and that fact alone speaks to its popularity and its distinction as a particularly Neapolitan dish. It was being consumed all around them. It may sound odd today, but at this time the poor ate out far more often than they dined at home. Back then, most Neapolitans had no ovens, no kitchens, and no running water. They took their meals on the streets—the cheaper, the better. If they had a few soldi, they could eat maccheroni (pasta with sauce), another famous Neapolitan dish. But if they had just one soldo, they could buy a piece of pizza. Alexandre Dumas, the French author of *The Three Musketeers*, was a Grand Tour visitor in 1835 and later wrote a whole book about his experiences called *Le Corricolo*. He provides a wonderful description of Neapolitan street life, including curious characters called *lazzaroni* (see page 18) who lived, or at least dined, quite visibly on the streets, buying food from sidewalk vendors. In summer it was watermelon, and in winter, pizza.

“The pizza is a sort of bun, it is round, and made of the same dough as bread,” Dumas wrote. “It is of different sizes according to the price. A two-cent pizza is enough for a man, a two-coin pizza has to

satisfy an entire family.” He went on to list some popular toppings: cheese, bacon, lard, tomatoes, and tiny larval fish called *cicinielli*.

“At first sight, the pizza appears to be a simple dish,” he continued. “Upon examination it proves to be compound. . . . It is the gastronomic thermometer of the market. The price of the pizza rises and falls according to the abundance or scarcity of the year.” If fishing was good, *cicinielli* pizza was cheap, he wrote. If the olive harvest was poor, pizza with oil was more expensive.

There is no question that this isn't Scappi's pizza—it was street food, not banquet food. It was simple to make with a few ingredients, and it was food for the poor. It developed precisely because this dense, chaotic atmosphere allowed vendors to earn a living on the street. (In that way, it has a lot of similarities with the slice culture in New York, which relies on heavy pedestrian traffic.)

As we know from the 1799 letter and the 1807 survey, there were already pizzerias at this time, but these sidewalk pizza vendors still existed as part of the city's informal economy right alongside them.

There were two types of pizza sold on the street—pizza frita, which requires just a small fire and a heavy pot filled with oil (see page 38), and



Pizza was sold by walking street vendors (above and at right, depicted by Filippo Palizzi) first in Naples's poorest neighborhoods, but it later spread throughout the city.

another, which was topped and baked, like what we commonly see today. Baking, of course, requires an oven, and an oven requires a shop rather than a mobile street-corner setup. At first, the shops operated more like commissary kitchens rather than actual restaurants. Typically, the pizzaiolo would bake his pizzas in the morning, stack them in a metal container called a *stufa*, and then send a boy out with the container on his head to sell the pizzas on the streets. The boy would roam the crowds, perhaps setting up a makeshift table to sell his pizza ambulante, or on foot. The first few customers might get a warm pizza, but after that they were sold cold, much like bakery products today.

There's an entertaining essay in *Usi e Costumi di Napoli (The Customs of Naples)*, a mid-19th-century book on Neapolitan culture, describing how these pizzas were made. "Take a piece of dough, make it larger or stretch it out with a little mallet or with the palms of the hands," wrote Emanuele Rocco. "Put on top anything that comes into your head, garnish it with oil or lard, cook it in the oven, eat it, and you'll know what a pizza is.

"Focacce and schiacciate," he added, "are something similar, but they are the embryo of the art." This distinction by Rocco underscores our earlier

point that people have been making baked flatbreads with toppings for centuries, including focaccia and schiacciate (flattened dough), and that various flattened breads, tarts, and cakes were called pizza in previous centuries.

Other curious observers during this period described pizza toppings as simple: just garlic and oil, for example, or fat from pigs (called *sugna*) with some grated cheese and a few basil leaves. Tomatoes, which were brought to Italy from the Americas in the 1500s but weren't part of Italian cuisine until the 1700s (see page 9), were sometimes, but not always, used as a topping. Mozzarella was sometimes used, too (see page 14). Most of these were cheap, second-rate ingredients.

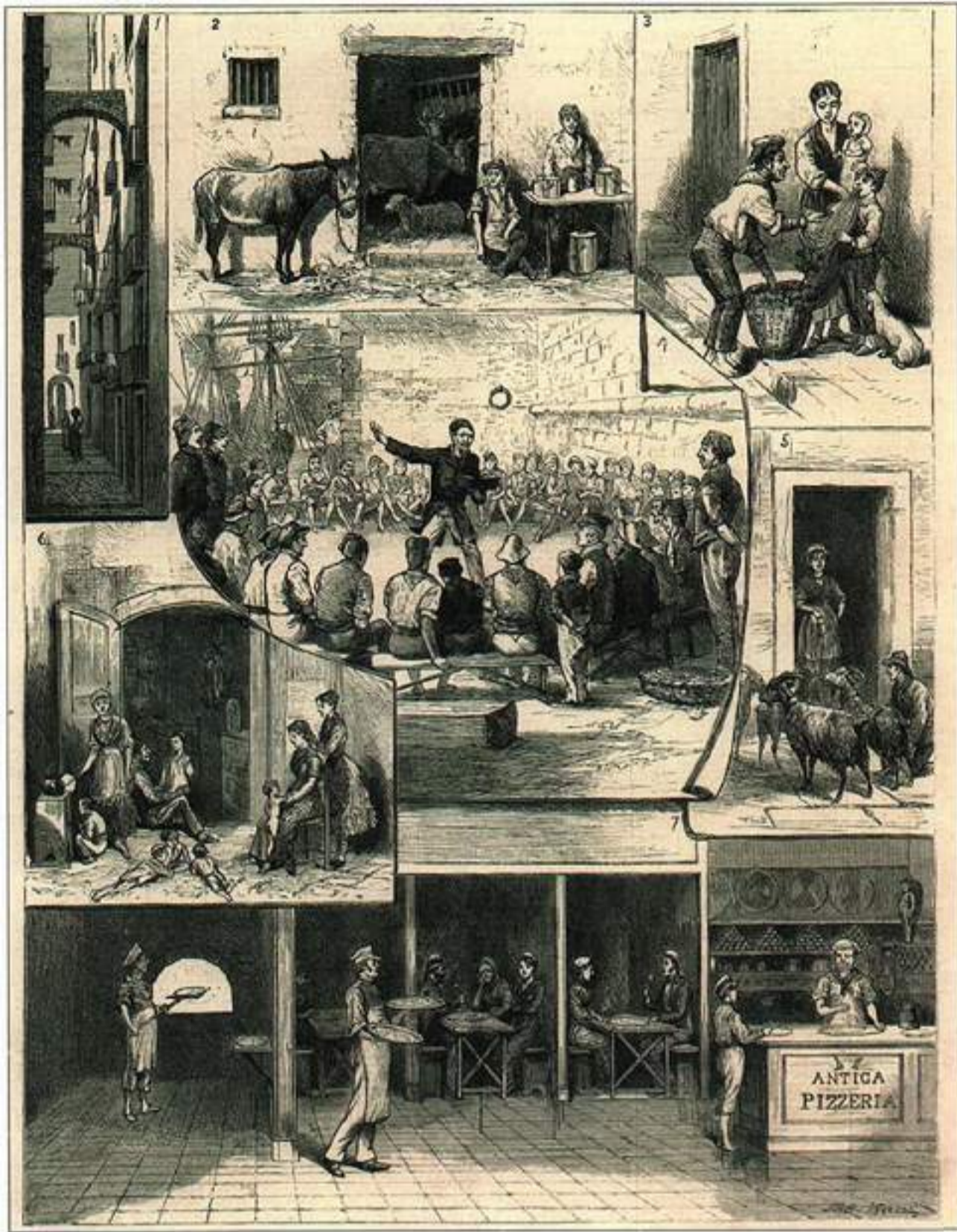
There are numerous accounts like this, and taken together, they tell us two key things. First, this kind of pizza was unique to Naples. Otherwise, why would so many people, particularly travelers, marvel at it? Second, it was popular enough by the mid-19th century that it seemed to be everywhere within Naples. It was no longer just food for the poor; even more well-to-do folks seemed to have been eating pizza, too. New pizzerias began to open in more upscale areas of the city.



A *stufa*, meaning "stove" in Italian, was a warming container used by mobile pizza sellers. The pizzas were stacked inside the *stufa*, which had a heated bottom fueled by charcoal.



This map of Naples, made from the research of Professor Antonio Mattozzi in his book *Inventing the Pizzeria*, plots the 73 pizzerias operating in 1861.



This 1881 depiction of a Neapolitan pizzeria indicates its place as part of life in the city. The distinct Neapolitan dish was chronicled by visitors in both admiring and unflattering terms for decades. Notably, the pizzeria is called Antica; even back then they were building the legend that the pizzeria had been around for a long time.

PIZZA'S DETRACTORS

Even as pizza was becoming inextricably intertwined with daily life in Naples and was growing in popularity among all social classes, there were long decades when many were unwilling to give it a try.

In 1831, Samuel Morse, the American inventor of the telegraph, described pizza as “a species of most nauseating cake . . . covered with slices of pomodoro or tomatoes, and sprinkled with little fish and black pepper and I know not what other ingredients.

“It altogether looks like a piece of bread that had been taken reeking out the sewer,” he concluded.

Gaetano Valeriani, from the Northern Italian city of Ferrara, described pizza in an 1847 collection of stories, *Napoli in Miniatura*, as “a dough made of wheat, without yeast [sic], and thus extremely indigestible. . . . Sometimes raw tomatoes are put on top, sometimes fish, sometimes cheese . . . and prepared like this they are put in an oven, burned rather than cooked, taken out and eaten. Heaven help us! All one’s digestive forces are in difficulty for half a day with this undigested weight occupying them.” (The topic of digestion is a thread that runs through pizza discussions even today; see page 133.)

Even the government weighed in, concerned that poor Neapolitans, who could afford little else, were subsisting on something that was a health risk. In an 1863 report, public health authorities said the pizza makers often used fats that had gone bad, and that pizzas were “digested difficultly and are little nourishing.” (At this time, poor Italians subsisted mostly on fruits and vegetables, which were seen as nutritionally lacking. They were derisively called “leaf-eaters,” a slur that stuck even into the 20th century.)

THE LAZZARONI OF NAPLES

Visitors who wrote about their travels to Naples in the 1700s and 1800s would invariably mention a distinctive class of impoverished street-dwellers called *lazzaroni*, who may have numbered as many as 40,000.

“Legs plastered with mud or dust; trousers down to the ball of the foot, with open patches and windows [very big holes]; a jacket that mocks all fashion; a cap of a certain long shape,” wrote Carlo Collodi, the Italian author of *The Adventures of Pinocchio*, after visiting in the late 1800s.

The *lazzaroni* had a distinctive way of dressing that was part of their identity, kind of like urban hipsters or even goths. Other visitors found their demeanor to be remarkable. “His [the *lazzarone*’s] necessities are in exact harmony with his desires,” wrote Alexandre Dumas. “Other men have houses, other men have villas, other men have palaces, the *lazzarone* has the world. The *lazzarone* has no master, the *lazzarone* is amenable to no laws, the *lazzarone* is above social exigencies; he sleeps when he is sleepy, he eats when he is hungry, he drinks when he is thirsty. Other people rest when they are tired of work; the *lazzarone*, on the contrary, works when he is tired of resting.”

The *lazzaroni* would scrape together a few pennies—either by doing odd jobs, small-scale theft, or cons—until they had enough to buy a bit to eat, which was often a slice of pizza, or watermelon in the summer. When they had a few more pennies, they would eat *maccheroni*, making a great show of devouring the long strands of pasta, which they ate with their hands.

But there was another side to this social group. According to John Dickie, the author of *Delizia! The Epic History of the Italians and Their Food*, they were also on the king’s payroll. Mozart, who visited Naples in 1770 when he was 14 years old, wrote that “the *lazzaroni* have their own general or chief who received twenty-five silver ducats from the King every month, solely for the purpose of keeping them in order.” The king kept the *lazzaroni* on the payroll and, in return, the *lazzaroni* did not revolt—a very real fear, given the history of popular uprisings in this region.



Writer William J. A. Stamer had even harsher words in his 1878 Naples travelogue: “Had [pizza’s] originator choked himself with the first mouthful,” he proclaimed, “none, save the members of the medical profession, would have had reason to mourn his fate.”

Carlo Collodi was thoroughly repulsed. “The black of the toasted bread, the off-white of the garlic and anchovies, the green yellow of the oil and the lightly fried greens, and the red bits of the tomatoes scattered here and there give the pizza an air of messy grime,” he wrote in an 1880s anthology for Italian schools, *Il viaggio per l’Italia di Giannettino*.

That grime, he noted, “was very much in keeping with that of the man selling it.”

Despite the naysaying, word of pizza was reaching more people outside of Naples during the mid-19th century. An 1860 article in the *London Chronicle* called the “pizza cake” a “social leveler.” The article went on to say, “For in the pizza shops rich and poor harmoniously congregate; they are the only places where the members of Neapolitan aristocracy—far haughtier than those of any other part of Italy—may be seen (eating) their favorite delicacy side by side with their own coachmen and valets and barbers.”



Carlo Collodi, famous for his book *Pinocchio*, had no kind words for Naples’s signature dish.

THE HYPERLOCALITY OF ITALIAN FOOD

In numerous polls “Italian food” is frequently listed as one of the most popular cuisines. The trouble is that inside Italy itself, Italian food doesn’t exist. Instead you find Roman food, Neapolitan food, Tuscan food, and so on. Italy was and is a country that is hyperlocalized, and the food traditions reflect this. (Unfortunately, this hyperlocal food, once established, can be impossible to remove; see *The Terrible Bread of Tuscany* on page 118.)

A dish you might find in Piedmont wouldn’t be served in Naples. This has to do, in part, with Italy’s history. Over the centuries, its various regions would fall under control of other European nations, including Spain, France, and Austria, as well as the Arabs, who invaded from the south.

There’s another aspect to this regionalization. Sometimes, dishes in different regions have the same name, but they mean something very different. In Palermo, for example, *sfincione* (see page 96) is a thick piece of bread with a smear of tomato sauce; in Marsala, *sfincione* is a sweet fritter.

You’ll also find different interpretations of similar dishes served in different regions. In much of the Liguria region, for example, you’ll find *focaccia*: a thick pan-baked dough, slicked with olive oil, and often sprinkled with salt (see page 3:117). But in the town of Recco, you’ll find a very different kind of *focaccia* (see page 3:167). In this version, the dough is stretched thin enough to see through, topped with cheese, and then finished with another layer of super-thin dough before it’s baked.

We see the problem clearly when we page through the most iconic Italian cookbooks. In Pellegrino Artusi’s highly regarded Italian cookbook of 1891, Neapolitan pizza is a sweet dish. As we’ve described earlier, pizza existed as a sweet dish in some places even as it was an iconic savory dish in Naples.

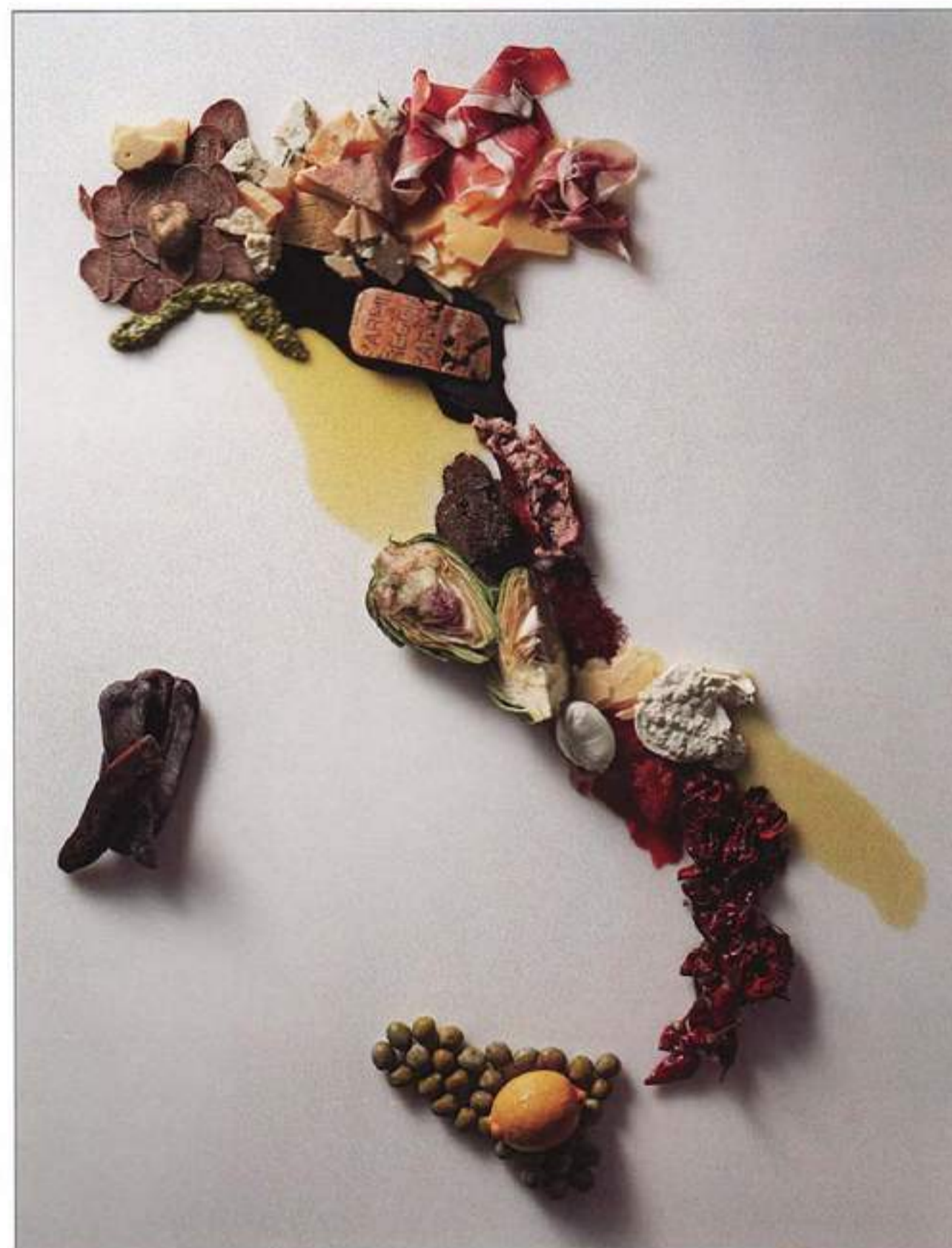
In his two books on Italian food, Waverley Root, a noted food journalist of the 1960s and 1970s, included many references to pizza, but oftentimes they were completely different things. In the Abruzzi region, for example, a dish called *pizza rustica* was a “meat-and-cheese pie of considerable complexity.” The dough included eggs, milk, cinnamon, and sugar. The filling featured cheese, chopped ham, sausage, and hard-boiled eggs, all capped off with a pie crust on top. In the Basilicata region, *pizza rustica* was “puff paste stuffed with grapes, sweet ricotta and sweetened salami,” Root wrote.

Root sums up the problem with a quotation from Enrico Galozzi, an expert on Italian cuisine:

“What is the difference between French and Italian cooking? French cooking is formalized, technical and scientific. Order *Béarnaise* sauce in

200 different French restaurants and you will get exactly the same sauce 200 times. Ask for Bolognese sauce in 200 different Italian restaurants and you will get 200 different versions of ragu.”

All of this points to the miracle of pizza—it escaped the pattern of being a delicious dish made in only one part of Italy, virtually unknown to those outside of its hometown. This was a direct result of Southern Italians leaving the country en masse and taking pizza with them.



We created this map of Italy using regional ingredients, from the foods of the north including Genovese pesto, Parmigiano-Reggiano cheese, and balsamic vinegar from Modena to southern ingredients including San Marzano tomatoes, Calabrian peppers, and Castelvetrano olives.



MARE
TIRRENO

This 1866 illustration depicts the unification of Italy, which brought together the disparate city-states under one government. This would effectively centralize power in the north of the new country, leaving Southern Italy and the city of Naples to grapple with their problems of poverty and disease.

THE BIRTH OF ITALY

In 1884, renowned Neapolitan journalist Matilde Serao painted a vivid portrait of city life in her novel *Il Ventre di Napoli* (*The Belly of Naples*):

“One day, a Neapolitan businessman had an idea. Knowing that pizza is one of the Neapolitan culinary adorations, knowing that the Neapolitan colony in Rome is very large, he decided to open a pizzeria in Rome. The copper of the casseroles and the round trays glistened; the oven always burned; all the pizzas were there: pizza with tomatoes, pizza with muzzarella [sic] and cheese, pizza with anchovies and oil, pizza with oil, oregano and garlic. At first, the crowd rushed; then, they slowly dwindled. The pizza, removed from its Neapolitan environment, seemed a sham and represented only indigestion; its star waned and then faded away in Rome. An exotic plant, it perished amid this Roman solemnity.”

Serao and others saw pizza not as an Italian dish but as a distinctly *Neapolitan* one. Given the political and cultural mores at the time, this makes sense. After all, Italy wasn't even a country when pizza emerged in 18th- and 19th-century Naples.

Naples was then part of something called the Kingdom of the Two Sicilies. This kingdom was established in 1442, after Naples fell to Sicily, and, aside from a period of Napoleonic rule, it was part of that kingdom for around 400 years. Over various periods of foreign rule, the once-prosperous region suffered precipitous economic decline. By the early 19th century, there was a movement for unification of the area's myriad city-states that came to be known as the *Risorgimento*, or resurgence. This movement continued for decades.

Finally, in 1861, the unification push was successful. Disparate city-states across the region were united as the Kingdom of Italy under its first king, Victor Emmanuel II. A short time later, the boundaries were expanded to include Venetia and the former Papal States, including Rome. Naples had been the capital of the Kingdom of the Two Sicilies, but Rome was named capital of Italy. Losing this capital city status had significant ramifications, sidelining Naples in the government and business sectors. This historical fact would play a major role in pizza's spread around the world.

THE RISANAMENTO

While the disparate regions on the Italian peninsula had been unified, it did not solve some of the most pressing problems. Poverty was endemic, especially in the south, where Naples is located. Unification actually made problems there worse. Half the city's population was unemployed and lived day to day.



In the surrounding countryside, feudalism had been dismantled, but farm families were left without any means to make a living. In addition, the north was focused on industrialization and modernization, which made the southern region even more poor. This institutionalized poverty in Naples reinforced preexisting prejudices in which Northern Italians looked down on those from the south. Unfortunately, these biases continue to the present day.

Poverty wasn't the only challenge. Disease shaped this city and its trajectory, too. For one thing, it was part of the reason why pizza stayed within city boundaries for so long.

“The problem with pizza was Naples and the problem with Naples was cholera,” wrote author and historian John Dickie in his book *Delizia! The Epic History of the Italians and Their Food*.

Naples was particularly hard-hit: there were at least eight outbreaks in the city in the 19th century. The disease is excruciating for victims, who suffer writhing pain, and terrible for witnesses, too. At that time, some hypothesized that the cause was the city itself, where the poor lacked plumbing and clean water, and where they spent their days on filthy streets and their nights in overcrowded tenements. After being crowned in 1878, King Umberto I decided that the water and sewer problems needed fixing and the tenements needed to be cleared. “Naples must be disemboweled” became the new slogan of a massive urban renewal program known as the *Risanamento*. This civic works project played a role in bringing pizza to the world.

The crushing poverty and repeated bouts of cholera brought on a massive urban renewal project known as the *Risanamento*. Large swaths of the city, including its poorest areas, were razed, displacing thousands and setting off a chain of mass migration.

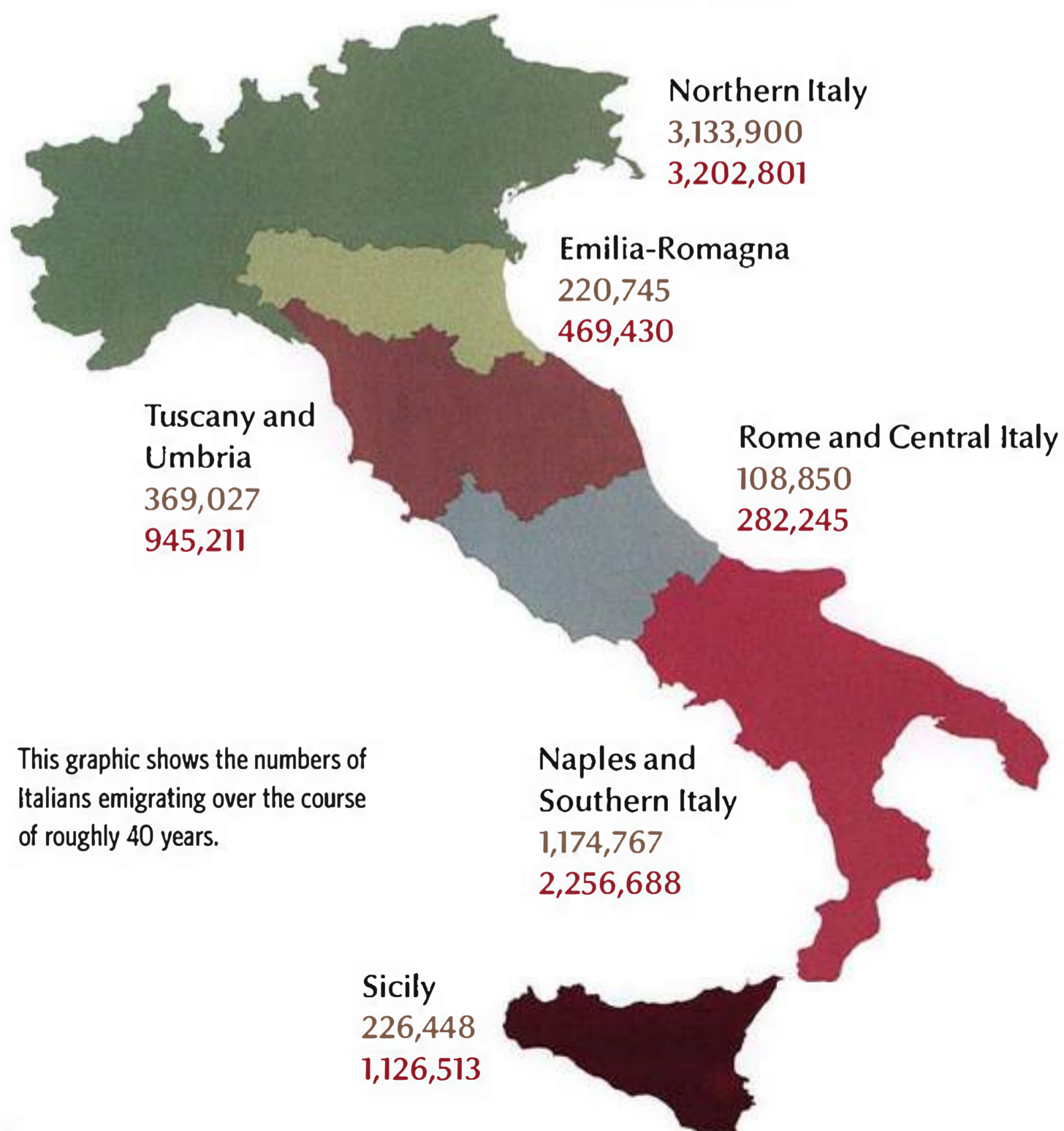


The intense crowding and squalid living conditions in the poorest neighborhoods of Naples left its residents particularly vulnerable to cholera.



Emigrants from Naples left the country by the thousands. The government encouraged this mass exodus as a solution to the housing crisis caused by the Risanamento and the endemic poverty of the region.

EMIGRATION FROM ITALY 1876-1900
1901-1915



This graphic shows the numbers of Italians emigrating over the course of roughly 40 years.

Starting in June of 1889, entire neighborhoods were razed to make way for new sewer and water lines. Things got worse before they got better. As housing was demolished, some 84,000 people who had lived and worked in these neighborhoods were displaced. With housing stocks reduced, real estate speculation and price increases began. The street economy that was the city's lifeblood and character was decimated.

At this point, Dickie wrote, the chances of exporting pizza, a product of this squalor, from Naples "were close to zero." Yet something happened that would substantially increase those odds. Citizens began to realize there was only one path for survival: they had to leave. Numbers of emigrants started to surge starting around 1880. Though Italy had just recently been unified, the government actually encouraged its newly minted citizens to go elsewhere. Between 1876 and the start of World War I, as many as 1.6 million people left from Campania alone. Many went to other parts of Europe. Large numbers went to Argentina (see page 40), and many headed to Brazil (see page 43) and Canada. But the United States would become a favorite destination.

With them, pizza would find a new life.

THE REAL STORY OF PIZZA MARGHERITA

The invention of the iconic pizza margherita is perhaps the most widely repeated story in the history of pizza. It goes like this: in 1889, Italy's King Umberto I and Queen Margherita were visiting Naples in support of the radical urban-renewal campaign known as the Risanamento. Growing tired of the fancy French cuisine that formed their daily diet, they decided to sample some of the local cuisine, summoning one of Naples's best pizzaioli. Raffaele Esposito prepared three pizzas, including one he invented with tomatoes, mozzarella, and basil. The queen promptly declared it her favorite and thus it became her namesake.

Esposito's pizzeria still exists, though it has changed hands several times. Today, it's called Pizzeria Brandi, and if you visit, you can see a thank-you note signed by an emissary of the royal court, dated June 1889. This is the home, the pizzeria loudly proclaims, of the world-famous pizza margherita.

The story has been told and retold everywhere, from the blogs of pizza devotees to the pages of reputable newspapers; it has been repeated by scholars and by travel agents. The pizzeria has become a favorite among tourists.

It's a wonderful story. The problem is, it's not accurate. Through meticulous study of the actual 19th-century records, Harvard scholar Zachary Nowak has proven that it's more marketing genius than true-to-life fact.

The king and queen did, indeed, visit Naples in 1889. But the pizza that Esposito supposedly created for them had been around for many years. We found a book published in 1858, for example, that describes a pizza topped with tomatoes, basil, and mozzarella, just like the margherita. This clearly shows that it was a popular combination some 30 years prior to the story (and prior to the existence of the Italian flag). Is it possible this particular pizza was favored by Margherita? Sure, there could be a germ of truth in there, but the idea that it was invented in 1889 is plainly false. Moreover, the chances that any royal would eat food prepared by a commoner are slim at best, especially during a cholera epidemic.

These basic facts have led some to suspect that the royal court invented the story of the pizza margherita. While the 1889 visit occurred almost three decades after the unification of Italy began, there was still societal discontent. For the royals, the goal was to unify the people from many disparate cities under one national identity. In this regard, the pizza margherita origin story seems to come wrapped up in a tidy bow: not only were the king and queen eating the food of commoners, but the pizza's toppings were red, white, and green, the colors of the Italian flag. In one dish, the food and people of Naples became "Italianized."

But a closer look at the details suggests that the royals had little to do with this theory. The proof is right there in the thank-you letter, which was signed by Camillo Galli, from the queen's Office of the Mouth—that is, the gastronomic office. Nowak scoured 19th-century archives, looking for records that such a letter had been sent to Esposito. In all, he found 24 records dated June 11, 1889, the date of the Pizzeria Brandi letter. But he did not find anything from Galli addressed to Esposito.

Taking a closer look at copies of the Pizzeria Brandi letter, Nowak noticed a few oddities. For one thing, the royal seal is stamped rather than preprinted on letterhead. That's different from other royal letters from 19th-century archives. Also, the seal is off-center and slightly crooked. The seal also doesn't match other examples of the royal seal, and the handwriting looks different from that in other letters written by Galli, too.

"Given these facts—the fake seal, the lack of a protocol, and the different handwriting—we can safely conclude that the letter in the Pizzeria Brandi is a forgery," Nowak wrote in the article he published in *Food, Culture & Society*.

So where did the letter come from?

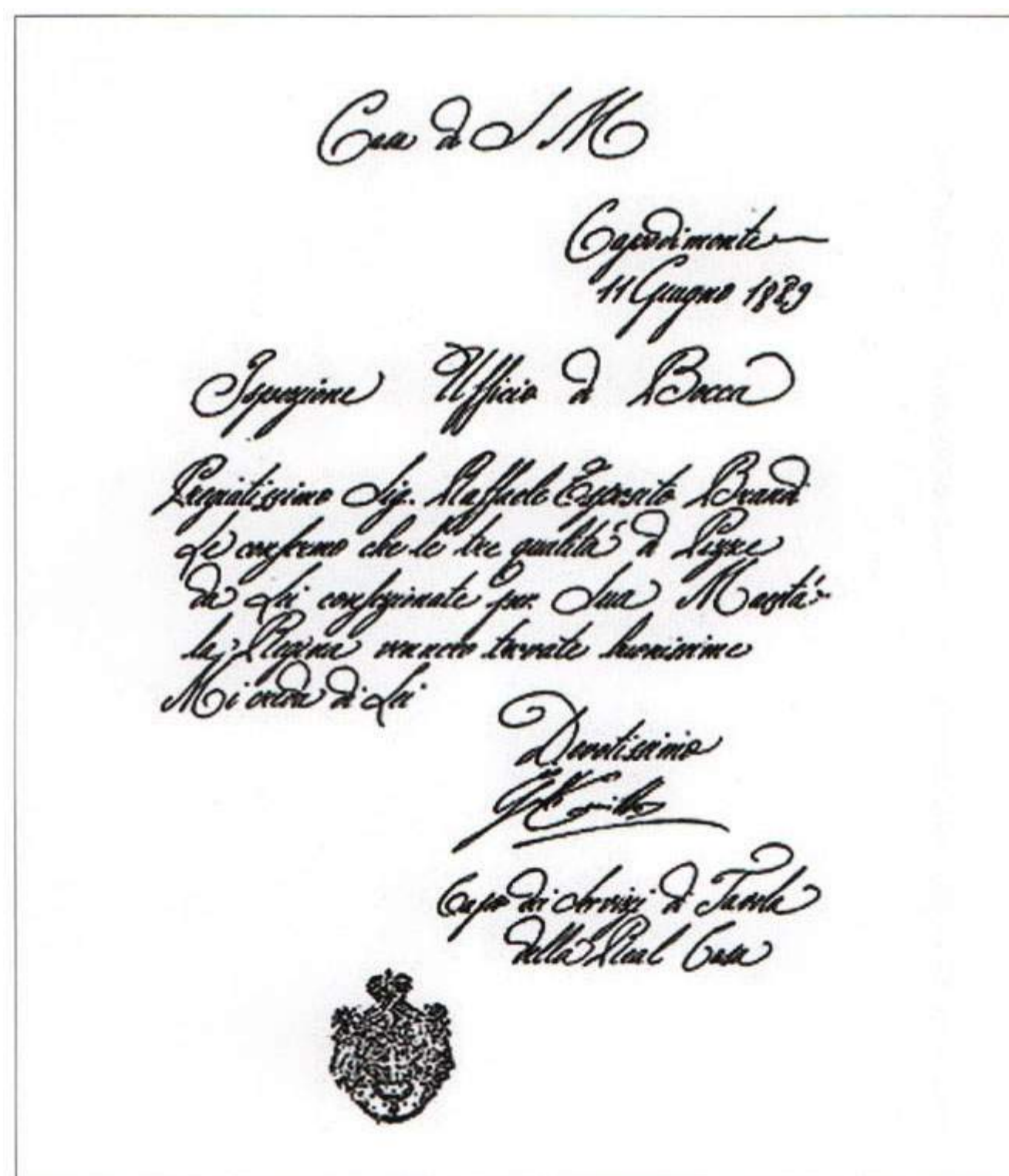
Nowak's theory is that in the midst of the Great Depression, the Brandi brothers, who were Esposito's in-laws and had taken charge of the shop in the 1930s, had come up with the idea themselves, writing the letter, signing it, and displaying it as a bit of marketing genius. "The forgery has been accepted at face value for over seventy years," he wrote.

Nowak is quick to point out that the Brandis did not necessarily make this story up out of whole cloth. Esposito, it turns out, was a bit of a marketing maven himself, trying to capitalize on any association with royalty that he could create. In 1883, when he bought the business, he called it Pizzeria della Regina d'Italia, or Pizzeria of the Queen of Italy. Years earlier, in 1871, he was proprietor of a wine and liquor store, and he had sought, and been granted, permission to display the royal seal.

The story of the queen's taste for pizza wasn't new, either. Nowak found a newspaper article from 1880 telling a story of Queen Margherita summoning a pizzaiolo to the court. The pizzaiolo's name? Giovanni Brandi, Esposito's father-in-law. Similar stories arose in 1914 involving a different pizzaiolo. And in 1935, yet another story of the queen and her pizza surfaced, this one referring to an event back in 1882 or 1883.

The cumulative impression was enough for Nowak to conclude: "The Brandi brothers drew on a historical fact—their ancestor's permission to use the royal seal on his wine store, the name of the pizzeria—and wove it into an existing legend of royals-eating-commoners' food. The myth had such narrative appeal that it developed autocatalytic momentum, propelling it forward into cookbooks, travelogues and tourist guides, as well as food histories."

In other words, the long-held origin story for pizza margherita is the stuff of legend. Meanwhile, the current owners of Pizzeria Brandi maintain the letter, and the story, are genuine.



A copy of the Pizzeria Brandi letter led scholar Zachary Nowak to determine it a fake.



Mulberry Bend: Sunday Morning

PIZZA ARRIVES IN AMERICA

Most histories of pizza in the United States begin with one man, Gennaro Lombardi, an immigrant who came to New York from Naples around the turn of the century. In 1905, as the story goes, he got a mercantile license and opened the country’s very first pizzeria. Not only that, but some of his workers spun off and founded their own pizzerias, which have also become New York icons. All of this, legions of pizza historians have opined, makes Gennaro Lombardi the “father of American pizza.”

What you’ll read here is a different story entirely, one that’s backed up by an all-out, several-years-long research effort by us, plus some supporting insights from others. For starters, the story of the earliest US pizza begins well before 1905, and it has nothing to do with Lombardi (for whom we could find no records of pizzeria ownership in 1905—or even in the 1910s or 1920s; see page 31). In truth, the story of the earliest US pizza isn’t about one man and one pizzeria. It’s a story of community. It involves forces well beyond individual control, including upheaval overseas and rapid industrialization domestically.

It’s also a story of misfortune and resilience, of poverty and prejudice, of temperance, urban renewal, and unintended consequences. And it’s centered in an area of Lower Manhattan called the Five Points.

NEW YORK: THE FIVE POINTS AND MULBERRY BEND

The neighborhood, which sits at the confluence of five corners made by three intersecting streets, was first settled by the Irish beginning as early as the 18th century. Their numbers increased dramatically around 1840, when the so-called Irish Potato Famine (which was actually a food shortage exacerbated by politics) began forcing millions to leave the Emerald Isle. The neighborhood also included German immigrants, as well as Africans and African Americans who found homes here as slavery was outlawed by New York state in 1827.

The Five Points was filled with people struggling to stay afloat, jammed together in substandard housing, taken advantage of by unscrupulous shysters, and competing against one another for jobs, housing, and sustenance. Given these conditions, the neighborhood was rough. It’s the setting for Martin Scorsese’s famously violent film *Gangs of New York*, which, though fictional, is grounded in historical fact, including gang warfare among Irish clans.

A 1913 article in *The (New York) Sun* newspaper called the area “the toughest section in New York at

the time the Italian invasion began.” By “invasion,” they meant the influx of Italian immigrants to the neighborhood, which began as a trickle in the 1840s and picked up over the next few decades. The same article recalled how they had been “hooted and mobbed” upon their arrival. “The Italians were beaten with clubs and fists and kicked . . . police in the nearby stations were unable to restore peace for several hours.” These newcomers found homes in jam-packed tenements in and around Orange, Mott, and Mulberry Streets. A crook in the road gave this particular spot in the Five Points a nickname, Mulberry Bend.

Eventually, the Italians would outnumber the other groups, and the area became a center of Italian immigrant life. In some ways, it felt a lot like Naples, with narrow alleys, a cacophony of street vendors, and the bustle of men and women trying to make their way.

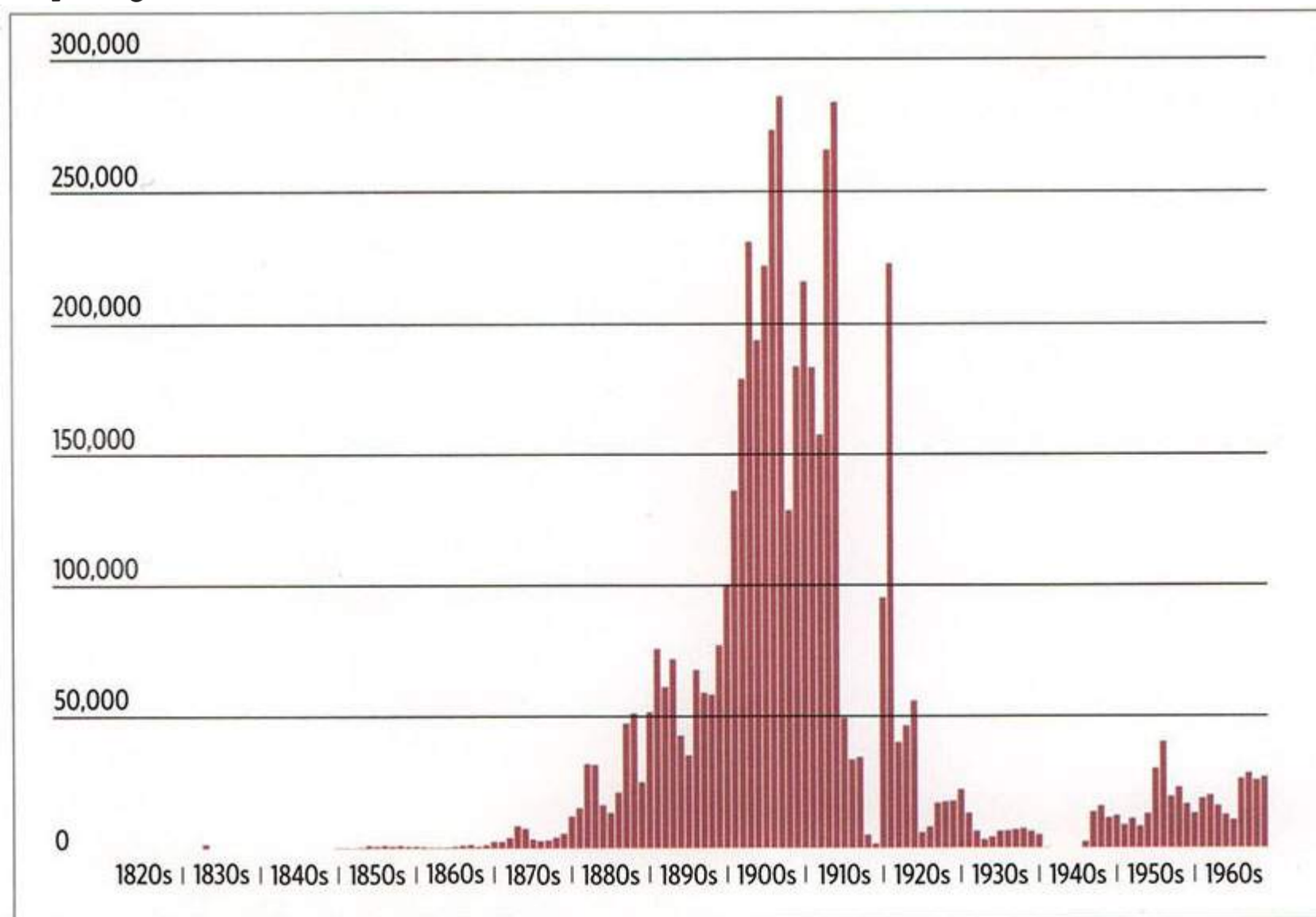
The Italians were fleeing poverty in their homeland, just like the Irish before them. While the earliest immigrants from the Italian peninsula hailed from Italy’s north, the huge influx in later years was dominated by people from the south, particularly Naples and Sicily.

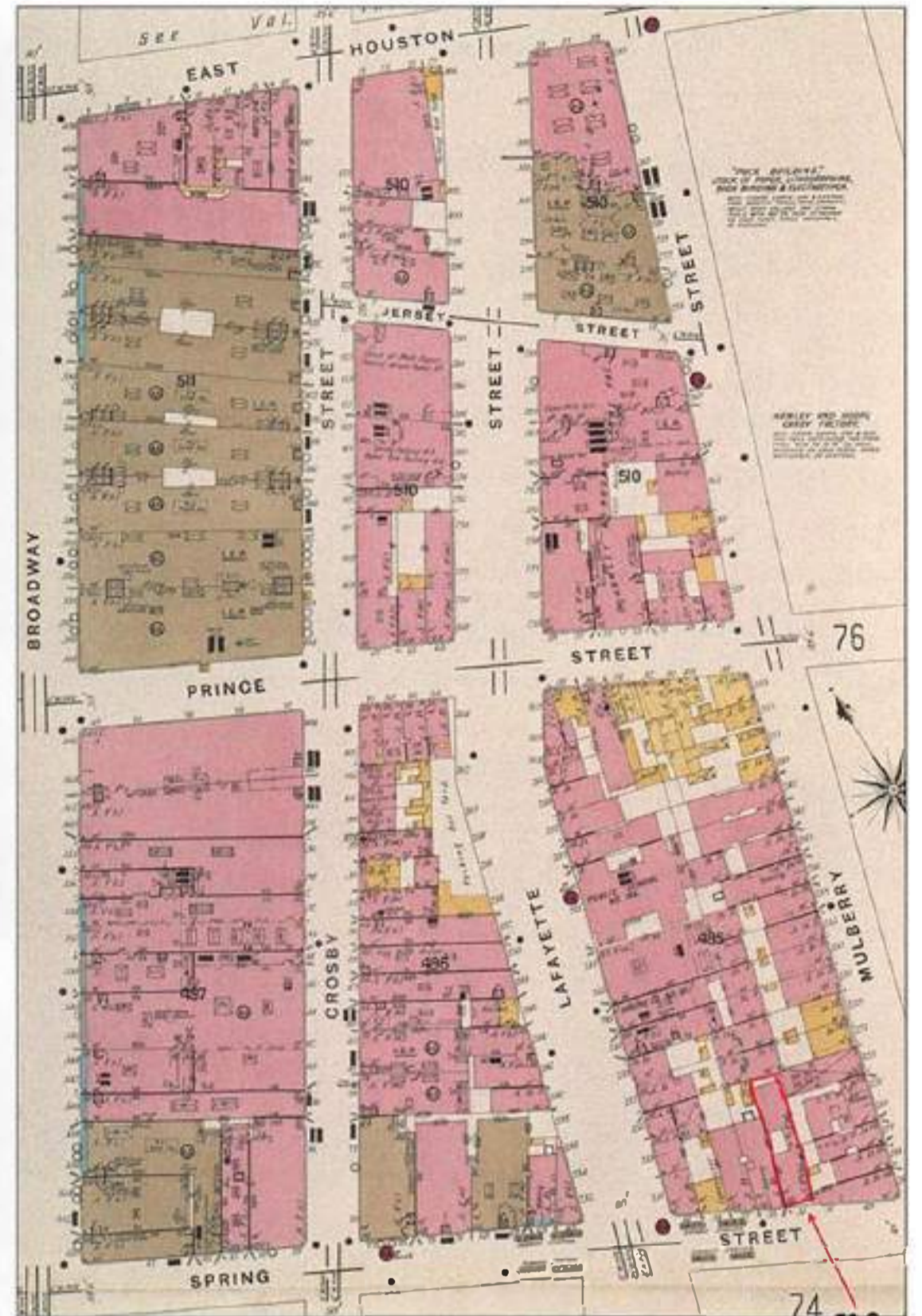
While many Northern Italians had arrived in the United States as skilled artisans and shopkeepers, the Southern Italians came with fewer marketable skills. Most were illiterate in Italian, let alone English. The majority were unaccompanied men looking for work (and as many as 50% of them wound up returning to Italy, sometimes making multiple trips back and forth, the so-called “birds of passage”).

Left: Mulberry Bend in Lower Manhattan became home to many of the Italian immigrants arriving in America. It’s also where the first evidence of pizzerias in the US can be traced.

The first time the term “Little Italy” was used in the *New York Times* to refer to an Italian neighborhood was in 1886 in a story about the Italian enclave in East Harlem that stretched from 96th to 125th Streets and from Lexington Avenue to the East River. There was another “Little Italy” in lower Manhattan around Mulberry Bend. Little Italy in Manhattan still exists, as do remnants of the one in Harlem. There is also a large contingent of Italians around Arthur Avenue in the Bronx.

More than 4 million Italians immigrated to the United States between 1880 and 1924, most of them from Southern Italy. By the 1920s, there were more Italian immigrants living in New York than the native populations of Florence, Genoa, and Venice combined.





At the turn of the century, Italian immigrants settling in Mulberry Bend (top left, bottom left) opened businesses including bakeries and even roadside clam carts (bottom right). The map (top right) shows the neighborhood in 1903.

By the 1880s, Southern Italians were immigrating to New York in huge numbers, and it turns out the timing was right. This new immigrant workforce was exactly what the titans of industry wanted. By the mid-19th century, the country was in great need of workers after the Civil War had created a labor vacuum. In 1864, President Abraham Lincoln had signed the country's first (and only) law specifically supporting immigration. Called the Act to Encourage Immigration, it provided incentives for private companies to recruit workers from abroad using middlemen. The middlemen could demand up to 12 months of wages in exchange for their services, and the contracts were enforceable in US courts. The arrangement gave rise to what was known as

the padrone system, under which untold numbers of Italians came to the United States to work under contract. As you might imagine, there was tremendous potential for abuse (see next page). The newcomers were dependent for their livelihoods on the padrone, who often controlled their food and housing, too. The law was repealed in 1868, but the practice continued.

In the post-Civil War era, the US economy was humming at an unprecedented clip, with technological innovation fueling growth, which was mostly concentrated in the north. Railroads and trolley lines were being built. There were opportunities in road building, coal mining, steel, and the tire industry. Mass manufacturing was replacing artisan piecework.

The work was often demanding and dangerous, and US citizens didn't necessarily want these jobs—or, more specifically, the pay probably wasn't high enough to attract people who had other options. By 1920, immigrants and their children comprised over half of the manufacturing workers, and estimates are that about one in six US immigrants came from Italy. A 2009 study looking at the turn-of-the-century labor market concluded that if it weren't for immigrant labor, "the scale and pace of the American industrial revolution might well have slowed."

Business owners pitted different groups of immigrants against one another. In the 1870s, for example, a contractor named J. D. Crimmins was running a project to lay down New York's First Avenue trolley tracks. When a crew of Irishmen moved to strike, he simply hired Italians. His comments in an 1893 builders' publication are telling.

"I consider (the Italian) a steady workman," he said, "but he is not as intelligent as the Irishman. . . . They live very cheaply and seem perfectly satisfied with their pay, and when it comes to a wild strike they will not join." Even better, from Crimmins's point of view, he paid the Italians 25 to 50 cents a day *less* than the Irish. They needed jobs, so they accepted the low wages. By the 1890s,

an estimated 90% of New York's public works crews were Italian immigrants.

During the trolley construction project, the Italian workers set up a shantytown in East Harlem near 106th Street, and over time thousands more would arrive to create a thriving "Little Italy." As for the Mulberry Bend, a travel writer in 1891 said, "it is hard to believe this is not Naples."

Housing conditions in Mulberry Bend were not necessarily an improvement on those in found in the poor areas of Naples. Tenements and substandard lodging houses were common.



THE PADRONE SYSTEM

Countless Italian immigrants traveled to America as part of an exploitative labor arrangement that took them years to escape. There is no way to pinpoint when the padrone system began, but it grew up during the late 19th-century Industrial period, when "capital sought labor with almost reckless eagerness," a Department of Labor report in 1897 said. Uneducated Italian peasants, looking to leave their country for a better life, were exploited by padroni—middlemen who were hired by American companies to bring laborers over. In exchange for arranging travel, work, and a place to live, the padroni would exploit the immigrants by taking a portion of future wages. The padroni not only took workers' wages but also received a commission from the company and sometimes required the workers to rent a room in a house they owned or buy food from their own grocery store.

In Southern Italy, padroni found a willing audience. Poverty was endemic, making for a desperate populace. Some estimates say as many as two-thirds of Italian immigrants during this period were working through padroni.

The imbalanced dynamic between padrone and laborer meant laborers were easily exploited. The padrone banks, which numbered as many as 150, were a significant drain on immigrants. The padrone would require the laborers to deposit their savings, undoubtedly receiving a kickback. The banker not only held the workers' money but also acted as a post office, a marriage broker, or even a legal advisor or bail bondsman despite the fact that he had no legal training, all for a hefty fee. The banker was also in charge of sending the workers' money back home to Italy. The money didn't always make it.

Entire families, with children as young as seven, were put to work on farms. In some cases, children were held in involuntary servitude. In 1873, the *New York Times* recognized that children were being held as "Little Italian Slaves." If they tried to leave, parents would incur stiff fees. Sometimes, women and girls were forced into prostitution.

Meanwhile, some of the padroni had political protection, which let them act with impunity. The system was unfair, exploitive, and, in some cases, criminal. But for some, the opportunities in the United States would be life-changing. We found connections between New York's earliest pizzerias and the padrone system, including the pizzaioli who worked over the years at what would become Lombardi's.



The padrone system took advantage of a desperate workforce, allowing for abuse and even criminal treatment.



Along with the large influx of immigrants, there came anti-immigrant sentiment. This political cartoon from 1891 was captioned “if immigration was properly restricted you would no longer be troubled with anarchy, socialism, the mafia and such social evils.”

In 1880, about half of the US population was rural, and farming was the biggest job sector, outnumbering industrial workers 3:1; by 1920, the number of agricultural workers and manufacturing workers was nearly equal. Between the late 19th and early 20th centuries, the millions of immigrants who arrived in US cities transformed the country from a predominantly rural economy to an industrial one. Not only did they fill the often-treacherous industrial jobs, their numbers also helped create new demand.

THE ILLUSION OF THE MELTING POT

The idea of an American “melting pot” originated with a French American author all the way back in 1782, but it was expounded upon and popularized in a 1908 Broadway production by London-born playwright Israel Zangwill. He saw the United States as a place where the different nationalities of Europe would be forced together in a “crucible” that would mold them into Americans. Zangwill believed this transformation would be traumatic.

And so it was with millions of late 19th- and early 20th-century immigrants. When Italians stepped onto ocean liners to leave their country, they had little in common. They didn’t even speak the same language. Instead, they spoke dozens of regional dialects. (In fact, only 2.5% of Italians at this time spoke standard Italian, a somewhat artificial language based on the dialect of Florence.) They had different customs, different foods, and different ways of life.

They worked to maintain those customs in their new home. They didn’t see themselves as “Italian” so much as Silician or Neapolitan and the like. They tended to settle in clusters with others from their village or region. This reflects Italian notions of *campanilismo*—an identity and allegiance among those who live within the sound of village church bells.

The Americans didn’t like what they saw. Southern Italians, in particular, were seen as the lowliest of all, a separate race. In 1880, the *New York Times* carried an inflammatory story about a ship set to arrive

with passengers who, reputedly, had been exposed to smallpox. Even worse, they were from Naples. This “filthy, wretched, lazy, ignorant and criminal . . . cargo of Neapolitan offscourings” came from “the meanest sections of Italy,” the article stated. “They are not a class of immigrants whom we can receive without danger to ourselves.”

In 1892, the *Times*’ editors wrote, “There has never been since New York was founded so low and ignorant a class among the immigrants who poured in here as the Southern Italians who have been crowding our docks.” Even their children were deemed “ragged, filthy, and verminous,” and, in the *Times*’ editors view, unfit to enroll in public schools “among the decent children of American mechanics.”

In 1903, a *New York Herald Tribune* story, “Do Fiery Foods Cause Fiery Natures?” questioned whether the Italian diet was at the root of Italians’ lowly existence. In a strange land filled with prejudice, Italians clung to their diet—heavy on fruits and vegetables, with specialized breads and pastas—and their age-old customs as acts of resistance to the prejudice and pressures of the melting pot. This adherence to old traditions played a role in pizza’s success, helping to mold an Italian American identity.

In the Mulberry Bend and in the Italian settlement in East Harlem, the immigrants were in many ways trying to replicate life back home, only better. By the late 19th century, it wasn’t just single men coming over; it was entire families. Now seeing the



Immigrants arriving in America from Italy and all over Europe made their way through Ellis Island.

United States as a permanent home, they founded import businesses to get ingredients from Italy. They started food-manufacturing businesses, bakeries, restaurants, and, yes, pizzerias, all of which initially catered to fellow Italians.

Italian names begin to show up in the city land registry in the late 1870s. Fruit stands were run by Italians. An Italian, Antonio Cuneo, cornered the city's banana market. The bakery business, which had been dominated by Germans for much of the 19th century, was being taken over by Italians. By as early as 1882, there were enough Italian-owned businesses to warrant specialized Italian business directories.

By searching through years of these business directories, along with other sources buried deep in library and government archives, we hoped to finally answer the question: Who really opened America's first pizzerias? The records would undermine a tale told for decades about the "father of American pizza."

WHO WAS FIRST?

The listing is tiny, tucked away in the 1894 edition of the Trow's Business Directory for New York City under the "Bakers" section. "Pizzeria Forno E." (suggesting that it was misinterpreted as a baker's name, rather than "Bakery and Pizzeria" in Italian) is all it says, along with an address: 59½ Mulberry Street. This business in the heart of Mulberry Bend was the first pizzeria in the United States for which we found document evidence. 1894. That's 11 years before Lombardi's claims to have opened (see page 32). Considering business directories were commonly compiled by door-to-door canvassing the year prior,

it's likely the pizzeria was open in 1893 or even earlier. Could there be an even earlier one? Quite possibly. We'd love to see the evidence.

There's more. This very address, 59½ Mulberry, was famously photographed by Jacob Riis (see page 30) a few years earlier. The photo, shot in 1887 or 1888, is called "The Bandit's Roost" for the nickname of the alley between 59 and 59½ Mulberry. Inside the building, Riis wrote, lived 39 people above a warren of ragtag merchants: "Here have the very hallways been made into shops. Three feet wide by four deep, they have just one room for one, the shop-keeper, who, himself within, does his business outside, his wares displayed on a board hung across what was once the hall door . . ."

Forno e Pizzeria would soon be among the businesses there. The fact that it was listed under "bakers" isn't surprising. The term "pizzeria" was almost unknown outside of Naples at that time; "bakery" was a close enough approximation.

The 1894 Forno e Pizzeria directory listing led us to wonder: Who was the proprietor? Did he or she come directly from Naples? And what was the pizza like?

Searching directories from prior years, we found a number of men connected with this address listed as running saloons, eating houses, or bakeries. Most didn't have any clear connections with pizza, but several seemed promising for our purposes. The 1895 directory lists John Albana under "bakers" at that address. There's also an Agostino Piscatore listed as a restaurateur at that address in 1893, 1894, and 1895. Was either of them the pizzaiolo at 59½

Mulberry Bend, where pizza made its first appearance in the United States, has changed significantly. Originally a predominantly Italian neighborhood, by 1950 about half the residents of the 50-square-block area said they were Italian American. In 2010, only 5% claimed that heritage, and a census survey didn't turn up anyone who was actually born in Italy. By that time, 45% of the region's residents had been born in Asia. Little Italy, the *New York Times* reported, was getting "littler by the year."



Photographer Jacob Riis captured the harsh conditions of life in Mulberry Bend.



BAKERS.	
Peters Gustav,	801 Av. C
Pfeifer Charles,	67 Cath.
Pfeifer Andrew,	822 Dolancey
Pfeifer Jacob,	1884, 2d av.
Philipps Joseph,	1889, 8d av.
Philipps Theodore,	50 Lnight
Pietsch Gustav,	47, 6th av.
Pilot Julius,	142 W. 17th
Pilz Anton,	3495, 8d av.
Pizzeria Forno E.	59½ Mulberry
Plapper Henry,	381, 8d av.
Polick Adolph,	1629, 1st av.
Postel Jacob,	189 Norfolk
Probeck Conrad,	256 E. 125th
Prosnitz William,	1670, 1st av.
Protzky Charles,	1008 Av. A
Pruss John A. Pelham	av. n St. Jo
av.	
Purdy's J. S. Sons,	1888, 1900, 211
	2320, 8d av.
Pursell Mfg. Co.	912 B'way, 100
av. & 46 E. 42d	

In the 1894 Trow's Business Directory, an entry for Pizzeria Forno E. at 59½ Mulberry appears in the list of bakers' names (above). This is the earliest documented evidence for a pizzeria in the United States.

In the early days, pizzerias were typically named after Naples, such as Pizza Napoletana and Bella Napoli, rather than after the owner.



The Bandit's Roost and the first documented pizzeria in the US were demolished to build Mulberry Bend Park, now called Columbus Park.

Mulberry? We could not find definitive answers, but we did learn more about Albana—more on that later (see page 33).

It turns out the place we believe to be America's first pizzeria was short-lived. That famous photograph of the Bandit's Roost had something to do with its demise. Photographer Jacob Riis (see below) brought the suffocating and dangerous conditions in the tenements to vivid life for middle-class Americans and policy makers. He and others believed the tenement buildings themselves needed to be demolished to improve the lot of those who lived there. The Bandit's Roost was on the demolition list to make way for what is now Columbus Park.

In 1892, at hearings on the demolition plans, it was clear that not all of the residents saw things the same way. Life in Mulberry Bend was hard, they

testified, but it was also an affordable place to live where immigrants might have a few bucks left to send back home. The area had a lively economy, with retail shops, taverns, groceries, and scrap dealers, plus many more street peddlers selling from pushcarts. In the Old Records Division of the New York County Clerk, you can still read that testimony, contained in three binders, stored in tattered old cardboard boxes.

In 1895, despite the testimony of the residents, the block was demolished in the name of urban renewal. But even though the first pizzeria had just a brief life and was located in one of the most notorious buildings in the city, the food would go on to change the way America, and the rest of the world, ate. And to think, we wouldn't know about it but for a line in a business directory.

JACOB RIIS AND THE BANDIT'S ROOST

"Long ago it was said that one half of the world does not know how the other half lives," wrote 19th-century journalist and social justice reformer Jacob Riis. "It did not know because it did not care."

In his 1890 book, *How the Other Half Lives*, he set out to change that. Through words and photographs, he documented the hardscrabble world of New York's impoverished, who lived and worked in deplorable conditions caused by what he called "public neglect and private greed." The book became a bestseller and wound up changing city life in dramatic ways, including the demolition of some of the tenements he photographed.

An immigrant from Denmark, Riis came to the United States in 1870 as a young man thinking he'd find steady work. Instead, there were years of struggle. He did carpentry, then mining, then farm work and odd jobs. Through bouts of unemployment, he scavenged for food, slept in seedy bunkhouses, and lived on the street. He tried to enlist in the military but even that didn't work. Then, one day, he learned of an opportunity to be a journalism trainee.

In 1877, he became a police reporter for the *New-York Tribune*. At the time, New York's slums were suffocatingly crowded, unsanitary, and dangerous. Assigned to the precinct around Mulberry Bend, he set about telling that story. But how to document the dark interiors with early camera lenses that, at the time, required quite a bit of light?

By chance, he read about a new invention: magnesium flash powder. Touring the area with a handheld camera, a flashgun, and a couple of assistants, he captured scenes that, the *New York Times* later wrote, "still have the power to shock, even after 120 years."

Among those scenes was the site of his most famous photo, "The Bandit's Roost," at 59½ Mulberry Street. It's also the address of the first documented pizzeria in the country (see page 29). Above the ground-floor businesses, he wrote, 39 people were jammed into the tenement apartments, sleeping on "foul straw" in "pitch-dark coops called bedrooms. Truly, the bed is all there is room for." The smell, he wrote, was "appalling." Fourteen people died, including 11 children, at this single address in one year, he wrote.

Through the book, Riis became a well-known national figure and even an advisor to future president Theodore Roosevelt. He would go on to write more books and numerous newspaper and magazine articles

bringing to light slum conditions, as well as other issues, such as unsafe drinking water and the spread of tuberculosis.

There is no doubt he felt strongly about the issues he covered. But reading *How the Other Half Lives* more than 125 years after its publication, some obvious problems and prejudices jump out, particularly about Italians, who Riis described as "content to live in a pig-sty," and "ignorant," among other things. But the book nonetheless provides a window into 19th-century life among the immigrants who brought us pizza.



UNTANGLING THE HISTORY OF 53½ SPRING STREET

For more than six decades, 53½ Spring Street had been publicly touted as the location of the first pizzeria in America. According to most versions of the story, it was founded in 1905, and it was owned by an Italian immigrant named Gennaro Lombardi (see page 32 for more on what is a

false narrative). Here, we present the true history of the building. It has four stories; the upper floors were cheap residential units jam-packed with immigrants, and there were generally two businesses below, either listed as 53½ Spring or 53 Spring.

Mid-19th century

The earliest records indicate that 53 Spring Street is a police station.

1874

As the *New York Daily Herald* reported, "rich and refined ladies from elegant uptown residences have deemed it their duty to give a helping hand to the poor," and thus 53 Spring becomes a soup kitchen.



1879

The city sells the building to Ella and Georgiana Wendel, two sisters from a wealthy New York family, who rent it out. By the 1880s, records indicate various businesses, such as grocers, saloons, fruit dealers, and restaurants, associated with Italian-sounding names.

1899

A "Philip Milon" is listed as the proprietor of a delicatessen. His name is an Americanized spelling of Filippo Milone, an Italian immigrant who would go on to open several pizzerias (see page 36). In July, there is evidence of a permit application for an oven, indicating Milone may have planned to bake pizza, which makes him the strongest contender for the first pizza maker at 53½ Spring.

Antica Pizzeria Napoletana



1904

There is direct evidence that the business at 53½ Spring Street is a pizzeria. In August, ads for Antica Pizzeria Napoletana, owned by Giovanni Santillo, begin appearing in the Italian-language newspaper *Il Telegrafo*. This is a year before many people have claimed Lombardi's opened, and the ad shows the business was owned by Santillo.



1918

The earliest definitive evidence linking Lombardi to 53½ Spring Street is a 1918 World War I draft card listing him as the "employer." By 1919-1920, he's listed in city directories as the proprietor.

53 SPRING STREET

4 story brick loft building with 1 store

Front and rear lofts on upper floors

ANNUAL RENT: \$1,860.00

(Vacancies \$1,080.)

Store, basement and 2nd floor leased to Lombardi at \$780.00 per annum.

1935

An appraisal document from the Wendel archives lists Lombardi as the "lessee" of the basement and second floor for \$780.00 per annum.



1939

Documents show that Filomena Lombardi buys the building from the Wendel estate—at this point they've been selling pizza there for years.

1956

Pizza at Lombardi's seems to be on the wane. *New York Times* writer Herbert Mitgang found the "tables and counters piled ceilingward with lobster fra diavolo," while "not a pizza stirred in the room."



1970s

Lombardi's closes following the death of Filomena Lombardi. Jerry Lombardi inherits the property and reopens in 1978 as G Lombardi Ristorante, a fine-dining Italian restaurant that does not sell pizza.

1984

Lombardi's closes as other restaurants and retail businesses struggle in the neighborhood.



1994

Lombardi's reopens just down the street at 32 Spring. As for 53 Spring Street? In recent years, it was a bar called Gatsby's that featured 12 TVs and DJs every Friday and Saturday night; it's since closed.

THE TRUE STORY OF LOMBARDI'S

According to archival sources, Lombardi's pizzeria, at 53½ Spring Street, was the first in the United States, making Gennaro Lombardi the "father of American pizza." These reports mention opening dates ranging from 1895 to 1905. It's a compelling story, but there are two problems with it. Lombardi's was not the first pizzeria in America, and Lombardi wasn't connected with the Spring Street address until later. By that point, it had been a pizzeria for years, and there were dozens, if not scores, of other pizzerias in the United States.

The claim stretches back at least to the 1950s, when New York writer Herbert Mitgang penned an article for *Collier's* magazine. "Probably the first pizzeria in America was established at 53½ Spring Street, New York City, about 1895," he wrote in 1953. Mitgang went on to say that at 13, Lombardi became an apprentice at this location, then, in 1905, bought the pizzeria himself. Note that the story was squishy—Mitgang said "probably."

Mitgang was a noted journalist, but could he have gotten the Lombardi's story wrong? Did the Lombardi family *tell* the story wrong? We'll never know. What we do know is that it was repeated and amplified (just like the Queen Margherita story, see page 23).

In 1984, food writer Evelyne Sloman called Lombardi's the first pizzeria in America in *The Pizza Book*. In 1998, the *New York Times* wrote, "New York pizza did not exist before 1905, when Gennaro Lombardi, a Neapolitan immigrant, began to sell pies in his grocery store in Little Italy." In 2003, *PMQ*, a magazine for people in the pizza business, called him "the founder of the American pizzeria. He had the first one on record." The Pizza Hall of Fame cited a 1905 opening date and added that Lombardi, "a bread baker from Naples," had "forever changed the course

of American eating habits." Adam Kuban, founder of the *Slice* blog, also repeated the Lombardi's-was-first story. There are too many others to list.

But over the years, some have noticed cracks in the story. We easily found several old newspaper reports online showing Lombardi's wasn't first. A 1903 article, for example, talks about *more than one* pizzeria in New York. By digging even further (see page 29), we found numerous pizzerias dating back earlier, to 1894.

So what's the real story?

According to immigration records, in November 1904, Gennaro Lombardi, age 17 with an occupation listed as a "laborer," made the first trip to New York. He had \$12 (about \$343 by today's standard) and was going to live with an older brother at 89 Mulberry.

We couldn't find any records of what he did the first few years. But in 1910 he married Filomena Bellucci, who came from a family of bakers. That may have altered the course of his career. The 1910 census lists Lombardi as a baker, and his 1917 draft card says he was a self-employed baker, with a business and home address of 234 N. 5th Street in Brooklyn—that is to say, not 53½ Spring Street.

Despite these errors of fact, Lombardi's is a success story. An immigrant arrives with a few bucks in his pocket, learns a trade, starts a restaurant, and passes it down through the generations. People who worked there went on to play significant roles in the emerging New York pizza scene (see page 36). Along the way, there were some fortuitous turns. Whether they were fueled by savvy marketing or lax fact-checking is unclear. And today, Lombardi's is still a mecca for pizza aficionados. They come, in part, for the pizza, but also for the story, which Lombardi's highlights. A sign at the front says, "Welcome to America's first pizzeria."

You've maybe seen this photo before (this version has been colorized): Gennaro Lombardi and Antonio Pero standing out front of Lombardi's pizzeria. The family dates it to 1905, but it just doesn't add up. There's a poster in the window advertising an event on Wednesday, November 25, a date that did not occur in 1905. November 25 fell on a Wednesday in 1903 (before Lombardi's arrival in New York), 1908, 1914, and 1925, so the earliest date for the photo is 1908. Changes to the building's façade in 1912 rule out the later dates.



Pizza Slowly Gains a Foothold

It's not a surprise New York had a pizzeria in 1894. By then, there were at least 40,000 Italians living in the city. Those who came from Naples knew pizza as cheap, filling, and easy to eat in the street. It was an obvious business opportunity.

We actually believe pizza was being sold in the United States even before Forno e Pizzeria. Our research suggests pizza was served in saloons as part of the traditional “free lunch” spreads designed to attract tipplers (see page 61), and it was likely sold in bakeries.

This was a natural outgrowth of what was going on in Naples. Through the course of the 19th century, pizza was gaining in popularity there, with the number of pizzerias nearly doubling. Pastry shops were being converted to pizza shops; tavern keepers, restaurateurs, and bakers were filing petitions asking to start selling pizza. At the same time, Naples had begun a massive demolition and gentrification program starting in 1889. It was centered on the poorer neighborhoods, which meant many pizzerias were being razed even as new ones were opening elsewhere. It just makes sense that some pizzaioli whose shops were demolished would wind up in the United States. John Albana, whose name we found in connection to 59½ Mulberry, seems to be one of them.

In Naples, records show, a Giovanni Albano ran a bakery on Via Firenze, and in 1889 or 1890 requested a license to sell pizza, too. The building would have been destroyed as part of the urban renewal project. Tracing his name through various New York directories, as well as census and customs documents, we believe the John Albana at 59½ Mulberry in 1895 is the same man, albeit with an Americanized first name. We found him listed (under various spellings) as a baker at several other nearby addresses in the years before and after. We suspect he was selling pizza in all of these locations.

After the turn of the century, pizza began to gain momentum in New York. In 1902, we noticed, the directory listings for “bakers, pie” began to include more Italian names. We also begin to see newspaper articles about (or at least mentioning) pizza at this time. Until the late 19th century, the most popular ethnic cuisines in the United States were German and French. Most Americans had never tried Italian food and had no idea what to make of this Neapolitan novelty. Echoing the comments from 19th-century travelers to Naples, the earliest US stories hovered between curiosity and revulsion.

A 1903 article from the *New York Herald Tribune* questioned the Italians' love of vegetables, including red peppers. It describes various vegetables eaten by

Italians, including—the horror!—dandelion greens collected by stooping old women, then adds a paragraph about “pomidore pizza” made with flattened dough and tomatoes, then baked.

In 1905, *The (New York) Sun* published a story called “Ever Eaten Pizze Cavuie or Tried Tarallucci?” which shows a little less revulsion. The story describes an Italian man taking an American woman to an unnamed dive on Spring Street to taste (or at least see) this strange thing called “pizze cavuie.” (Pizza cavuie translates roughly to “pizza of your choice” in Neapolitan dialect.)

The Italian is referred to throughout the article as “the Dago,” a slur, though the anonymous author feels compelled to insist the Italian doesn't mind.

The pizza is described as a “pastry” with lard, cheese, and cooked tomatoes on top, which emerged from the oven “enticing by reason of its hotness and crispness and the blend of spicy flavors.” Nonetheless, it “was not lacking in suggestions that when cold it might lie with some heaviness in an unaccustomed interior.” (For more on what early US pizza was like, see page 38.)

The article struck us as something of a landmark in pizza's US history, reflecting the best and the worst of the American melting pot. Despite the derogatory term for Italians, non-Italians were being encouraged to come try this unique new food.

Another part of the story made us chuckle. The Italian notes that while there were a number of pizza sellers in New York at the time, there were only two “where you can get real, genuine Neapolitan pizza. . . . The rest are Americanized substitutes.” The debate over “authenticity,” apparently, has been going on for more than 100 years. It also makes it clear there were several pizzerias, at least, in operation at the time.

Early pizzaioli apparently kept long hours. Giovanni Santillo's pizzeria on Spring Street—which would later become Lombardi's—was open from 8 a.m. to 2 a.m., according to a 1905 ad. Lombardi's would later up the ante and was open round the clock, with family members working in shifts.

People living outside of major Italian immigrant points probably couldn't sample pizza, but they could read about it. We found references to pizza in a number of late 19th-century travel stories around the country, including an 1883 story in the *Arkansas Weekly Mansion* in Little Rock, an 1891 story in the *Evening Democrat* (Marysville, Kansas), and an 1894 story in the Rochester (New York) *Democrat and Chronicle*, among others.

The 1905 “pizza cavuie” story is one of the earliest in a long line of New York journalists urging people to go into an ethnic neighborhood and try something new. These days you can find articles like this about the Asian restaurants in Queens. It was true back in the 1950s too.

The Lower East Side was home to many pizzerias. Newspaper coverage in the early 20th century introduced non-Italian readers to them, including weighing in on which ones were “authentic.”



EARLY PIZZA IN THE UNITED STATES

1879-1908

Pizza arrived in the United States with the wave of Italian immigrants leaving Southern Italy as early as the 1870s. To follow its path in the New World, we scoured newspaper archives, libraries, public records, and business directories to track pizza's arrival and spread in the United States. As in Naples, it is very likely that pizza was being made and sold before there was documented evidence, but these historical references give a framework to pizza's story, beginning in the late 19th century up to Prohibition. For the historical references in the United States after the 1920s, see page 56. For historical references in Italy, see pages 10 and 72.

The San Diego Union

1882

San Diego Union

Mention of Neapolitan pizza, a cake topped with onions and tomatoes

1891

Evening Democrat

Stories of pizza and Naples run in newspapers all over the country.

DEWAR'S SCOTCH WHISKEY.

TAMMANY

DEVOTED TO DEMOCRACY

TIMES

The Carracciola Hotel, cafe and restaurant, F. Milone, and F. Trapani Proprietors, is located at 130 W. 26th St., bet. Sixth and Seventh aves. Here all kinds of Italian and French dishes are served, at very low prices. Ample accommodation for societies and parties, and the best brands of wine, liquors and cigars always in stock. Pizzeria Napoletana.

1900

Tammany Times

Ad for the Carracciola Hotel and Pizzeria Napoletana



1902

Fort Wayne Journal

Famed opera singer Pietro Mascagni introduces Americans to his favorite dish, pizza.



ANTICA PIZZERIA PORT'ALBA

Alba, Italia

FILIPPO MILONE, Prop.

PIZZERIA NAPOLETANA aperta GIORNO E NOTTE

192 GRAND ST., NEW YORK

Il conosciuto Proprietario dell'Antica Pizzeria Port'Alba, Signor FILIPPO MILONE, fa noto al Pubblico che ha aperto al N.º 192 Grand St., un'Elegante PIZZERIA NAPOLETANA.

Essendo l'unico locale Italiano del genere, fa sperare al Signor FILIPPO MILONE il concorso numeroso di Italiani.

Come pure fa noto al pubblico che quanto prima verrà annesso alla pizzeria una Cucina Casereccia per colazione alla Forchetta.

I barongustai vadano a mangiare le squisite PIZZE che fa il simpatico Filippo Milone nella sua Nuova Pizzeria al N.º 192 Grand St.

1903

Il Telegrafo

Ad for Antica Pizzeria Port'Alba at 192 Grand Street

Antica Pizzeria Napoletana



Il proprietario della rinomata Pizzeria 53 e ½ Spring St. tra Mulberry e Marion St. NEW YORK

GIOVANNI SANTILLO

fa conoscere a tutti i suoi amici della Colonia Italiana che nel suo locale si fanno Pizze all'uso Napoletano essendo il Santillo un pizzaiuolo proprio di Napoli che per lungo tempo fu in una delle primarie pizzerie. Il Santillo per soddisfare i suoi commensali, ha rinnovato il suo locale e per la stagione estiva ha arricchito di ventilatori e luce elettrica. Chiunque potrà condurvi la propria signora e figlio, poiché troveranno la massima decenza. La Pizzeria è aperta dalle 9 del mattino alle 2 dopo mezzanotte.

PROVARE PER CREDERE

1904

Il Telegrafo

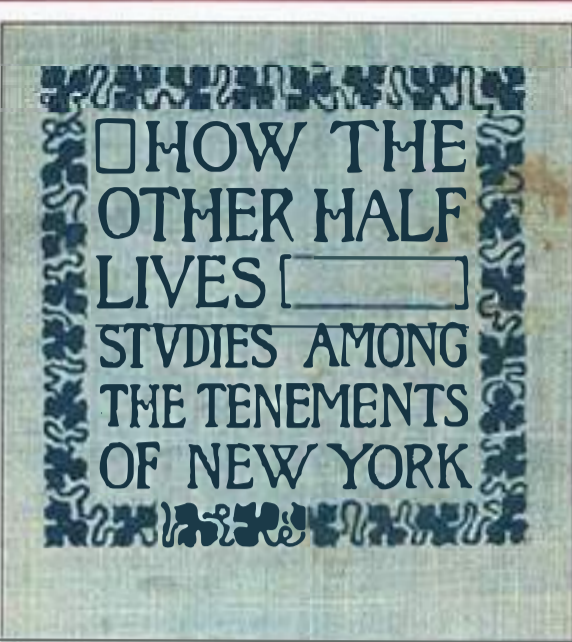
Ad for Antica Pizzeria Napoletana, owned by Giovanni Santillo, at 53½ Spring Street



1905

The (New York) Sun

The article "Ever Eaten Pizza Cavuie or Tried Tarallucci?" invites readers to Spring Street to experience pizza.



1890

How the Other Half Lives

Jacob Riis publishes his book, including his famous photograph "The Bandit's Roost" at 59½ Mulberry Street.

Philippa Joseph, 1889, 841 av.
 Philippa Theodore, 50 Light
 Pietsoh Gustav, 47, 14th av.
 Pilot Julia, 142 W. 17th
 Pils Anton, 8495, 8d av.
Pizzeria Forno E. 51½ Mulberry
 Plapper Henry, 881, 8d av.
 Polick Adolph, 1629, 1st av.
 Postel Jacob, 181 Norfolk
 Probeck Conrad, 248 E. 125th
 Prohitz William, 1670, 1st av.
 Prutzky Charles, 1008 Av. A
 Pruss John A. Pelham av. n St. J

1894

Trow's Business Directory for New York City

First documented pizzeria in a business listing for "Pizzeria Forno E." at 59½ Mulberry Street

ANDREA PALOMBA

42 Union St., Brooklyn

Pizzeria alla Napoletana

Latticini freschi tutti i giorni.

Steam Power Facilities Established

A. CAPRA & CO.

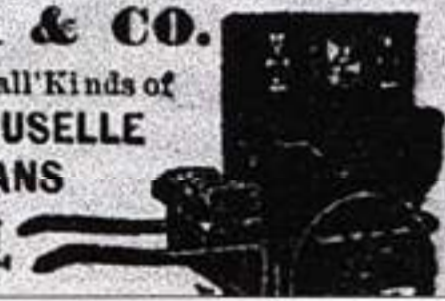
Manufacturers of all kinds of

CYLINDER CAROUSELLE

PIANOS ORGANS

1218-20 Eighth St.

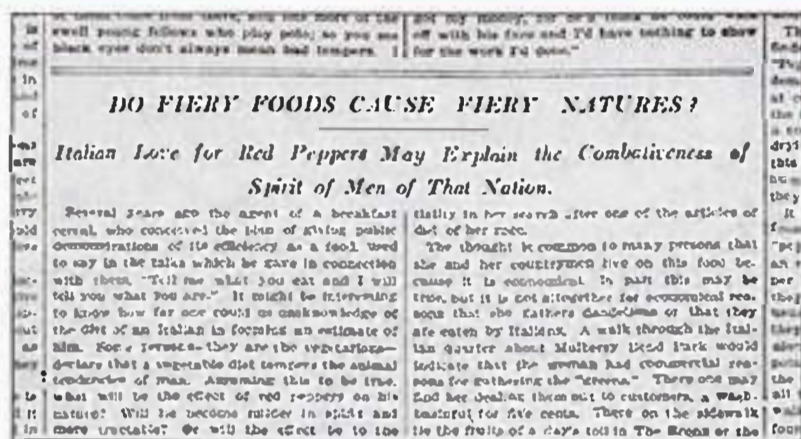
Below Federal



1898

L'Araldo Italiano

Ad for Pizzeria alla Napoletana at 42 Union Street, Brooklyn



1903

New York Herald Tribune

Article wondering "Do Fiery Foods Cause Fiery Natures?" mentions pizza pomodoro.

"HOT CAKES" IN NORTH STREET

Toothsome Dainties, Favorites With Neapolitan Palates, Are Pizze Cavuie and Taraluccio — Beer, Not Wine, Therewith.

Scattered through North and Prince streets and other portions of the Italian colony where Neapolitans congregate are occasional little shops with the words "Pizze Cavuie" on the windows. The words mean simply "hot cakes" in the Neapolitan dialect. But only a traveler would know that the pizze are one of the famous products of Naples, eaten by rich and poor, high and low, and dutifully partaken of by every tourist on one of the features that must be "done" in order to say that one has seen Naples. The devotion of the American race to the spiky aromatic herb which is such a favorite Italian seasoning. The cheese used is the fiorano, so much employed for culinary purposes. The whole operation has not taken him more than a minute. Then he slaps it on a broad, flat, long-handled paddle, and thrusts it into the furnace over. In two minutes it is done. It comes to the table on a tin, flat, paper plate. Ordinarily individual pizze are not furnished or ordered, for every true Neapolitan takes his piece of pizze, folds it over so that the crust is outside, and eats it from the hand. The pastry seems to be a cross between bread, dough, and pie crust.

1903

Boston Journal

Evidence of a pizzeria in Boston serving "pizza cavuie" on North Street



1904

Passenger manifest

Gennaro Lombardi arrives in the United States at age 17

HOT CAKES.

"Pizze Cavue" Shops of New York Are Popular.

Scattered throughout Mott and Mulberry streets and other portions of the Italian colony where Neapolitans congregate in New York are occasional little shops with the words "Pizze Cavuie" on the windows. The words mean simply "hot cakes" in the Neapolitan dialect. A visit to one of these reveals a window piled so high with great round Italian cheeses that the interior is invisible, says a writer in *What-to-Eat*. Entering, one sees a long table covered with brown oilcloth and bounded by long black benches. One side of the room is lined with little private supper rooms about the size of theater boxes, partitioned off

1908

Pittsburg Press

Article about the popularity of "Pizze Cavue" shops in New York mentioning shops selling pizza "throughout Mott and Mulberry Streets"

PIZZERIA NAPOLETANA

Al N.o 507 di Green St., presso Duout i signori Pasquale Acclardi e Co hanno aperta una pizzeria napoletana.

Colà i buon gustai possono trovare eccellenti maccheroni cucinati secondo la vera arte napoletana, spaghetti, ecc., ecc. e le celebri pizze, la cui confezione sarà affidata a Nicola Balle capo della cucina ed il cui nome popolare nella nostra colonia.

Una buona porzione di spaghetti alla napoletana, susseguita da una pizze alla "pomarola" ed all'"alice" possono farvi sognare di trovarvi sulla in-

1908

L'Italia

Evidence of the first pizzeria in San Francisco: Pizzeria Napoletana on 507 Green Street that would make diners "dream of being on the enchanted beach of Posilipo"



1908

Undated photo

Famed image of Gennaro Lombardi and Antonio Pero in front Lombardi's was taken, inaccurately dated 1905

WHO WAS FILIPPO MILONE?

He's not the first or the most long-lasting. But Filippo Milone is an interesting and little-known character who ran a number of pizzerias in turn-of-the-century New York.

We know Milone was an immigrant from Naples but don't have many confirmed details of his life back in the old country. He was around 30 when he came to New York with his wife in 1892, putting him slightly ahead of peak Italian immigration years, which started in 1900. That makes him something of a groundbreaker on the US pizza scene, and his story speaks to broader issues in those early days.

The first time we noticed the Milone name was in a blurb in a 1901 edition of the *Tammany Times*, a publication of the Democratic machine in New York. "The Carracciola Hotel," located at 130 West 26th Street, served up "all kinds of Italian and French dishes" and it referenced "Pizzeria Napoletana."

In 1894, a city directory lists a "Filippo Milon" as the operator of an "eating house" at 421 East 112th Street. While we don't know what kind of food he served, pizza is a strong possibility.

In 1899, there's a directory listing for a "Philip Milon" running a delicatessen at 53 Spring Street (this later became the site of Lombardi's original pizzeria; see page 31), which probably served pizza.

By 1903, he's listed as a "baker" at 183 Mulberry Street. But that same year, he also started running advertisements in an Italian-language newspaper for his "Antica Pizzeria Port'Alba" at 192 Grand Street. A short accompanying article has an interesting turn of phrase: it notes that Milone's pizzeria "is now at 192 Grand," apparently referencing his earlier businesses and suggesting he may have been well known at that time. (Conveniently, a mozzarella maker, the Alleva Dairy, was next door.)

Peter Regas, an independent researcher from Chicago who's spent considerable time on Milone, discovered his connection to a restaurant in Brooklyn at 47 Union Street in 1898, a butcher at 156 West 28th Street, and groceries at 2228 1st Avenue in 1901 and at 181 Mulberry in 1903.

Aside from all the different addresses—which we'll get to in a moment—we found several interesting points to note in all this. Take

the ads for the Carracciolla Hotel and for Antica Pizzeria Port'Alba, both of which attempt to elevate the status of pizza. That's a far cry from the cheap street food eaten in pizza's earliest days by Naples's poorest residents, including the street-dwelling *lazzaroni* (see page 18). It's also different from even 19th-century Naples pizzerias, which still were geared toward quick, cheap meals, although by then they were attracting a more diverse crowd (and typically included seats).

Those two locations were clearly named to conjure references to Naples. Antica Pizzeria Port'Alba was the name of a famous pizzeria there that is still in business today. Port'Alba is also a neighborhood in Naples that's still known for its street food. The Carracciola Hotel is a (slightly misspelled) reference to an actual palace in Naples, Palazzo Caracciolo, which was built in 1584. In the early 19th century, it was converted into a luxury hotel that's still there today.

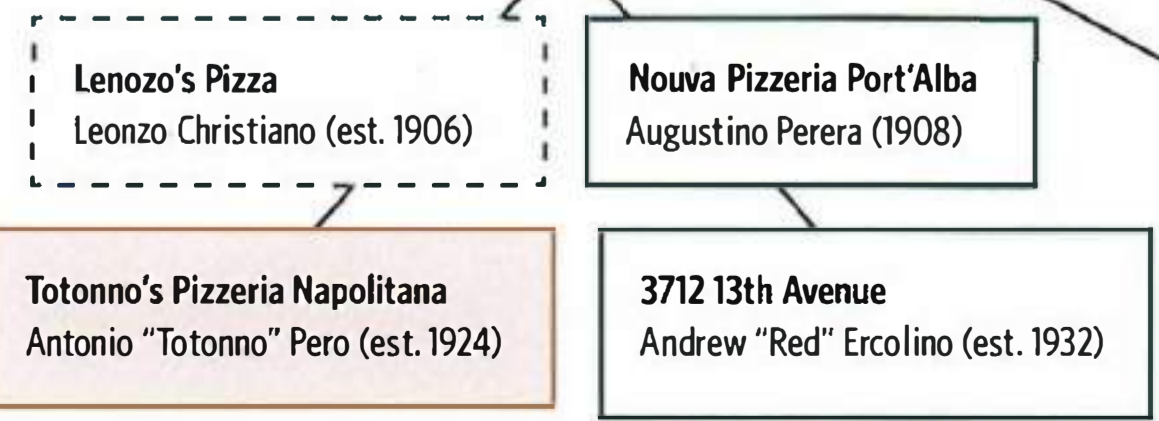
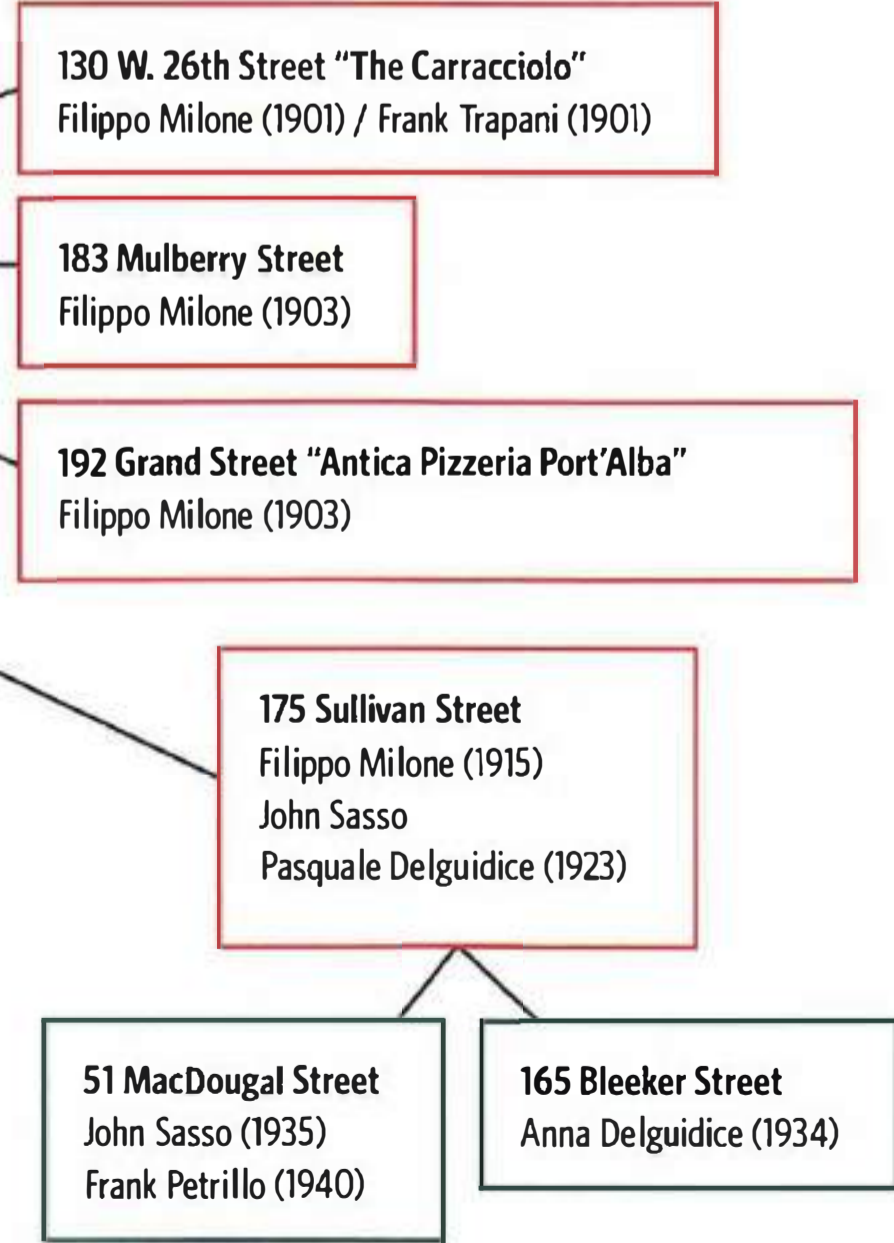
The most obvious thing about Milone is his penchant for opening and closing businesses. We suspect that this may be evidence he wasn't all that successful. When we dug into records maintained by the buildings' landlords, we found cash books suggesting Milone fell behind on rent for a couple of months. At the very least, the missing rent payments suggest Milone struggled as a businessman.

We found that some of Milone's businesses continued on as pizzerias after he left. At 53 Spring Street, there was a steady string of proprietors between Milone and Gennaro Lombardi. The original address for John's was 175 Sullivan Street, which still exists today, albeit on Bleecker Street. The business at 120 Van Brunt later became Pop's Pizzeria, an iconic spot in Brooklyn.

Peter Regas, an independent researcher, made pizza news when he released his findings about Filippo Milone, casting him as part of a "forgotten generation" of "pizza pioneers." It was newsworthy because he also proved that the story of Gennaro Lombardi as the father of American pizza was wrong. Regas considers Milone to be a kind of long-lost forefather of American pizza.

Researcher Peter Regas mapped out Milone's business movements, showing his connections with numerous notable historic pizzerias. Here we've focused on Milone's New York pizza businesses through the 1920s, but his influence continued into the 1940s.

- Milone owned
- Still exists
- Related to or linked by staff
- Inspired



PIZZA ELSEWHERE IN THE UNITED STATES

New York had the largest number of Italian immigrants in the early 20th century, so we spent most of our research time buried in archives there. But we found very early references to pizza in some other cities, too.

In 1897, the newspaper *L'Araldo Italiano* began running a tiny ad for a café and restaurant at 324 North Street in Boston run by Luigi U'Pizzaiuolo, the Neapolitan spelling for pizzaiolo. Luigi would continue to advertise through mid-1898, moving his business several times.

In 1903, another Italian-American newspaper in Boston, *La Gazzetta del Massachusetts*, began running ads for La Grotta Azzura (The Blue Grotto), a pizzeria and restaurant on Boston's Hanover Street. It served "Neapolitan pizza, spaghetti from the best artisans in Italy," and the proprietor was listed as Luigi Ponticelli.

That same year, the *Boston Journal* ran a story headlined, "'Hot Cakes' in North Street" about a curious restaurant serving *pizze cavuie*, billed as the most famous food of Naples. The writer described a group of men sitting on benches along an oil-cloth-covered table and eating a "pastry [that] seems to be a cross between bread dough and pie crust" and featured grated "Roman cheese" and cooked tomatoes.

Looking to San Francisco, which had a significant Italian population, we expected to find a number of early pizzerias there. But Italian immigration to that West Coast city was a little different than on the East Coast in that the earliest group came from Northern Italy. The 1849 Gold Rush was an early draw, and soon passenger ships began to arrive. Some immigrants found work in farming, while others settled in the city. Some of the Northern Italians opened businesses, congregating in the North Beach/Telegraph Hill section. Around 1880, Southern Italians began to arrive in greater numbers, settling in the same area as well as the Hayes Valley neighborhood. Like their counterparts on the East Coast, many of these Southern Italians would return to Italy after earning some money to take home.

Estimates vary on the number of Italians living in California during this time. But there were enough to support several Italian-language newspapers, including *La Voce del Popolo*, *Giornale L'Italia*, and *Corriere del Popolo*. Their pages were full of ads for Italian foods, whether imported or locally produced, but many of the specialties advertised were foods from the north. The first few times that we even see

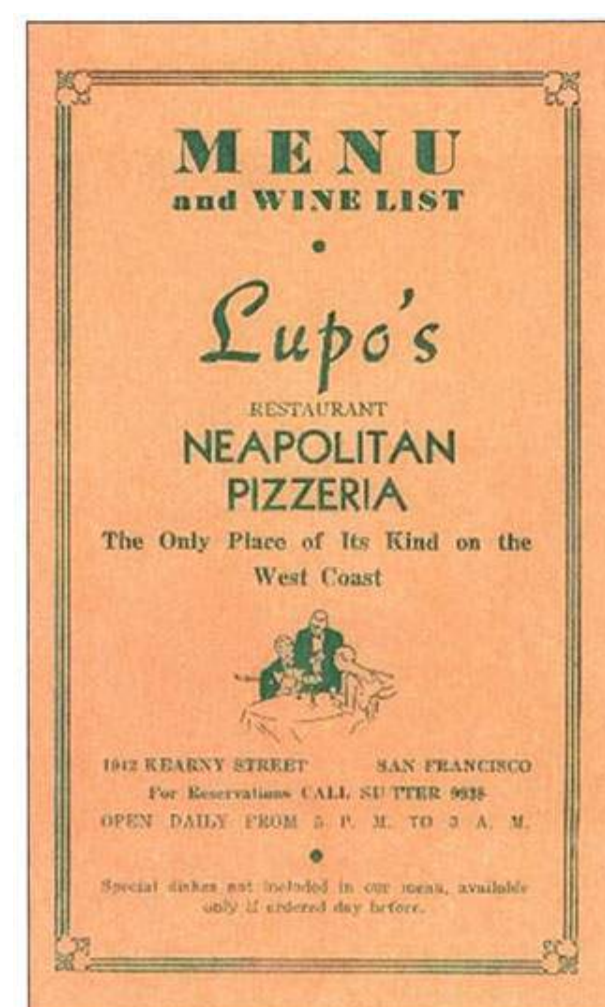
pizza mentioned in these papers is in stories about travel to Italy.

The first mention we could find of pizza locally was a 1908 article in *Giornale L'Italia* about Pizzeria Napoletana at 507 Green Street. It served "excellent macaroni cooked according to the true Neapolitan art . . . and the famous pizzas" that would make diners "dream of being on the enchanted beach of Posilipo!"

The manager was listed as Nich Basile, who was born in Naples and emigrated to New York in 1894 before making his way west. He later described himself in naturalization documents as a baker, and after the Green Street business it appears he was associated with a number of bakeries or restaurants through 1929. We found numerous sources citing a different restaurant, Lupo's (later renamed Tommaso's), as the first pizzeria in the city, but since Tommaso's didn't open until 1936, this ad proves pizza had been in San Francisco for nearly 30 years.

New Jersey also had large numbers of Italian immigrants. In the Chambersburg neighborhood of Trenton, Joe's Tomato Pies opened sometime in 1914–1915. In 1923, an employee, Joe Papa, left to found Papa's Tomato Pies nearby. And in 1920, Pizzeria Napoletana opened in Trenton on South Clinton Avenue.

In other cities with large Italian populations, we suspect pizza may have been available around the turn of the century in bakeries and saloons, too, just like in New York.



Lupo's, later renamed Tommaso's, is often cited as the first pizzeria in San Francisco. But there were pizzerias advertising in the city's Italian-language newspapers for almost 30 years before it opened.

For more on the South Jersey "tomato pie" nomenclature, see page 104.

A pizzeria along Boston's Hanover Street in 1948.



WHAT WAS 19TH CENTURY PIZZA LIKE?

The question remains: what was the first pizza in America like? After searches that included the Smithsonian, public library and newspaper archives, the Library of Congress, and a callout over social media, the earliest photos found are from the 1920s. Written descriptions were our only hope.

“Boys at the doors of bakeshops vociferate, ‘Pizzarelli caldi!’—hot pizzarelli. The pizzarello is a little flat cake of fried dough, probably the Neapolitan equivalent of a doughnut. They sell for a penny a piece. Sometimes the cook makes them as big as the frying pan, putting in tomato and cheese—a mixture beloved of all Italians. These big ones cost 15 cents but there is enough for a taste all around the family. The bakers are frying them hot all through the feast . . .”

It was from a 1903 *New York Times* article headlined, “Quaint Italian Customs of Summer Festal Days,” and it was the earliest description of pizza being sold in the United States that we could find. It wasn’t baked, it was fried! Neapolitans typically call this pizza fritta, a simple fried (and sometimes filled) dough.

Is it possible that the first pizzas sold in the US were a version of pizza fritta? Antoinette Balzano, co-owner of Totonno’s pizzeria on Coney Island, recalled family lore describing how her grandfather, Antonio “Totonno” Pero, had made pizza in the early 20th century. “They used to make the pizzas on a potbelly stove,” Balzano told the online publication *Vice*. “He used to put them on his head, the pizza

boxes, and he would go through the streets and sell them by the slice in the streets of Little Italy, and the people that bought them used to warm them up on their radiators . . .”

A potbelly stove? That’s not a pizza oven. It’s hard to picture how these pizzas were getting cooked other than in a pot of oil on top of the stove.

But other early 20th-century articles confirm that baked pizzas were also being served at this time. The Neapolitan pizzaioli who came to New York would have had to make some adjustment in their baking because ovens in Naples were wood-fired while in New York they were typically heated by coal or gas.

Early 20th-century writers often described pizza as a kind of pie. “Pie has usually been considered a Yankee dish exclusively,” a December 1903 article in the *New-York Tribune* says, “but apparently the Italian has invented a kind of pie. The ‘pomidore pizza’ or tomato pie is made in this fashion. Take a lump of dough, and under a roller flatten it out until it is only an inch thick. On this scatter tomatoes and season plentifully with powdered red pepper. Then bake the compound.” The article also describes “salami pizza,” made with tomatoes, cheese, red peppers, and bologna.

An October 1903 article in the *Boston Journal* ran a story that said, “Ordinarily individual plates are not furnished or required for every true Neapolitan takes his piece of pizze, folds it over so that the crust is outside and eats it from the hand.”

Just like we do today with a slice in NYC or pizza a portafoglio in Naples.



Photographs of pizza before the 1930s are scarce. This image of boys selling what appears to be pizzas in East Harlem in 1928 is one of the earliest we’ve come across.

THE ORIGIN OF PIZZA FRITTA

Sometime around 2012, there was a mini craze in New York pizzadom: fried pizza. The pizza fritta trend spread elsewhere, too. But it wasn’t a new invention—not by a long shot. Fried pizza has a centuries-long history in Naples, the same city where oven-baked pizza was born.

In 18th- and 19th-century Naples, most daily meals came from vendors, including pizzerias. But alongside these pizzerias, there was a second pizza economy. It involved individuals, mostly women, making and selling pizzas from the alleyways in front of their apartments to earn extra money. Without access to ovens, they instead set up portable deep fryers, using big vats of oil that were heated with coal. In Italian director Vittorio De Sica’s 1954 film *L’Oro di Napoli*, Sophia Loren plays one of these pizzaioli. Loren’s pizza fritta was simple fried dough, served in a square of paper. But sometimes, pizza vendors would place toppings on the circle of raw dough, cover it with another piece of dough, and then drop the whole package into the boiling oil—another version of pizza fritta.

On our tour of Italy’s pizzerias, we had some very tasty pizza fritta (see page 155), including a course from Enzo Coccia that was served with champagne.



ANCESTRAL PIZZA

Pizza in Naples in the 19th century was not very similar to Neapolitan pizza today. The 19th-century pizza was thicker, tougher, and had a denser crust in order to survive being sold by hawkers on the street and to cope with the poor flour available at that point in time (see page 67). We believe that it was likely similar to the dense crust of New Haven pizza today, or roughly similar to pizzas from historic pizzerias like Totonno's in Coney Island, New York, or the older pizzerias in São Paulo and Buenos Aires (see pages 190 and 200).

Neapolitan pizzaioli reinvented their pizza at some point post World War II, after they had access to high-protein flour from Canada and the United States, which is generically called farina Manitoba in Italy (see page 68) to this day. This allowed the creation of much lighter and more delicate doughs.

The images below show a set of pizzas that seem to be frozen in time—the New Haven pizzas in 1925 and today don't look all that different from each other, for example. We were struck by the similarities they shared with some of the pizzas we ate in South America, notably from historic pizzerias. Comparing them to the 1940 image of Neapolitan pizza from the Italian film *San Giovanni Decolato* (*Saint John, the Beheaded*), we can see a through line of what appears to be a thinner, denser pizza very different from the Neapolitan pizza we know today. We believe these pizzerias have preserved what appears to be the ancestral pizza and are likely the closest you can get to the pizza that left Naples in the 19th century and spread throughout the world.



Frank Pepe, New Haven, 1925



New Haven pizza today



New York pizza today



The 1940s film *San Giovanni Decolato* shows a pizza with a thin, flat rim that isn't like Neapolitan pizza today, which has a puffy rim.



São Paulo pizza today



Buenos Aires pizza today



This 1954 photo of Sophia Loren (making Neapolitan specialties while in Milan) shows a pizza that looks very different from Neapolitan pizza today; most notably it was baked in a pan.



This 1960 image of Jean Paul Belmondo eating pizza while filming in Italy shows a puffier pizza that looks more like Neapolitan pizza today.



This 1967 pizza from L'Antica Pizzeria Port'Alba in Naples shows something distinctly different than the pizza we see in the 1940s (middle row, left).



Neapolitan pizza today is characterized by a puffy, open-crumbed cornicione.

PIZZA IN ARGENTINA

Italian immigrants who traveled back and forth to Argentina were known as *golondrinas*, or swallows. Many would arrive in Argentina to work during the summer months there (November–March) and then return to Italy during its summer months (May–September).

Approximately half of Argentina's citizens proudly claim Italian ancestry. The country is considered such an Italian bastion, in fact, that Italian politicians court the half-million dual citizens registered for the Italian vote.



This image of a *fainá* seller in Buenos Aires bears a striking resemblance to the etchings of pizza sellers from 19th-century Naples.

It's important to note that pizza in 1930s Buenos Aires was different from that in Naples and the United States. It was made *al molde*; that is, in a pan.

Buenos Aires was a top destination for Italian immigrants. The first wave of Italians to settle in the capital came from Northern Italy, with the immigration wave from Southern Italy following several decades later.

Pizza arrived in Argentina thanks to the same forces that brought it to the United States: immigrants who left Italy in the 19th and early 20th centuries seeking better lives abroad, and who turned recipes from their homeland into a livelihood. Over the years, its popularity grew, and the pizza culture in Argentina's largest city, Buenos Aires, is just as robust as that in New York and Naples. It's considered an iconic part of the city's cuisine, and its residents, called *Porteños*, embrace pizza as a part of their very identity.

And yet if you compare the pizza in Argentina to the pizza in its Italian homeland, the two are very different. Argentinean pizza is also different from New York pizza, even though they're both one step removed from Italy and came of age during a similar time frame. We're not just talking about different topping choices based on local ingredients. It's much more profound than that—a kind of alternative experiment in the history of pizza.

Here, we'll explore the development of pizza in Argentina, focusing on its capital city, and look at some of the factors that made it grow up so differently than elsewhere. For starters, its roots can be traced to Genoa, not Naples. But we've noticed at least one thing in common with other pizza stories: whether we're talking about New York, Naples,

Buenos Aires, or anywhere else, there's never a shortage of dubious pizza lore.

GENOA, NOT NAPLES

Many of the early arrivals who landed in Argentina hailed from Liguria and its capital, Genoa. Large numbers of them settled in La Boca, a neighborhood in Buenos Aires at the mouth of the Matanza River. To this day, La Boca is considered the historical locus of *Porteño* pizza.

The first wave of Italian flatbread in Buenos Aires was not pizza. These Genoese transplants seemed to have immediately started making and selling a chick-pea pancake called *farinata di ceci*, which came to be known as *fainá*. The first documentary evidence of *fainá* we found dates to 1890. *Fainá* was likely sold on the street, as pizza was in Naples, then later in brick-and-mortar *fainerias*. Its popularity grew in the decades to follow and by the time Southern Italians began arriving, *fainá* was well established.

Immigrants from Southern Italy brought pizza along with them; *fainá* vendors were among the first places to take up making and selling pizza. By the 1930s, pizza was regularly sold in *fainerias*, despite the fact that most were run by Northern Italians. In 1931, a business directory created a new category for "*fainá* and pizza" businesses and listed 11 establishments.



Even more interesting, perhaps, is the fact that they were spread around the city, not just in La Boca.

Some of the historic Buenos Aires pizzerias still around today opened during this decade (though some started as *fainerias*), including *Banchero Pizzeria*, *Güerrín*, *Las Cuartetas*, *Angelín*, *La Mezzetta*, and *El Cuartito*. (We visited them all; see pages 203–207.) The early business model was strictly quick-service, and diners typically ate standing at a counter. That’s still a popular model for pizza businesses today.

BUENOS AIRES LOVES PIZZA

This 1930s explosion of pizzerias is clearly documented in the history, but it seems to have appeared out of nowhere. Could it have really gone from zero to everywhere in such a short span? Whatever the case may be, by the 1940s, pizza had most definitely arrived.

A 1942 article, for example, noted that “Buenos Aires is distinguished by its pizzerias,” and said they sold *fainá*, *fugazza*, and *empanadas* in addition to Neapolitan pizza, “which has grown popular in the last ten or fifteen years.”

In 1949, well-known artist and social commentator Luis J. Medrano wrote and illustrated an article for *Argentina* magazine on the “Origins and Social Functions of the Pizzeria,” saying it wasn’t a

coincidence that pizza became a part of the city’s fabric at a time when the working class had been buffeted by the political winds. First it was sold by street peddlers, then in pizzerias.

The earliest pizza in Buenos Aires was strictly pan-baked; it was heavily yeasted; it was thicker than most American and Italian pizzas; it was served alongside other pizza-like things that you won’t find on pizza menus elsewhere. As we learned on our 2019 tour of pizzerias there (see page 200), many of those characteristics stand to this day, with one major addition: cheese.

Cheese seems to have been added to at least some pizzerias’ kitchens in the 1940s. We don’t know how much cheese. All we know is that today, the amount of cheese can be astonishing. (It’s so much cheese that when Argentines visit Italy and find the pizza has more moderate amounts of cheese, they wonder about the stinginess of the proprietor.) If you ask Argentines why so much cheese, they’ll say it’s because they like it that way. Fair enough.

Pizza began to morph into different forms. It was, and is, sold both in sit-down restaurants and by the slice in to-go places (a point we found slightly surprising since the cheesy, heavily topped slices are not type you can eat on the go). The fact that pizza was first made in *fainerias* meant that *fainá* was sold and eaten with pizza. Even to this day you can get pizza

Canchera is another cousin of pizza specific to Buenos Aires—it’s a thick-crust pizza without cheese, the *Porteño* version of *pizza marinara*. In Spanish, *cancha* means “court,” the Argentinean term for a soccer field. You’ll often find *canchera* peddlers selling cold slices outside of soccer stadiums today, although it can also be found at some pizzerias.



Fugazza is another pan-baked flatbread available at most pizzerias, and it comes with mounds of onions on top but no sauce. The name suggests a linguistic corruption of “*focaccia*.” *Fugazzeta*, a variation on *fugazza* that has cheese on top, was said to be invented in the early 20th century. This, too, is a Buenos Aires pizzeria staple today, and we sampled all of these things on our pizza travels (see page 200).



Farinata (or *fainá*) being baked in Italy in 1937



Just as in Naples, pizza was sold from *stufas* by walking street vendors.

Top row: The first documented evidence of pizza in Argentina dates back to the 1930s. Banquero (left) and Las Cuartetas (right) both opened during that decade. They are two of the oldest pizzerias still in operation in Buenos Aires.

Bottom row: Pizza in Argentina was adapted to local tastes and ingredients. One distinctive feature is the amount of cheese used. The pizza de muzzarella (left) is pan-baked and heavily topped with cheese. There are also thinner styles (right) served.

a caballo (meaning pizza on horseback), which is a slice of pizza topped with a slice of fainá (see page 200). (The great irony here is that fainá appears to be vastly more popular in Buenos Aires than farinata di ceci ever was in Genoa at any point in time.)

In the 1950s, a pizzeria called Los Inmortales began making “a la piedra”—style pizza—that is, baking the pizza on the brick oven floor, as it was done in Naples and later the United States. Today you’ll find both al molde and a la piedra all around the city.

Another mutation was canchera, a cheeseless pizza premade and sold at soccer games. Buenos

Aires pizza culture shares a strong link with futbol. A number of the city’s historic pizzerias were founded by soccer players, and you’ll often find memorabilia on the walls. The association goes the other way, too—soccer teams are associated with pizza. For example, the soccer team based in the La Boca neighborhood, the Boca Juniors, is sometimes taunted by fans of the opposing team with the jeer, “Your pizza is burned.”

Considering the Argentines’ love of both pizza and soccer, those are strong words indeed.



PIZZA IN BRAZIL

The people of São Paulo, Brazil, are so passionate about their pizza that every year on July 10 they observe Pizza Day, complete with competitions, events, and discounts celebrating a dish they consider an iconic part of their homegrown cuisine. Pizza isn't native to Brazil, of course. Like pizza elsewhere, it arrived more than 100 years ago thanks to Italian immigrants, but here, the circumstances were somewhat different. Rather than being drawn by industrialists who needed factory or construction workers like in the United States (see page 26), Italian immigrants were pulled to Brazil to work on coffee plantations. By the middle of the 20th century, pizza would become a part of São Paulo's very identity.

After being colonized by Portugal in 1500, Brazil's economy was dominated by the sugar plantations of Northeast Brazil through the 17th century. But in the 19th century, coffee would be king. First planted commercially in the 18th century, coffee showed tremendous export promise in the 1820s and 1830s when worldwide prices skyrocketed. Within 60 years, coffee would account for nearly two-thirds of the country's exports.

For much of Brazil's colonial history, the work that made plantation and mine owners rich was done by Africans held in slavery. In 1850, though, the Brazilian government ended the transatlantic slave trade. Slavery itself had not yet been outlawed, but coffee planters knew they would have to change their slave-based labor system. Banding together, they formed recruiting companies and looked overseas for help.

Initially, Italian immigrants came in small numbers. In 1875, they settled mainly in the rural areas of Southern Brazil, building small independent homesteads that colonized the country's vast frontier. Over the course of the 1880s, planters began sending immigrants toward the labor-starved coffee plantations in the state of São Paulo, in Southeast Brazil. Today, its capital city, also named São Paulo, is one of the most populous in the world, but back then, the rural land outside the city's boundaries was where coffee thrived.

In 1888, slavery was finally outlawed, and planters were forced to turn to paid labor. The situation grew tense and desperate. A year after abolition, embittered planters overthrew the monarch and took power in a coup. Now in control of the state, planters made subsidized Italian immigration official government policy. They stepped up efforts to attract Europeans and banned immigrants from Africa.

Plantation owners guaranteed there would be jobs for people overseas. Pamphlets distributed in port cities promised great wealth: "Land in Brazil for Italians. . . . Come build your dreams with the family. . . . In Brazil you will be able to have your castle," one flyer read. Family immigration was officially encouraged in the hopes that laboring men would be more likely to stay if they brought wives and children.

The push for immigration wound up spurring profound demographic changes. As many as 3 million immigrants arrived between 1880 and 1930, from more than 60 countries. Among them were some 1.2 million Italians who arrived by World War I. Like elsewhere, many of the early Italian arrivals

Many Italians were drawn to Brazil to work in the coffee plantations outside of São Paulo.



São Paulo has an estimated 6,000 pizzerias. Brazilians are said to devour nearly 1 million pizzas a day.



This 1908 immigration pamphlet illustrates the Brazilian government's support of the influx of Europeans to the country.

On menus all over the city, you'll find a pizza known as the Castelo, featuring tomato sauce, sliced Calabrese sausage, and mozzarella. It's named for Castalões, one of the city's earliest pizzerias that is still open today. We can't think of another time we've seen a menu item named in honor of a competitor.

Castelões is regarded by many as the birthplace of São Paulo pizza.

came from the country's north, but starting in the 1890s, Southern Italians were joining them.

Thanks to immigrant labor, coffee production in São Paulo state tripled after abolition, and that, in turn, propelled growth in other sectors. Meanwhile, the immigrants from Italy and elsewhere in Europe would create footprints for a new diasporic culture in a modernizing Brazil.

FROM POLENTA TO PIZZA

Not surprisingly, life wasn't easy for the newcomers. The promises of great wealth were often not kept, as plantation owners routinely failed to pay workers their full wages. Still, the money was good enough for some of these transplants to save up to buy their own land and homes. And as they tired of the hardscrabble rural life, they began moving in great numbers into the city proper, where there were more opportunities.

São Paulo's culture was transformed. All told, 70% of Italian immigrants arriving in Brazil between 1870 and 1920 went to São Paulo. By 1905, according to one estimate, Italians owned 14% of the land in São Paulo state and comprised more than 25% of the city's population. In 1920, the governor of São Paulo said that if everyone in the city put their country of origin's flag on their roof, "from above São Paulo it would look like an Italian city."

Even as they adapted to Brazilian culture, Italians clung fiercely to their identities—a focus bolstered by the government back in Italy, which, for many decades, worked to keep ties to the homeland strong while also encouraging trade. In Brazil they married

other Italians, went to Italian churches, and ate foods from back home. Polenta, of course, is a traditional Northern Italian cornmeal dish, and there are references in the early decades of immigration to Italians in rural Brazil continuing this tradition, but as Brazil's Italian population moved to the cities, it would eventually be replaced by pizza.

The first mention of pizza we could find in the Brazilian press was in 1889, in the immigrant newspaper *Gli Italiani in São Paulo*. In the story, a disgruntled Italian soldier complains after becoming ill after eating a "damned Sicilian pizza." But this is a rather oblique reference, especially since pizza is not native to Sicily. There are additional references to pizza over the next few decades as well, but none of them specifically discuss pizza being made or served in Brazil.

That kind of discussion would have to wait until 1917, the earliest confirmed pizza reference we could find with an explicit connection to Brazil. The mention came in an advertisement that, remarkably, does not name the restaurant. It simply says, if you're hungry, go to 67 Rua Ypiranga and ask Don Genarro Menzione for a "Bella pizza with mozzarella and pummerola" (tomato). A later ad mentions the same location and praises "delicious pizza with garlic and oregano."

It was not until the 1920s that we began to see more frequent references to pizza or, specifically, pizzerias, in the city of São Paulo. A pizzeria named Castelões, for example, was founded by a Sicilian family in the Brás neighborhood of São Paulo in 1924. It's considered to be among the earliest



pizzerias in the city, and it's still around today. On our visit to Castelões in 2018 (see page 199), we could see how this pizza had palpable ties to the pizza we believe was served back in 19th-century Naples.

By 1928, pizza in São Paulo began to appear outside the strict boundaries of the Italian community and the immigrant press. It figured most prominently across three aspects of Paulistano life: nightlife, domestic life, and media. With the country's largest middle class, the booming city's club and restaurant scene was legendary. In 1947, the famous Brazilian writer Afonso Schmidt reminisced about the São Paulo of his youth. He remembered the bohemian nightlife of Brás, and the literary societies and cabarets that dominated the neighborhood's nightlife—as well as the vast amounts of cheap wine and pizza consumed by revelers at all hours of the night. The neighborhood's nightlife remained vibrant through the 1940s, the decade when pizzerias began to spread across the city. During this period, São Paulo's Italian community was solidifying and becoming more Brazilian. Or perhaps you could say that Brazil was absorbing Italian culture and turning it into a matter of national pride.

NEW WORLDVIEW, NEW WAY OF EATING

In the years after it ended slavery, Brazil was modernizing, and at the same time, rethinking its past and reformulating its self-image. Back in the 19th century, most elite Brazilians looked down on traditional Brazilian dishes, even as they no doubt enjoyed them. French cuisine was revered, along with European civilization in general. Pizza arrived in Brazil just as people were beginning to question this old Eurocentric way of thinking.

Massive changes related to immigration and urbanization led to an ongoing public reckoning of what it meant to be Brazilian. In the 1930s and '40s, intellectuals such as the anthropologist Gilberto Freyre urged countrymen not to see themselves through the lens of race, with one being superior to another. He searched for a broader national identity and found common ground in the country's cuisine.

São Paulo's Italian neighborhoods, with signs advertising pizza and the new espresso machines that *O Mundo Ilustrado* gleefully reported on, were a physical place where that progress happened through cross-racial mixture and sociability.

Pizza was becoming more and more a part of Paulistano cuisine as the food spread across different venues of the city, served in cantinas, bakeries, and even posh restaurants. Soon, Brazilians of all classes would come to embrace pizza's multiple roles as both a quick



food eaten on the go and as a refined and particularly modern meal. In fan magazines, Brazilian stars named pizza as their favorite food—often including a second favorite dish that was part of the more traditionally Brazilian culinary repertoire. The message was that these stars were cosmopolitan and modern (by virtue of the pizza) and also truly Brazilian. Pizza became a reflection of São Paulo's modernity.

Pizza culture evolved in its own way. Unlike other places, pizza is not a street food in Brazil. It became a fancy, white-tablecloth affair and a traditional Sunday dinner for families (see page 191). The pizza we had in São Paulo bears some similarities to those we ate in New Haven and at Totonno's in Coney Island. It helped shape our view on what historical pizza may have been like (see page 39).

Pizza has been integrated into the cuisine of Brazil and can be found in cities all over the country, including Bahia.

HISTORICAL PIZZA RECIPES

Finding historical recipes for pizza was key to understanding what early pizza was like and how it has changed over time. This proved to be challenging given that through the 19th century, and even into the early 20th, the word “pizza” could mean any flat round thing (see page 7). And because pizza’s beginnings as a food for the Neapolitan poor made it largely ignored initially, the oldest recipes for pizza came nearly 100 years after the first documented evidence we have (see page 16).

The first true pizza recipe—that is a recipe for a savory pizza—we found is in French; like the other

sorts of documentary evidence (see page 10), we see more interest in pizza from non-Italians. Foreign pizza recipes were appearing even as recipes for sweet pizza alla Napoletana were being published in Italy. In the early 20th century, the recipes for pizza largely reflected simple combinations of tomatoes, mozzarella, anchovies, oil, and herbs. By the middle of the 20th century, many recipes relied on mixes for the dough and other convenience foods.

Here, we have gathered a selection of pizza recipes over the century. We’ve highlighted significant recipes in blue.

First recipe in French

1875

Neapolitan pizza in *Cuisine de tous les pays* (French)

The recipe calls for 600 grams of bread dough for the crust, topped with oil, fresh or salted anchovies, halved tomatoes, “mouzarella” (described as a soft sheep’s milk cheese), fresh chopped garlic, and parsley, then baked in a clean bread oven for 20 minutes.

First recipe in the US

1927

Recipe for pizza alla Paesana in *The Saturday Evening Post* (English)
The Cook’s Tour column, written by George Rector, recounts a tour of Northern Italy that includes pizza as “part of a typical Tuscan menu.” The method for making the pizza is described so closely it constitutes a recipe (and was included in a collection of recipes from Rector’s column the following year). A large flat disc of “unsweetened brioche dough” is shaped to an inch thick and topped with tomatoes, anchovies, mozzarella, and olive oil. This appears to be the first pizza recipe published in America.

1927

Recipe for pizza alla Napoletana in *Il Talismano della Felicità* (Italian)

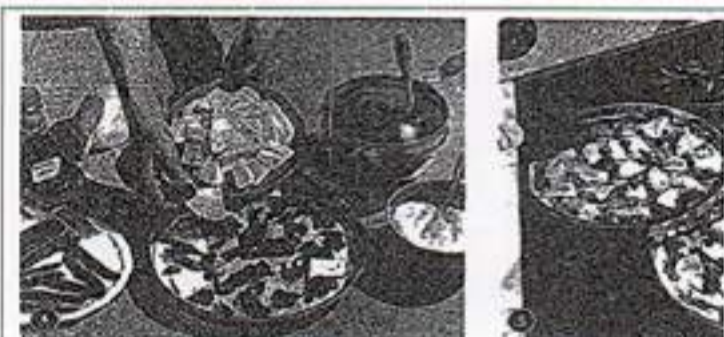
A recipe for Neapolitan pizza is included in Ada Boni’s famous cookbook for Italian housewives, published later in English as *The Talisman Italian Cook Book*. The recipe calls for bread dough topped with tomatoes, anchovies, mozzarella, olive oil, and oregano. Boni’s 1955 edition includes a recipe for the pizza dough that contains leaf lard.



1936

Recipe for Neapolitan pie in *Specialita Culinarie Italiane* (English)

This recipe for pizza alla Napoletana calls for raised dough, tomatoes, scamozza (possibly a misspelling of scamorza), olive oil, and Parmesan cheese. This is the second pizza recipe known to be published in an American cookbook.



Hot, Hearty Pizzas

1947

Easy pizza in the *New York Times* (English)
Three months after the first pizza recipe ran in the NYT, this recipe for “Easy Pizza” ran in July 1947. It appears to be the same recipe that appeared in the *San Francisco Chronicle* (see the 1947 entry above).

Pizza alla Napoletana NEAPOLITAN PIZZA (*Grand Hotel Villa d’Este, Cernobbio–Lombardy*)

1950s

Recipe for pizza alla Napoletana in *Italian Bouquet* (English)

This recipe for Neapolitan pizza served at the Villa d’Este in Northern Italy points to the spread of pizza within Italy. Dough is topped with fontina cheese, anchovies, oregano, and oil.

1954

Recipe for quick pizza in *Westinghouse Cookbook* (English)

This recipe uses a “hot-roll mix” for the crust, condensed cream of tomato soup, oil or shortening, cheddar, oregano, and crushed red pepper.

PIZZA DOUGH

6 cups flour
3/4 cup sweet butter
1 tablespoon of yeast

2 cups warm water
1 teaspoon salt

Mix yeast, butter, salt in warm water. Place flour on pastry board and add water mixture and work well until smooth.

Place dough in warm place for 1 hour and let rise.

Divide dough into 2 pieces. Roll out dough to 1/4 inch thickness. Stretch each piece into a greased deep round tray and let rise for 1/2 hour more. Cover dough with anchovies, tomato sauce, mozzarella cheese, sprinkle with a little oregano, a pinch of salt and place in a hot oven (350°) for 30 minutes. Serve hot.

19

1960

Pizza recipes in *Italian Cooking According to American Taste* (English)

The recipe for pizza dough includes a half stick of butter and a tablespoon of yeast. It rises for an hour before being rolled out and allowed to rise for another half hour. It’s then topped with anchovies, tomato sauce, mozzarella, and oregano.

First recipe in English

PIZZA.—This, a sort of cake, is Naples, and should be eaten directly prepared as follows:

Put a pound and a half of light well-floured board or table, flatten it the edge slightly, smear a little oil on tomatoes cut in halves, small fresh

1898

Recipe for pizza in the *Encyclopedia of Practical Cookery* (English)

This recipe for a "sort of cake [that] is a favourite dish in Naples" is the first pizza recipe published in a British cookbook. The recipe appears to be an updated version of the 1875 French recipe from *Cuisine de tous les pays* (see 1875 entry at left).

First recipe in Italian

618. Pizza alla napoletana.

Prendete una pasta lievitata da far pane, quanta ve ne abbisogna: impastatela con un poco d'olio e sale in proporzione, maneggiandola in tutti i versi per circa mezz'ora: poscia stendetela in una teglia, il fondo della quale sia stato prima unto con olio, pizzicatene colle dita la superficie, e fatela cuocere al forno.

1904

Recipes for pizza in *Il Re dei Cuochi* (Italian)

These appear to be the first Italian recipes for savory pizza, from a collection about "the art of eating Italian," published in Florence. There is a recipe for Neapolitan pizza, which is a leavened dough "kneaded in every direction" and topped with oil, then baked, as well as two topped variations, one with anchovies and oil, and one with Swiss cheese and oil.

1911

Recipe for pizza alla Napoletana in *L'arte Cucinaria in Italia* (Italian)

The second recipe we found in Italian calls for leavened bread dough, mixed with oil and salt, to be shaped, then placed in a copper pan coated with oil, then topped with anchovies, mozzarella, and tomatoes, plus more "for garnish and decoration."

1927

Recipe for pizza alla Napoletana in *Il Vero Re dei Cucinieri* (Italian)

This recipe calls for bread dough topped with oil, tomatoes, grated cheese, and lard.

557. Pizza alla napoletana

215.—Pizza Napoletana.

Take some leavened dough, knead it well with little oil and salt, adding at intervals a little grated Swiss cheese rather fresh. Spread the

1944

Pizza Napoletana in *Maigre Cookery* (English)

This recipe calls for leavened dough with oil, salt, and grated Swiss cheese mixed into the dough and topped with more cheese and baked.

1945

Pizza pie recipe in *Gourmet* magazine (English)

This recipe, provided at a reader's request, calls for pastry or biscuit dough placed in individual buttered pie plates and parbaked. They are then filled with a mixture of chopped tomatoes, anchovies, Italian salami, green olives, grated onions, garlic, parsley, grated Swiss or "Italian" cheese, and cayenne and baked again.

1947

Pizza recipe in the *New York Times* (English)

Pizza had existed in New York City for well over 60 years (see page 29), but this recipe, which appeared in May of 1947, is the first time pizza is the focus of an article. The detailed recipe includes separate instructions for making dough (which inexplicably calls for dissolving shortening and sugar into boiling water) and is topped with grated Parmesan-type cheese, tomato, mozzarella, chopped anchovies, and oregano.

1947

Pizza recipe in the *San Francisco Chronicle* (English)

This heavily Americanized recipe for pizza calls for a biscuit-mix crust topped with ham or luncheon meat, sliced cheese, and "chili sauce or catsup." It's cooked in a skillet on the stove top.



1961

Pizza recipes in *Il Carnacina* (Italian)

This large Italian cookbook includes several recipes for pizza alla Napoletana: a marinara, a variation with anchovies, and a commercial (described as the "Neapolitan pizza served in all pizzerias"), which includes tomato sauce, mozzarella, chopped anchovies, and oil.



1977

Pizza recipes in *Piatto Unico all'Italiana* (Italian)

There are numerous pizza recipes in this volume, though some more closely resemble quiches. They feature doughs made from flour, water (in undisclosed amounts), yeast, lard, salt, and sometimes oil. While several of the pizzas are sauced and topped in the typical way, others feature prepared fillings that are mixed and sometimes cooked ahead of being added to the dough.

Pizza alla Romana
Pizza by the Meter

The invariable image of pizza to an American is of a thick- or thin-crust round of dough that is covered with topping, cut into wedges, and eaten out of hand. Italians, who go to bakeries to buy pizza by the meter, know another way. This extraordinary recipe comes from Gianfranco Anelli in Rome. He allows the soft, supple dough a very long rest—up to seven and a half hours, the longer the better—and then places it on a baker's peel two and a half feet long, and rhythmically pounds it with such vigor that it literally dances beneath his fingers. He paints the dough with oil and then sets the peel in the oven where the totally unforeseen occurs: the baker slowly, slowly withdraws the peel, stretching the remarkably elastic dough to a thin, incredibly light dough of an astonishing six-foot length.



1985

Pizza recipes in *The Italian Baker* (English)

Carole Field's recipe for pizza alla Romana is adapted from a recipe from a Roman pizzaiolo. It includes variations for pizza bianca, pizza rossa, and pizza pugliese with eggplant, provolone cheese, anchovies, basil, tomatoes, and olives.



1997

AVPN Handbook

In 1997 the Associazione Verace Pizza Napoletana (AVPN) published their recipes to maintain and protect the standards of "true" Neapolitan pizza (see page 74).

INDUSTRIAL AMERICA AND NEW HAVEN

New Haven, Connecticut, is a city of about 130,000 that's home to Yale University. The Elm City also boasts some of the most-talked-about old pizzerias in America, with roots dating back to the early 1900s. (For our take on the pizza itself, see page 113.)

New Haven's pizza history was predicated on large influxes of Italian immigrants, just like it was elsewhere in America. But the size and insularity of this city, coupled with some targeted overseas recruiting by the city's industrial titans, have given this pizza a specific identity, one we believe has close ties to the original pizza back in Naples.

Thinking about this more deeply, we realized how cheap power—or, more precisely, swiftly moving rivers—was a driver for a lot of this. In the 19th century, the Industrial Revolution in the United States was centered in New England. Here, factories took advantage of fast-flowing streams and rivers to power water wheels, which in turn powered the factories. As a result, Connecticut became an industrial center—a Silicon Valley of its era, if you will, and the birthplace of many important inventions and patents. Eli Whitney, for example, designed and built a manufacturing system here that relied on templates, so each worker could turn out identical pieces. This allowed for interchangeable parts, which revolutionized almost every industry in the United States. The concept became known as the American system of manufacture, and it was born here.

New Haven's location helped get those factory-made pieces out in the world. Sitting alongside Long

Island Sound and within easy travel distance of Boston and New York, it became a prime shipping center. By 1848, a rail line connected the city to New York and an industrial area grew up around the New Haven depot. By 1900, there were more than 2,500 manufacturing establishments county wide.

Industrial leaders looking to capitalize on all of this were constantly on the search for cheap labor, and when they couldn't hire enough Yankees, they turned to immigrants. In the early and mid-1800s, mostly Germans and Irish were immigrating. Starting around 1870, the Italians began arriving, eventually creating a major pipeline. At the New Haven Clock Company, Italians became the largest ethnic group, comprising about half of the factory's foreign-born workers. Strouse, Adler Company Corset Factory employed many Italians among its 1,500 workers. The hardware manufacturer Sargent & Co. had agents in Southern Italy recruiting workers, and also got an extra boost from the owner's Italian wife, all of which helped bring boatloads of Italians to New Haven's doors (see next page).

According to Colin Caplan, a New Haven pizza historian, "these Yankee heads of factories had no idea they were literally importing pizza to New Haven."

The Italian workers moved into neighborhoods near the factories, focusing on Wooster Square, which is now also referred to as Little Italy. Prejudice was rampant, but, as the *New Haven Register* reported in 1883, it turned out to be a boon for building

Pizza makers originally wrapped takeout slices in brown paper, but they soon realized they needed a better solution. Fortunato Cocco, one of New Haven's earliest pizzaioli, sought help from Strouse, Adler Company, since they were known for making custom boxes for ladies' underwear, but customers ended up complaining that the pizza tasted like cardboard. Frank Pepe took a stab at the problem by trying another local manufacturer, National Folding Box Co. And it worked—by the 1940s, pizza boxes had become the norm.



New Haven became home to a large population of immigrants from Southern Italy, drawn to the area by factory jobs, around the turn of the 20th century.

owners, who could stuff more than 25 Italians to a house. “Many tenement houses, which were before comparatively valueless, have yielded their owners handsome incomes from Italian tenants,” the article said. “While the amount each individual pays is small, the total for a few rooms makes a profitable class of occupants.”

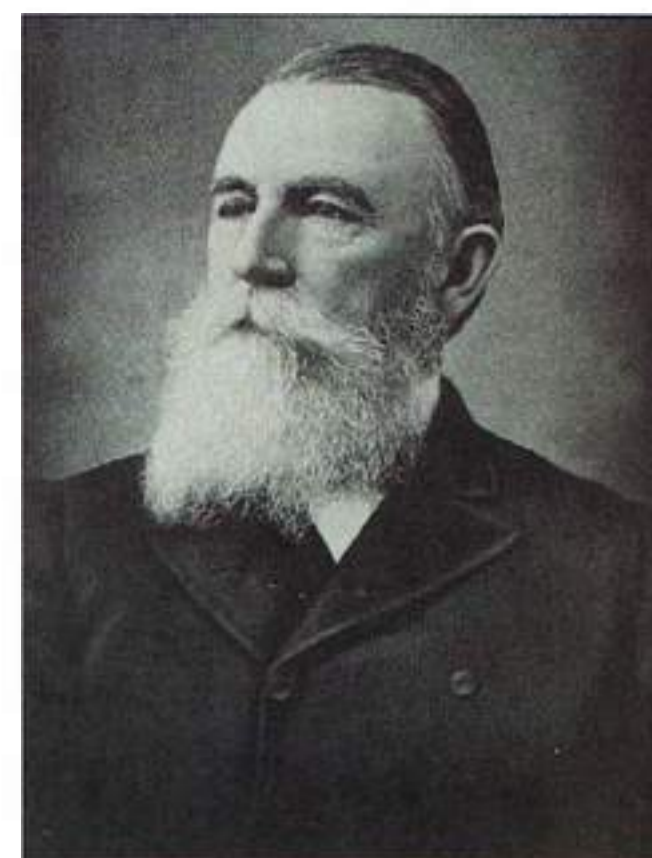
As the Italians moved in, other residents weren’t happy. By 1890, the change in the neighborhood had prompted the middle class to leave. The only people left were Italians. By this time, they had opened a night school for Italian adults. Social and benefit societies began springing up. A census count in 1910 showed Italians comprised one-third of the city’s foreign-born, who in turn were about one-third of the city’s population. Italians would eventually reach about 9% of New Haven’s total

population. Even today, Connecticut has the second-highest percentage of people claiming Italian heritage in the country.

These Italians weren’t all strangers to one another. As is often the case with immigrants, as one family member got a factory job, he would send word back home telling others about opportunities. In addition, recruiters, like those who worked with Sargent & Co., targeted certain villages, especially along the Amalfi Coast, where times were particularly tough.

The end result was an insular culture that transplanted Southern Italy to a small bit of real estate in a midsize city.

Not surprisingly, as pizza made its appearance here, it thrived.



Joseph B. Sargent recruited Italian workers from impoverished villages in Southern Italy to work in his New Haven factory.

SARGENT’S ITALIAN CONNECTION

Joseph B. Sargent was a nationally known denizen of the Elm City in the late 19th and early 20th centuries whose position as a factory owner, plus his special connection with Italy, would give him an outsize role in shaping the city’s character. Sargent, known as J. B., was a founder of Sargent & Co., a hardware manufacturing company that opened a New Haven factory in 1864. Sargent was a powerful figure outside the factory, too. Over the years he would become mayor of New Haven and the Democratic nominee for governor.

His 16-acre factory was one of the largest hardware manufacturers in the country and was in regular need of workers. Like many factory owners at the time, Sargent began hiring foreigners. In this effort, he had a secret weapon: his wife. Florence Winchester von Karajan, born to an American mother in Italy, was 12 years old when she first set foot in the United States in 1855, speaking fluent Italian and no English. Soon, she would be fluent in both.

In 1878 she married Sargent, a much older man. At that time, Italy was in turmoil and its citizens were desperate for work. With his Italian-speaking wife, Sargent recognized a mutual opportunity: by recruiting poor Italians, he’d get cheap labor and they’d get a new life.

According to Colin Caplan, “she encouraged her husband to hire Italians.”

He sent recruiters overseas, targeting villages and cities mainly along the Amalfi Coast, not far from Naples, where jobs were scarce. At that time, Italian immigrants were at the bottom of the US employment hierarchy, and pay scales for Italians in some places were below both “white” and “colored” workers. Still, many Italians jumped at Sargent’s offer.

Florence’s obituary, printed in a local Italian-language paper in 1938, noted she “always maintained a particular affection for our homeland . . . demonstrated with deeds in favor of our emigrants, who, following her exhortation, were admitted by her husband to the industrial plant.” Thanks to her, “the Italian element” was predominant in the factory, it said.

Interestingly, Sargent would publicly deny he was recruiting Italians or that he was driving down wages. In 1888, for example, after he was accused of exactly that, he denied it vehemently.

“I have never imported a laborer or mechanic of any nationality,” he was quoted saying, adding, if the accusers “don’t correct their misrepresentations, I will make them suffer.”

Despite his moneymaking motivations, there is no question that the jobs at Sargent’s factory, helped along by Italian fluency, enticed more Italians to this city. Its Italian character is still evident today, both inside and outside its pizzerias.



The Sargent hardware factory, largely manned by an Italian immigrant workforce, influenced the culture of the city for generations to come.

By 1932, pizza was on the lunch menu at many New Haven-area schools.

According to records pieced together by Colin Caplan, several of the backyard bakers we've identified also all occupied the same bakery—located at 14 Donnelly Place—at different points from 1896 to 1934. We don't know exactly when pizza was first made at this address, but the bakers who were later associated with pizzerias included Angelo Gentile, Ignazio Camposano, and Dominico Zuppari.

BACKYARD BAKERIES

Factories weren't the only employers. While thousands of workers churned out clocks and corsets six days a week, other Italian immigrants started businesses to serve them. They peddled goods on the street; they opened grocery stores and bakeries, often specializing in the foods from home. Census records show that in 1910, a large number of immigrants were in the retail business, including at least 218 people identified as bakers. By 1920, census records show there were about 35,000 Italians living in New Haven.

For some, the means to a livelihood was just out their back door. Bakers built backyard ovens and started making Italian-style bread to sell to their countrymen. As a sideline, many made pizza—or rather, apizza, a term peculiar to this region. Pronounced “uh-BEETz,” like it was in the old country, it's a living reminder of exactly who settled this area (see next page).

There aren't any records showing who sold New Haven's first pizza from one of these backyard ovens. But in looking at the connections between known bakeries and pizzerias, Colin Caplan identified several possible candidates. Records show Angelo Gentile, an immigrant from Caserta, Italy, outside of Naples, ran a bakery behind his home in 1896. In 1931, his son opened Pizzeria Gentile, suggesting the Gentile family was likely making pizza out of the bakery oven before that. Francesco Scelzo had his bakery running in 1916, and his grandchildren say his main product was pizza. Ignazio Camposano,

another immigrant from outside of Naples, ran a home-based bakery that also was documented as far back as 1916. He delivered by horse and wagon to the city's Italian produce market, and it's likely pizza was among the offerings. In 1924 he opened a storefront called Camposano's Apizza, which everyone knew as just “Camp's.” The family had the pizzeria for years. In 1944 they advertised themselves as the “Oldest Apizza Maker in New Haven.” (Later ads said it was “one of the oldest.”)

Today, if you ask a New Haven resident who opened the city's first pizzeria, they're likely to say Francesco “Frank” Pepe. While we know he wasn't the first, the business, still thriving, is certainly the longest lasting. Pepe and his wife, Filomena, both came from the village of Maiori, near Salerno in the region of Campania. Frank tried working in the factories, then in a big bakery, but the jobs didn't suit him. In 1925 the Pepes decided to go it alone, renting a single-story bakery with a brick oven fueled by a coal by-product called coke. Pepe started off hawking bread by horse and wagon, but later added small pizzas to his offerings. In 1930, he recognized pizza was the main draw and the building was renovated to house a sit-down restaurant. When they outgrew that, in 1936 they bought two nearby buildings, renovated them, and opened a 136-seat pizzeria, which still stands today. (For more on Frank Pepe's, see page 231.) It's a tremendous success story and today Pepe's is credited with expanding pizza's appeal beyond Italian immigrants and into the New Haven mainstream.



Camposano's Apizza, or Camp's as it was known, opened in 1924 and billed itself as the oldest pizzeria in New Haven. This image from 1935 is one of the earliest photographs of pizza we came across.



Frank Pepe's is arguably the most famous New Haven pizzeria and is also one of the oldest. Pepe's began as a bakery in 1925, selling pizzas along with breads.

PROHIBITION ENDS, PIZZA DOMINATES

At the end of Prohibition, pizzerias began popping up all over New Haven, helped along by the availability of booze, as well as a law allowing them to stay open until 3 a.m. Several of the iconic New Haven pizzerias still open today (see page 228) had their roots in this period. Sally's Apizza opened in 1938. Its founder, Salvatore Consiglio, had learned the trade working at his uncle Frank Pepe's pizzeria. Modern Apizza dates to 1934. Zuppardi's Apizza got its start as a bakery in 1934, becoming a full-fledged pizzeria in 1947.

By this point, pizza had clearly been established outside of the Italian community. There were ads in local papers and telephone directories that didn't cater just to Italian speakers; they were part of the Yankee established media. Pizzerias were placing ads in student publications to entice Yale Elis.

By 1940, there were at least 30 pizzerias in New Haven, then with a population of 160,000.

After World War II, the circle only grew wider. As one pizzeria owner told the *New Haven Register* in 1950, "I estimate my trade is three-quarters everyone and one-quarter Italian." By this point, there was enough interest at Yale to offer delivery to campus, too.



Pepperoni is visible on the menu at The Spot in this image (left) taken around 1950. It's unknown exactly when pepperoni became a popular pizza topping.

Modern Apizza (right) opened in 1934. It was one of many pizzerias that sprung up in New Haven following Prohibition.

DECODING NEW HAVEN PIZZA

You don't need to take a bite of New Haven-style pizza—or even see one—to know it's different. The name alone makes it distinct. In New Haven, pizza is pronounced "uh-BEETz." There are several slightly different theories as to why this is, but they essentially come down to immigration patterns and linguistics. In the late 19th and early 20th centuries, most of the immigrants from Italy came from its southern regions, where Naples is located. This group was culturally distinct from other Italians.

In New Haven, the Italian community was even more insular in the early to mid-20th century than elsewhere in the country. Thousands of Italians from small villages were clustered in just a few neighborhoods, making for a homogenous population that continued speaking the mother tongue. Remnants of that linger even today.

In Neapolitan (and other southern dialects), the *l* is often dropped from the article: "la pizza" becomes "a pizza." The dialect also gives some consonants additional weight, changing them from "unvoiced" consonants to "voiced" ones. If you say the letter *p* while focusing on your lips, not your larynx, you get an "unvoiced" consonant. If you use your larynx, it turns into a *b* sound. Thus, pizza becomes "a-BEETz." In addition, *o*'s are pronounced more like "ooh's."

You'll find other remnants of this language elsewhere in the Northeast, mostly in conjunction with foods, though the rules can vary slightly. For example, the Neapolitan dialect explains why, on *The Sopranos*, capicola was "gabbagool." It's how ricotta becomes

"ah-ree-GOT" and prosciutto is "bruh-ZHOOT." It's also why "mozzarella" is sometimes pronounced "mutza-DELL" or even just "mutz," like in New Haven. Scamorza, the aged mozzarella-like cheese, is often pronounced "ska-MOOTZ".

The funny thing is, even those Italian Americans who use these terms most likely don't speak the Italian language, and certainly don't speak a regional dialect that has all but died out in Italy. It's essentially an Italian American version of Italian.



Chili peppers, which provide the spicy kick in many Italian sausages, as well as in American pepperoni, aren't native to Italy. They're originally from Mexico. They came into use in Italy in the 16th century, after the Spanish conquest.

In New Haven, there was, and is, a particular style of pizza. It starts with the name, *apizza* (see page 51). But there's more. The dough is very low in salt, and whereas mozzarella was long a staple in New York, it's not standard in New Haven. Without refrigeration, fresh mozzarella has a short shelf life, and unlike in New York, there weren't many cheese makers in New Haven in the early 20th century. As a result of all this, mozzarella wasn't common on pizzas until the 1930s. Instead, a "plain" pizza had (and has) only a dusting of hard grated pecorino cheese, along with a scattering of plain crushed tomatoes and olive oil. Anchovies were among the earliest toppings available. Pizza lovers here take it as a point of pride that the pizza hasn't changed in 100 years. We believe them.

We did, however, find one thing that's changed: the oven fuel. There's a mystique today around the "tradition" of coal-fired pizza ovens, and some of

the best-known pizzerias in New Haven today use anthracite coal. It turns out that in the early days, New Haven pizza ovens were fueled by coke, not coal. Coke is a type of fuel that's made by heating coal in the absence of air until it carbonizes (much like the way charcoal is actually carbonized wood). Coke burns cleaner than coal, and there was a local supplier, Connecticut Coke. When that went out of business in 1968, pizzerias switched to coal. Sally's and Pepe's still use coal today.

Other than the different oven fuel, we think New Haven pizza may be one of the closest things we have to the original pizza of Naples (see page 39). New Haven pizzaioli don't toss the dough like many New York pizzaioli; instead, they pat it out like in Naples. Even the predilection for anchovies (called *alici* but pronounced "a-LEEJh" here) reminds us of *cicinielli*, the small larval fish that topped some pizzas back in Naples.

PEPPERONI: THE SAUSAGE YOU WON'T FIND IN ITALY

Pepperoni is the most popular pizza topping in America. The cured, air-dried sausage with the slightly smoky flavor is so connected with pizza that even the pizza emoji features its distinctive red circles. The "oni" at the end makes it sound Italian, and you'll often find it listed under "Italian" sausages, but there's nothing traditional about it. In Italy, you won't find it on pizza menus. In fact, in the Italian language, "pepperoni" (also spelled "peperoni") is a pepper, not a sausage.

To be sure, there are Italian sausages that have some similarities to American pepperoni. *Soppressata Calabrese*, for example, is a soft pork sausage with a red color, though the meat is coarsely ground and comes out quite different than pepperoni used for pizza. Naples has *salsiccia Napoli piccante*, another spicy, smoked sausage that's not pepperoni. These spicy sausages are found on pizza in Italy, but they are not very popular (possibly because they are not that good as a pizza topping). If anything, it's a response to American pepperoni, not the root cause of it.

So how did this American sausage become so closely associated with pizza, a food born in Italy? Even though its history doesn't go back very far, it's not crystal clear.

The earliest mentions of "pepperoni," or, for that matter, "peperoni," we could find referred to the vegetable, not the sausage. An 1855 edition of the journal of London's Royal Horticultural Society, for example, calls it a hot pepper. The *Pall Mall Gazette* of London in 1878, and then the *Times of London* in 1888, both mention Neapolitan chilis called "peperoni."

By the early 20th century, the word began to take on a new meaning—at least in the United States. In 1908, it's listed in a magazine article on sausages along with a number of other varieties from all over the world, including Thuringer, landjaeger, and mortadella. Hormel was making pepperoni in 1915. By 1917, it had become popular enough that the US Department of Agriculture published guidelines for curing. (It should be held in a drying room for 20 days, although 15 days was allowed under certain circumstances.) And by 1920, Armour & Company was selling pepperoni, pioneering a large-scale automated production process. Nonetheless, Italian grocers were still advertising jarred or tinned peppers called pepperoni during this same time period.

So, when did pepperoni and pizza first meet? We know that by the late 1940s and early 1950s, the connection was well established: both grocery stores and pizzerias across the country were advertising pepperoni pizza.

For more on pepperoni, see page 2:378.

The earliest mentions we found of pepperoni are from the early 20th century, but we didn't find proof of it on pizza until 1948.

1908

The Gateway

Pepperoni listed among sausages from around the world

1909

Denver Post

Recipe for pepperoni, referring to peppers, not sausage

1911

Sacramento Bee

Ad for pepperoni sausage, listed among the imported sausages; after this point ads for pepperoni all refer to the sausage, not the pepper

1913

Osage Free Press

Mention of mortadella pepperoni as part of an Easter luncheon

1920

USDA guidelines

The USDA published guidelines for curing pepperoni

1920

Fitchburg Sentinel

Ad for Armour's Caserta Pepperoni

1948

Shamokin News

Ad for La Pizza with pepperoni: the earliest we found linking the sausage to pizza



Pepperoni sausage production at Hormel Foods plant in Austin, Minnesota, circa 1930s.

PIZZA MARCHES ACROSS THE UNITED STATES

It took the first few decades of the 20th century for pizza to gain a small toehold in the American marketplace. By the 1920s, many of the large coastal cities had pizza. We found additional examples outside of those bustling population centers. In 1927, for example, Barbiero's was serving pizza in Chester, Pennsylvania, a small city along the Delaware River not far from Philadelphia. A year later, a pizzeria was advertising in Asbury Park, New Jersey, a beach town 50 miles from New York City. And so on. But these were largely communities where Italian immigrants had settled, and given what we've learned so far, the businesses likely catered to mostly Italian customers.

Then in 1927, the high-circulation, American-as-apple-pie *Saturday Evening Post* published a recipe for pizza. It called for unsweetened "brioche" dough, sliced tomatoes, anchovies, and an unspecified "cheese similar to mozzarella." It's not exactly what they were serving in Naples, but it's close.

Not long after that, momentum began to build. By the 1930s, larger numbers of non-Italians had begun venturing into these foreign-food places. Italian food wasn't exactly mainstream yet, but it was

cheap and filling and maybe not as weird as some had apparently thought. Many Italian restaurants were flouting Prohibition and serving alcohol, which added to the appeal (see page 61).

Mainstream commentators were shifting, too. While some of the earlier articles about pizza focused on Italians as "other" and pizza as an object of curiosity at best, 1930s writers were starting to introduce Americans to pizza in new ways. Rather than being a strange food eaten by even stranger people, pizza started to look more like a new trend that, while foreign in origin, wasn't nearly as exotic as it seemed. In fact, it was downright appealing. Touting a new restaurant in Harlem in 1932, a column in the *New York Age* called pizza "an Italian pie-like dish, the main elements being cheese and tomatoes and furnishing a filling and enjoyable meal," adding, "we have tried it." (Some earlier articles were conspicuously absent of the reviewer having actually tried the pizza.) The restaurant's owner, by the way, was an Irishman.

The Chicago Tribune wrote a nice story about a pizzeria in 1939, 15 years after it opened. "Try it with a salad," the columnist suggested. A 1930s



This 1925 article from the *New York Herald Tribune* tells readers to "eat pizzaiolo and know your Little Italy."



Pizza was common in large East Coast cities by the 1920s and would continue to spread throughout the country in the decades to follow.



This image from the filming of a 1949 television show shows soldiers on a New York street, right in front of a pizzeria. Many servicemen returned from overseas through New York, giving them a chance to try pizza.

Hartford Courant columnist even made comparisons among pizzaioli: “The pizza cook cannot be any Italian. He must be a Neapolitan, for only in Naples does it reach its perfection.”

These sorts of positive introductions were not an insignificant development for the pizzerias or for the patrons. At this time, Italians were still being viewed with suspicion. But slowly, Italian dishes were moving into the mainstream. The US idea of Italian food was more like a mishmash of food from different regions, whereas the cuisine that actually existed in Italy was hyperlocalized (see page 19). But it was the start of a kind of Italian identity centered on food. As Americans became more familiar with Italian (or Italian-esque) food, they wanted to make it at home, including pizza. More recipes began appearing in publications aimed at mainstream audiences. A 1936 Italian-food cookbook published a recipe for pizza. A few years later, several newspapers around the country printed a recipe from an Italian restaurant in Louisiana. It was baked in a pie plate, but it was a decent approximation.

In 1939, the *New York Herald Tribune* chimed in. “If someone suggests a ‘pizza pie’ after the theater, don’t think it is going to be a wedge of apple,” columnist Clementine Paddleford wrote. “It is going to be the surprise of your life.” She included the obligatory pronunciation tip: “peet-za,” and provided some general guidelines for home cooks, suggesting they serve it to guests.

Moving into the 1940s, the number of both pizzerias and newspaper mentions was picking up and according to tax records, the number of pizzerias in New York was in the hundreds. In 1944, the *New York Times* published its first article on a pizzeria, one on West 48th Street. that made “authentic pizza,” serving it to dine-in customers or to-go in “special boxes for that purpose.” Columnist Jane Holt still felt obliged to describe what, exactly, pizza was—“a pie made from yeast dough and filled with any number of different centers”—because the dish still would have been unfamiliar to many readers. It’s striking to see the sharp rise in articles and recipes about pizza when you consider that the country was

THE MYTH OF THE PIZZA-PROSELYTIZING GIs

Given what else was going on in the world during the mid-20th century, pizza’s growing popularity is surprising. In December 1941, Italy had declared war on the United States and was now a sworn enemy, a point underscored when President Franklin Delano Roosevelt detained Italian Americans living here. (They were released after a few months, unlike the Japanese Americans who were detained for years.) As war raged on Italian soil, hundreds of thousands of Allied troops were sent overseas to participate in the Italian campaign, which lasted two years.

Simultaneously, pizza was becoming more popular. So how did that happen? The story goes that when the American GIs were sent to Italy, they had their first taste of pizza. When they returned home, they had a hankering for the foods they tried overseas, and pizzerias began popping up all across the United States to meet the demand.

It’s an oft-repeated story, but it’s wrong in many important ways. Sure, there were some American GIs involved in pizza’s success, but during the war they were mostly eating good ole American food in the mess halls. Military rations included samples of Italian food, such as Hector Boiardi’s spaghetti. But only a few Americans got to taste pizza during the Italian campaign. It was a war, after all. After the war, Naples was decimated. When the Germans ruled over Campania, they slaughtered much of the water buffalo for meat, disrupting cheese production. A 1945 report in the military magazine *Yank* stated that the Neapolitans couldn’t get pizza with real mozzarella. Other reports describe a city disseminated, without reliable food sources and potable water. Americans were able to roam Naples’s fabled cobbled streets, but they reported that they couldn’t find pizza anywhere. Many GIs did travel through New York when returning from overseas, and it was more likely that any exposure to pizza occurred there.

Lieutenant Abraham W. Brussell, for example, wrote in a Chicago publication in 1944 that he had “searched high and low

for a Pizza in Italy with no success. . . . For Italian food, my experience has taught me that at present the best may be obtained in good Italian restaurants in Chicago.” It strikes us as more likely that military personnel who were pizza neophytes got wind of this trendy new dish not in Italy but when they arrived back home. Hundreds of thousands of troops came through the New York Port of Embarkation before and after the war. With a fair number of pizzerias in Manhattan by this point, we can imagine soldiers checking out this popular food that was both cheap and filling.

In our view, though, the explosion in popularity had less to do with the war in Europe and more to do with cultural and technological change and economic pressures, as well as marketing savvy and creativity.



Servicemen eating spaghetti and pizza in Manhattan in 1942

at war with Italy at the time. Italian food was popular enough that it didn't stop the *New York Times* and other publications from encouraging people to both eat it and make it at home.

Pizzerias were opening in areas not known for large Italian populations and even in small towns. They hit the Midwest and the South. There were pizzerias in Shamokin, Pennsylvania; Miami, Florida; Calumet City, Illinois; and Kalamazoo, Michigan. Seattle had something of a pizza factory by 1948, where the assembly line consisted of a few people sitting at a table applying sauce and cheese. Just a few years earlier, an Italian restaurant there had tried selling pizza but had to give it away to attract customers because no one knew what it was.

Recipes started appearing even more frequently in the 1940s, too, though they could be hit and miss. For example, a 1941 article on an Italian restaurant in Monroe, Louisiana (pop. 28,300), included a pizza recipe that wouldn't be too out of place today. But looking through other recipes, we noticed mainstream writers were trying to make this dish more familiar to Americans by including ingredients like Swiss cheese, American cheese, salami, ketchup, or biscuit mix.

The *New York Times* bounced back and forth between Americanized recipes and ones closer to the Italian norm. Its first pizza-like recipe—a one-dish meal “somewhat reminiscent of the Italian pizza”—called for a dough of self-rising cake flour with sliced raw tomato and onion rounds layered on top, along with cold cuts (specifically liverwurst). To be sure, it was 1945, and it was wartime so meat was in short supply. Still, we suspect even the lazzaroni of Naples (see page 18) would have been horrified. But in

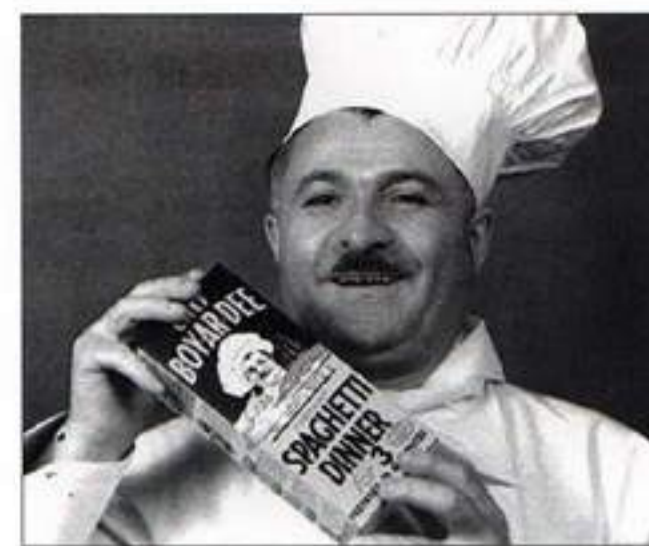
1947, the *Times* published another version of a pizza recipe that was much more reasonable, with canned tomatoes, Parmesan, mozzarella, and anchovies. “Pizza could be as popular a snack as the hamburger if Americans only knew more about it,” writer Jane Nickerson declared.

Putting all of these examples together, it's clear pizza was becoming more American. Sure, some people didn't know about it, even in the 1940s. But by 1950 it was served at ballparks and in department stores. It was being mass-produced in factories large and small.

By the 1950s, Americans and pizza had become inextricably intertwined. In September of that year, many US newspapers, including dailies in far-flung Utah, Florida, and Montana, ran a syndicated column of news tidbits that included this: “Beginning of the end department: Film Daily reports that pizza (Italian tomato pie) is being hawked at movie drive-ins.”

We love this little blurb because, in just one sentence, it reveals so much. Pizza was a) becoming so mainstream that it was served not just in Italian pizzerias but also at all-American drive-ins; b) still unknown to enough people that the columnist felt the need to explain what it was; and c) not seen as a positive development by everyone. In the course of just a couple decades, it had gone from being strange to trendy to ubiquitous. The headline of another newspaper column a year later read: “Insidious Pizza.”

Pizza was approaching a cultural tipping point, and it was propelled, in part, by advances in food technology.



Many of us know Chef Boyardee as the smiling face on cans of ravioli, but he was an actual chef who helped introduce Italian cuisine to millions of Americans. Hector Boiardi was a cook in both his native Italy and in the United States, where he immigrated as a teenager. After coming to the United States, he worked in kitchens, including at hotels in New York and West Virginia, where he helped cater President Woodrow Wilson's second wedding. Later, he took a position at a hotel in Cleveland, Ohio, where he became locally known for his spaghetti dinners—a meal that was new to many American palates at that time. He went on to open his own restaurant in 1924 and eventually began canning his pastas. However, hard-to-pronounce Italian names were not popular, so Boiardi changed the name on the label to Chef Boy-ar-dee, included his picture in a chef's hat, and sales took off. By the late 1930s, it had become a national brand.



Pizza had reached the cultural tipping point by the 1950s. It was deeply ingrained in American culture and eating habits.

PIZZA MARCHES ACROSS THE US 1920-1960

By the 1920s, pizza was well established in the coastal cities of the US. Newspaper articles, advertisements, and recipes provide clues to its spread to smaller cities and towns and give evidence to its adoption by the American palate. Pizzerias were opening all over and ingredients for pizza—particularly mozzarella and pepperoni—were becoming widely known. By the late '40s, pizza was in the culinary mainstream, and the pizza industry was big business by the end of the 1950s. We've highlighted key firsts in blue.

OVER \$1,000 MONTHLY
Now being earned by our owner operators of mobile restaurants and ice cream shops; over 1000 Pizza Pie Mobile Units offered by world's largest independent manufacturers. Cash investment \$4,000. Balance can be financed. Write for details. Box T-3 Nantucket Daily News.

1930
The Jersey Journal
A shooting between a known gambler and his friend takes place outside Pizzeria Napoletana, where they had been eating dinner.

1926
Delaware County Daily Times
Ad for a pizza truck for \$4,000 (over \$57,000 in today's money)

1939
The Daily Journal in Vineland, New Jersey
An article about whether a pizzeria qualifies as a tavern or a restaurant given that local ordinances prohibit women from working in taverns; the article includes the state liquor commissioner's description of pizza as "dough pies, embroidered with tomatoes, anchovies, or mozzarella . . . and embellished with peppers and garlic"



1941
Le Parola in Los Angeles
Ad for Casa d'Amore pizzeria in the Italian-language newspaper in Los Angeles

1943
San Francisco Examiner
The pizzeria Lupo's (see page 37) is mentioned in the society column Around Town

1946
The Spokesman Review in Spokane, Washington
A wounded soldier's dying wish was to eat pizza; two types of pizza (with the sauce on the side) were air expressed from New York to an army hospital in Denver.

1941
Monroe News Star in Monroe, Louisiana
Recipe for Neapolitan pizza with tomatoes, mozzarella, and Parmesan; this same recipe appeared in a number of newspapers at the time

1943
Brooklyn Daily Eagle
An article about purveyors of cheese includes mozzarella, "the very stringy cheese one meets on Italian main-dish pies"

1944
Star Tribune in Minneapolis, Minnesota
Mozzarella described as "a wonderful cream cheese made from the milk of water buffaloes," made at an idyllic farmhouse



1948
Country Gentleman magazine
A recipe for making campfire pizza, cooked in a skillet over a campfire and described as "another old stand-by for picnics"

1948
The Middleton Bulletin
Ad for Verdolini's "the place 'A Pizza' was made famous" specifically calls out taking orders by telephone.



1948
Los Angeles Times
Ad for frozen pizza distributors, pointing to the spread of frozen pizza

1949
Il Progresso
Ad for Mastro pizza ovens (see page 59) in the Italian-language newspaper

1949
La Tribuna Italia d'America
Ad for La Detroit Colonial Bakery selling "Panini e Pizze," or sandwiches and pizza, in Detroit



1953
Sunday Herald in New Haven, Connecticut
Article on the apizza parlors of New Haven calling Frank Pepe's "the granddaddy"

1953
Collier's magazine
Food writer Herbert Mitgang wrote an expansive article on pizza and Frank Mastro, complete with recipes, including one for "Italian Pizza, New York Style" made with English muffins.

1955
Yale Daily
Apizza is hailed as New Haven's greatest industry in the Yale student newspaper.

1953
The Tatler
President Eisenhower is quoted as saying "he had eaten a better Pizza Napoletana in New York than in the Neapolitan capital," a statement that "lowered his reputation in Naples."

1953
Dean Martin's song "That's Amore," with the famed lyric "when the moon hits your eye like a big pizza pie, that's amore," hits #2 on the Billboard charts.

1956
Boston American
Recipe for pork sausage pizza, calling it the "life of the party"

1954
Shakey's Pizza opens in Sacramento, California; within three years Shakey's expands its franchise model to open pizzerias all over the country.

1956
Omaha World Herald
Article about an American in Naples asserting that pizza was an American invention; "the American literally was forced to eat his words, in the shape of a Pizza alla Marinara. He prudently fled to Rome."

PASTRIES OF TUSCANY

On Telegraph Hill you may buy the sweet breads of Naples and the pastries of Tuscany. For 10 cents you can have a large flat square of fugaccia—a rich greasy cake filled with raisins—or the Neapolitan pizze, which is the peculiar combi-

1932

The San Francisco Chronicle

An article about Telegraph Hill, San Francisco's Italian neighborhood, describes pizza, one of the "pastries of Tuscany," as a peculiar combination of pastry garnished with anchovies."

1934

The Record from Hackensack, New Jersey
Ad for Roma Gardens boasting free pizza on Saturday night (see page 106); early ad for tavern-style pizza

1936

New Orleans Item

Mention of "pizzeria alla Napolitana," an Italian pie with cheese and tomatoes, which a musician in the Metropolitan Opera "has a weakness for"

FREE PIZZA

SATURDAY AND SUNDAY
From 7 P. M. at
A. ROCCO TAVERN
191 Ferrill Road Farwood

1936

The Courier News in Bridgewater, New Jersey
Ad for free pizza on Saturday and Sunday nights at the A.

Rocco Tavern: just one of many ads we found for free pizza in bars and taverns in the 1930s

1938

Salt Lake Tribune

An article about Colucci's on West 37th Street, an Italian restaurant that serves "home-cooked" food including pizza

Amedeo Fiore's

NOW OPEN

ORIGINAL
NEAPOLITAN PIZZERIA
At its new home

Featuring the famous ITALIAN DELICACY PIZZA—and serving a complete menu of delicious Italian and American foods.

The MELROSE

5026-28 Easton RO. 9734
(at Kingshighway)

1947

St. Louis Dispatch

A recipe for pizza from Amedeo Fiore, owner of the Melrose Café (see page 66), includes tomato sauce, anchovies, cheese, olives, and ground meat.

1947

The New York Times

A recipe for pizza is the first time the *Times* devoted a full article to the subject, despite pizza being well established in the city and covered in other newspapers.

1948

Il Progresso Italo-Americano

Want ads for a pizzaiolo and pizzerias for rent in the Italian-language newspaper

WILLOW CAFE

451 West Fourth Street
at Willow
MOUNT CARMEL

Serving Daily
12:00 Noon to 12:00 Midnight

La Pizze

Plain or with mushrooms,
anchovies, pepperoni, salami
or sausage meat.

1948

Shamokin News Dispatch in Shamokin, Pennsylvania

Ad for Willow Cafe, serving La Pizza plain or with mushrooms, anchovies, pepperoni, salami, or sausage; this is the earliest ad we found listing pepperoni as a pizza topping

1949

The Philadelphia Inquirer

A feature on frozen-food menu planning includes pizza

1949

Council Bluffs Nonpariel in Council Bluffs, Iowa

Recipe for Biscuit Mix Pizza suggested by famed food writer M. F. K. Fisher, saying, "Italian 'pizza' is rapidly becoming a favorite delicacy of many Americans, although few housewives not of Italian derivation can make it"

META GIVEN MENUS

You Can Make Intriguing Pizza at Home

1949

Salt Lake Telegram in Salt Lake City

Recipe for making "intriguing pizza at home" from cookbook author Meta Given; Given says, "if you can stir up and knead yeast dough and can procure tomato paste and have on hand such good leftovers as ham or cheese, also some onions, [and] salad oil . . . you can make a delicious pizza."



*Chef Abelldira presents
Italian Pizza, Ravioli
in our Crystal Tea Room*

*A treat for you lovers of Italian food!
Famous Chef Ricardo Abelldira will prepare
and serve these two famous dishes right in*

1950

The Seattle Times

Ad for pizza being served in the Tea Room at the Bon Marché department store

1950

The Times-Tribune in Scranton, Pennsylvania

Ad for Cariati's pizzeria in Old Forge, featuring pizza, tripe, and spaghetti

SWAMP WOMEN in color
LIVE IN ENGLISH MEANS THE BEST way of life.

1st IN PIZZAS
from AROUND THE WORLD
Francine's
PIZZA JUNGLE

Capitel 8-8081 500 NW 21st Ave., cor. Gilsan
OPEN Monday thru Thursday 5 P. M. to 1 A. M.
Friday and Saturday 3:00 A. M.
Sundays 2 P. M. to 10 P. M.

JUNGLE PIZZA	SMALL	LARGE
Cocktail (lett, apple sauce, chopped avit.)	\$1.00	\$1.90
AMERICAN PIZZA	85	1.60
Memberger, chopped onion, chopped calary.		

concrete floors and heating plants
freight elevator
Sixteen
for hooped
paddocks
Bids will
February 2

LAMBERT
Sheriff
appointed
rector
The
comm
Terry D. S
mayor, wh
cruisers wh

BLU
25c
P. 100 CA 7
C. 12
G. 100 P
G. 100 P

1957

The Oregonian

Ad for Francine's Pizza Jungle includes a Hawaiian pizza, featuring pineapple, papaya, and green pepper: notable since it comes five years before the reported invention of the Hawaiian pizza by Canadian Sam Panopoulos in 1962.

Family Pizza Factory

Thousands of West Coast's best pizza makers
The family at 2020 W. 1st St., Seattle, Wash., is
The grocery at 2020 W. 1st St., Seattle, Wash., is
The grocery at 2020 W. 1st St., Seattle, Wash., is



1957

The Seattle Times

Article about a family of Italian grocers who make 300 "Italian pies" per day in an assembly line in the back room of their market

1957

The Saturday Evening Post

Large illustrated article about pizza, saying it's "giving the hot dog a run for its money"

Pizza at a Party Puts
Jingle in the Cash Till

National Agent in Philadelphia: 200-0000
Bellevue Year Bookery—From "Linda's Book,"
the Book Store in Eng.

By Ruth S. Williams
The pizza is a hot new food, a hot new food
The pizza is a hot new food, a hot new food
The pizza is a hot new food, a hot new food

ALL-STEEL

1957

Kansas City Star

Article about the pizza industry stating it has grown to a \$200 million a year industry (nearly \$2 billion in today's money)

For more on how to make your own frozen pizza, see page 3:331.

A FROZEN FOOD REVOLUTION

In the 1920s, inventor Clarence Birdseye began experimenting with freezing food. Certainly, the idea of freezing food to preserve it went back centuries, but the point early on was to simply stop food from spoiling. Birdseye's genius, along with the technology of flash freezing, was to position freezing as a way to capture peak freshness while also affording convenience. Want strawberries in the winter? You can buy them frozen. Gourmet food from a foreign country? It can be frozen. With this reframing, frozen food was better than fresh. Americans could taste foods from foreign lands without the trouble of travel—or even cooking.

The first grocery freezers were made in 1928, and by around the Second World War, frozen food began to catch on. During the war, it was even cheaper than fresh food. Between 1938 and 1948, the production of frozen food worldwide increased fivefold, to 1.2 billion pounds (54 million kilograms) a year.

Pizza makers began seeing the potential in the early 1940s. In 1942, for example, the Grand Union supermarket chain in Maryland was advertising frozen pizza under the Buitoni brand. Jenò's was another brand advertising frozen pizza in the 1940s. Some smaller pizza businesses even stumbled onto the idea of freezing by accident. That Seattle grocery, Alfieri's Italian Grocery Store (see photo below, right), with the small pizza assembly line?

Convenience foods, including frozen pizza, were all the rage in the postwar years.

A customer reported back to them in 1949 that he froze the leftovers after a party. A few months later, he reheated the pizza and discovered “it was just as good—maybe even better—than when it was fresh,” the grocery owner told the *Seattle Times*. “Thereafter, we froze 'em.”

In 1950, an Akron, Ohio, restaurant experimented with frozen pizza when a cook's vacation was going to leave them shorthanded. Suddenly, they had a sideline business selling to groceries and delis, and set up distributorships elsewhere in the state, reportedly grossing \$20,000 each month.

By 1950, pizza was being sold in many grocery stores. To get all those pizzas into the stores, frozen pizza companies had to create a new kind of help-wanted listing for frozen pizza delivery drivers and distributors. That helped get pizza into roadside stands and taverns, which saw an easy way to feed people with no need to hire a trained cook.

While it would take years before every home would have a freezer, the popularity of frozen food helped bring pizza to more and more people—even to areas where there were no pizzerias. The timing was perfect. American women, many of whom entered the workforce to help the war effort, were spending significantly less time in the kitchen. Popping a frozen pizza in the oven was an easy solution to the dinner dilemma.



From freezer to fun in 8 minutes
...hotter, fresher, tastier than any pizzeria pizza you bring home.

Pep up your next party with Chef Boy-Ar-Dee Frozen Pizza. Serve it fresh and bubbling hot ...with the crust so tender and crunchy, and a topping of the Chef's slow-simmered sauce plus three kinds of cheese.

It's so much better than a pizzeria pizza that's half-cold by the time you get it home!



And Chef Frozen Pizza has another big advantage: convenience. You keep it in your freezer, pop it into a hot oven—and it's ready, piping hot, in just 8 minutes. Perfect for spur-of-the-moment parties.

Enjoy both kinds: cheese, or sausage with cheese. Delicious!

Chef Boy-Ar-Dee® Frozen Pizza



NEW OVEN TECHNOLOGY

Restaurant pizzas took off thanks to another kind of technological development that was occurring around the same time. In Naples, pizza was baked in wood-fired ovens. But in US cities, wood was expensive, so early pizzaioli turned to cheaper fuel such as coal or coke (see page 52). Unfortunately, these ovens have a number of practical downsides: They require a lot of attention. You don't set the temperature with a dial like on a home oven. They take hours to heat up. To maintain a steady temperature, you have to tend them and shovel in fuel. Different parts of the oven heat to different temperatures, so bakers have to play a constant shuffling game with each pizza. To bake the bottom of a pizza properly, the oven door should be open; to bake the top, the door should be closed. Though it wasn't high-status type work, pizza making was skilled labor. Also, coal ovens are enormous and often had to be hand-built inside the building (although portable models were available starting in the 1930s). With these barriers to entry, only those with know-how could make the business work.

Then, in the 1930s and 1940s, two men working separately developed new ovens that would transform the pizzeria business. Frank Mastro came first. An Italian immigrant who ran a restaurant supply store, Mastro saw the tremendous potential in pizza starting in the mid- to late 1930s. Mastro's story has

been told several ways over the years. The way he told it to the *Saturday Evening Post*, a saloon owner looking for a quick fix asked to buy a pizza oven. Mastro got an old gas oven from a junkyard and jury-rigged it to burn coal, the preferred fuel at the time. The trick worked well enough that he was converting gas ovens to burn coal all around town. A "born wheeler-dealer," as the pizza industry publication *PMQ* later called him, Mastro was convinced that "pizza had the potential to take America by storm."

Then the gas company came around. None too happy with this development, they showed Mastro that gas could bake pizza just as well as coal—an idea they were pushing nationally. No shoveling required. Steadier heat. Less floor space. More portable. Mastro was sold. He convinced the G. S. Blodgett Company to make gas ovens to his specs. Then he set about selling them. He traveled the country hyping the tremendous profits to be made in the pizza trade. "Why, a \$1 pizza pie costs only 20 cents to make," he proclaimed. As proof of the concept, he set up pizzerias in New York that a) were successful and b) served as training academies for aspiring entrepreneurs. If you bought an oven, Mastro would teach you every aspect of the business. He'd even finance the oven. The press dubbed Mastro "The Pizza King," and he marketed to both English- and Italian-speaking audiences.

For more on different types of oven fuel, see page 388.

Frank Mastro opened his restaurant supply store in the Bowery (left) in the 1930s and eventually focused on pizza-making equipment, notably the gas oven (right).



Turn your **\$1** bills into **\$5**'s
with
THIS NEW
MASTRO... PIZZA OVEN

URNS OUT 60 BIG PIZZA PIES AN HOUR SELLING AT FIVE TIME FOOD COST

This revolutionary new Pizza Oven is designed to produce a better PIZZA pie faster and help you cash in on this rapidly growing, highly profitable Pizza market.

Gas data. Manufactured, natural, mixed or petroleum gas. Floor space 61 x 49 inches. Interior size 48 x 36 inches.

NOW!... A PIZZA PIE A MINUTE!

Pizza bake in less than 5 minutes. This sensational oven will turn out 60 pies per hour. Big size hearth holds six 12" pies—greater capacity on small pies. Fast service at your busy time. No lost sales due to waiting.

FRANK MASTRO INC.
SPECIALISTS IN PIZZA EQUIPMENT
240 BOWERY, NEW YORK CITY 12. CANAL 6-5184
The Oldest and Largest Pizzeria Equipment Dealer in the United States

FREE PARKING SPACE



Pizza making was big business by the 1950s, with companies like Frank Mastro (left top and bottom) and Bakers Pride (right) competing.

Business was good for Mastro and for his customers, including fellow Italians who had struggled through the Depression amidst widespread discrimination; here was a business they could win at. Pizzerias were opening in every corner of the country, whereas only a decade earlier, the *Galveston Daily News* reported it was “strictly a neighborhood thing. . . . The only place it was served was at Italian affairs.”

A few years later, another oven maker, Ira Nevin, began developing his own gas and electric pizza oven models after a pizzeria owner complained his pizzas could take as long as 20 minutes to bake. Nevin came from a family of oven builders, so he had some ideas. He designed one that could bake them in nine minutes. He kept tinkering, going on to earn numerous patents over the decades as he repeatedly improved the design. A 1948 ad boasted that Nevin’s oven could bake 36 pizzas an hour. His work, and

his efficient ovens, helped many people build profitable pizzerias, making “millionaires out of normal people,” his son-in-law later said. Nevin’s company, Bakers Pride, founded in the Bronx in 1945, is still a supplier of pizza ovens today.

Anyone could learn to bake pizza in one of Nevin’s or Mastro’s ovens. And suddenly, everyone wanted to get in on the business. From the mid-1940s to the 1950s, newspapers and magazines were breathlessly telling the stories: A trucker gave up life on the road to open a pizzeria in Texas after going through Mastro’s training program in 1956. An acrobat dumped the trapeze for pizza. A Chinese restaurant in Los Angeles shut down one day, then reopened as a pizzeria.

These ovens weren’t just trendy contraptions. They lowered the bar for entry into the pizza business, paving the way for an even bigger pizza boom to come.

A SLICE AND A BEER

Pizza and booze are partners in the modern food landscape, as closely associated as cookies and milk. But it's about more than flavor pairings. There's long been a symbiotic relationship between pizza and alcohol that has helped each of them survive tough times, with booze helping introduce Americans to pizza, and pizza helping booze flourish underground even when it was outlawed.

Their tag-team history goes way back. In an 1858 essay, Emanuele Rocco described the scene in a Naples pizzeria, noting that the first person to greet patrons wasn't the pizzaiolo, "but rather the boy from the wine shop next door" who came to take their wine order. At that time you couldn't sell pizza and wine in the same shop, so the proximity helped both stay in business. We see a similar scene in a 1903 newspaper article called "Hot Cakes in North Street" about a Boston pizzeria. "A bright tin bucket of beer is in the center of the table and passes from lip to lip without the formality of glasses," the writer explained. "The shop does not sell beer. When a man gives his order he takes a bucket from a stack provided for the purpose and goes to a neighboring bar for his beer."

Looking at turn-of-the-century New York neighborhood maps and directories, we see the same theme: pizza being sold next door to saloons or groceries, which, at that time, also could sell alcohol by the glass. Sometimes, these businesses were all in the same building.

Just like today, saloons in early 20th-century New York served up both booze and camaraderie. They also played a crucial role in the social lives of immigrants. In addition to being places of business, they offered the comforts of home—or, rather, comforts many *didn't* have in crowded tenements. Saloons had potbelly stoves for heat and even running water. Saloons also had a custom at the time of putting out a spread of food for what was called the "free lunch." With so many Neapolitan immigrants in the area, and the blurry lines between saloons and pizzerias, it's likely that pizza was one of the offerings. After all, dough is cheap.

We don't know what the saloon pizza was like back then, but we suspect some of it may have been pizza frita, which involved nothing more than a stove and a hot pot of oil (see page 38). There were also bread ovens available at that time, and saloons may have used them. We've found some of the earliest New York pizza spots were located in former German bakeries, meaning a bread oven was already on the premises.

In 1896, New York State imposed tough new liquor laws requiring businesses to get special licenses. The law also laid down strict rules for liquor sales, and businesses regularly ran afoul of them. So business owners found crafty ways to comply with the law. In 1901, the Carracciola Hotel opened at 130 West 26th Street, run by Filippo Milone (see page 36), an Italian with a string of pizzerias, and F. Trapani. As best we could tell, it was a hotel in name only. The Carracciola wasn't listed in any hotel directories; in fact, we found the address under "wines, liquors, and lager beer saloons." Then we realized why: New York's liquor laws allowed more leeway for hotels, and Milone and Trapani were taking advantage

* * *

The Carracciola Hotel, cafe and restaurant, F. Milone, and F. Trapani proprietors, is located at 130 W. 26th st., bet. Sixth and Seventh aves. Here all kinds of Italian and French dishes are served, at very low prices. Ample accomodation for societies and parties, and the best brands of wine, liquors and cigars always in stock. Pizzeria Napoletana.

* * *

From the early- to mid-20th century through to the present, pizza has long been a drinking food. Advertisements spanning the century back this up.

of that loophole, serving "all kinds of Italian and French dishes" in their "Pizzeria Napoletana," according to their ads.

In 1920, alcohol sales were outlawed nationwide. The ban was fueled, in part, by an anti-immigrant sentiment, the thinking being that *they* were the ones consuming most of the wine. Wine was so integral to Italian cuisine, and alcohol was such a part of the pizza business, that owners weren't deterred.

The 1920 law allowed people to make up to 200 gallons of home-made wine—a loophole that pizza makers and others seized. Italian historian Simone Cinotto traced how Prohibition turned wine making from a neighborhood ritual shared among families into a business enterprise. US publications geared toward Italians advertised wine-making supplies. You could find bootleg liquor all over Greenwich Village, where there was a large population of Italian immigrants. Middle-class Americans, looking for a drink in the midst of Prohibition, knew it. In the 19th century, German and French restaurants were popular, but starting in the 1920s, Italian restaurants surged in popularity. "Because their economy was based on the sale of alcoholic beverages, restaurant speakeasies lured customers from their competitors by offering generous servings of food and drink for just a few cents," Cinotto wrote.

"By the end of the 1920s," he added, "(Greenwich) Village Italian restaurants had made their name among a large middle-class clientele of both sexes, and among artistic, theatrical, political, and big-business celebrities."

Thanks to a law fueled in part by anti-immigrant sentiment, Italian food, and pizza, had arrived.



JANET MICK, MISS RHEINGOLD 1961

Friendly, fresh'ning, happily dry
-that's fine cold Rheingold

Dry beer is cleaner-tasting, smoother, more thirst-quenching than beers that aren't dry.
 This very real difference brings out the refreshing beer flavor that is Rheingold's alone.

© 1961 THE LIBBEY-BROSSEY CO., NEW YORK, N. Y., U.S.A. ESTABLISHED 1874 PHOTOGRAPH BY PAUL HESSE TEAL TRAINA costume selected by HARPER'S BAZAAR

REGIONAL PIZZA STYLES EMERGE

The pizza that developed in the United States was different in significant ways from its Neapolitan ancestor. American pizzas were larger, making them food for a crowd. They were more heavily laden with toppings, and they were baked in a different kind of oven, at a different temperature, making for a different texture and appearance.

By the mid-20th century, there were some additional characteristics of American pizza, too—particularly New York pizza. In many places, pizza wasn't just food; it was performance. A *Herald Tribune* columnist marveled at pizzaioli who “bake them right before your eyes—oven, work table, all the ingredients exposed in full view of every one.” This was quite different from the typical US dining-out experience. In 1944, the *New York Times*'s Jane Holt watched in fascination as the pizzaiolo picked up the dough and “twirl[ed] it around, first in one hand and then in the other.” Today, Neapolitan pizzaioli don't tend to twirl it, so this may well be an American flourish.

We also see the development of distinct regional styles outside of New York, though it can be challenging to answer the “who, when, and why” questions (see page 37). When we began digging into the backstories, some had the whiff of legend. Often, we began to suspect that as the popularity of the styles grew over time, the origin stories were stretched as well. Still, these stories offer an interesting window into the maturation and popularization of pizza.

Chicago was home to numerous pizzerias as early as the 1920s. Granato's (left) opened in 1924. Some pizzerias like Vito's & Nick's (right) began as taverns in the 1920s, then added pizza to the menu later on.

Pizza in Chicago

The stories of New York pizza (see page 25) and New Haven pizza (see page 48) center on immigrants making their home in America. But the stories of later regional styles are different. In Chicago, in fact, a distinct pizza style emerged only after the old Italian neighborhoods were breaking down. In the early 20th century, large numbers of Italian immigrants had settled in Chicago, and the earliest pizzerias catered mostly to them. There was Granato's, founded by a Naples immigrant in 1924, which served thin-crust pizzas that were “oversized and underpriced.” While the pizza wasn't fancy, “its preparation at Granato's in a huge brick oven over a wood fire was a spectacle that brought the smart set from all over town.”

By the 1930s, there was at least one more Italian restaurant serving pizza here, and it was known by various names—Tufano's, Vernon Park Tap, Vernon Park Restaurant—probably because it had no sign on the door. The menu was written on the wall. This establishment, too, was founded by Italian immigrants, and commentators said you were just as likely to hear customers speaking Italian as English. Tufano's is still around, and it's still run by the Di Buono family. What these places served was simple. It wasn't the deep-dish pizza that we now know as Chicago style. It was just pizza, and the restaurants were distinctly Italian, or at least an American notion of Italian. By 1940, the Pelican Tap served pizza in



the location that would become Pizzeria Uno: 29 East Ohio Street.

The Italian community in Chicago was nearly 74,000 strong in the 1930s. But by the end of World War II, waves of demolition made room for public housing projects and hospitals. As the Little Italies were demolished, immigrants scattered to the suburbs. Around the same time, some local entrepreneurs saw opportunity in the restaurant business. One, Ike Sewell, was a liquor distributor; the other, known as Ric Riccardo, was an artist and bon vivant who had spent time in Italy during the war. Over the years, the story has been told mostly by Sewell, since Riccardo died in 1954. As Sewell tells it, they didn't initially have pizza in mind; their goal was to simply own a successful business. They bought an old mansion at the edge of downtown and came up with a theme: Mexican.

Sewell didn't know much about running a restaurant, much less cooking—he was a salesman. Riccardo (whose real name was Richard Novaretti), knew a little bit about the business, as he owned the Riccardo Restaurant and Gallery, better known as

Ric's, which he opened after Prohibition. In its heyday, the *Chicago Tribune* said, it was "the Montmartre of the Midwest." The place was filled with artists and opera singers, journalists and movie stars, and a healthy contingent of "drunks, scalawags and bon vivants, real and would-be."

As a salesman, Sewell was personable, gregarious, and shrewd, and he told Riccardo that a Mexican restaurant would be a winner. Riccardo had never even tried the cuisine, so a local Mexican bartender offered to make a special dinner. "The guy fixes the meal, and it makes Riccardo sick," Sewell later told the *Tribune*. "I mean violently sick. He always said it was the worst meal he ever had in his life." After the dinner fiasco, Riccardo simply vanished, and Sewell was left holding the bag for an empty restaurant. A few months later, "Riccardo wanders back from Italy, broke and disillusioned," Sewell said.

Already, this story has some problems. For one thing, the idea that Riccardo was touring Italy during World War II is dubious, at best. (There are other problems with the story, too; see page 54). In

Left: Rudy Malnati, shown here with his son Lou, was the manager and bartender at Pizzeria Uno. Lou opened Lou Malnati's, a rival deep-dish pizzeria.

Top right: Ric Riccardo and guests at Pizzeria Uno in 1945

Bottom right: Pizzeria Due was an offshoot of Pizzeria Uno. It served a thinner pizza.



Some Chicagoans claim that deep-dish pizza is for tourists, and that “real” Chicago pizza is thin-crust pizza. See our discussion of thin-crust pizza in The World of Pizza chapter, on page 105.

any case, Sewell says Riccardo suggested pizza, and he agreed.

The restaurant, called simply The Pizzeria, opened in 1943, though they soon changed it to Pizzeria Riccardo. Chicagoans didn’t seem interested. Desperate, Sewell and Riccardo started giving their pizza away at the bar. They were on the brink of closing when they had a stroke of luck: “This young reporter comes in one night,” Sewell later told the Tribune. “He’d fought in Italy, and he knew what pizza was. He writes an article about our place in his newspaper. He says our pizza is better than any he had in Italy.” We’re not sure what article Sewell is talking about, but something apparently changed, and the pizzeria got hot. After spinning off a second restaurant in 1955, called Pizzeria Due (“two” in Italian), they changed the name of their first place to Pizzeria Uno. By this point, there were more than 100 pizzerias in Chicago.

Today, we know Pizzeria Uno as the originator of deep-dish pizza, also known as Chicago-style pizza.

For years, the style was mostly confined to Chicago. (For over 20 years, Uno was the only pizzeria making this style of pizza.) Sewell had been approached numerous times to sell Pizzeria Uno franchises, but he refused. In the late 1970s, however, he agreed, after he became convinced that people were stealing his idea anyway. There are now more than 100 Uno Pizzeria & Grill locations worldwide and deep-dish, Chicago-style pizza has become an international phenomenon.

Several former employees of Pizzeria Uno and Pizzeria Due went on to found their own pizzerias, including Gino’s East (1966), Lou Malnati’s Pizzeria (1971), and Pizano’s Pizza & Pasta (1991), the latter two founded by sons of the original Uno’s manager, Rudy Malnati. Alice Mae Redmond, who made Uno’s dough for years, went on to Gino’s East, where she cooked and developed recipes for 29 years after that (see below). Louisa DeGenero, another Uno’s cook, opened Louisa’s Pizza and Pasta in 1981.

WHO INVENTED DEEP-DISH PIZZA—AND WHEN?

Pizza aficionados in Chicago seem to agree that deep-dish pizza was invented at Pizzeria Uno and spread from there. But how this dish came to be—and when—is a lot murkier than it might seem. It’s likely that African American women, not culinary Italians, are responsible for this iconic Chicago version of Italian food.

The story of Pizzeria Uno has mostly been told by Ike Sewell, one of the original owners. According to him, Riccardo, his co-owner, was the one who suggested pizza when they were working on restaurant concepts. After trying the dish, Sewell concluded, “It won’t sell. It’s more like an appetizer. We need something more to feed people than this.” As he told the *Chicago Tribune*, “We started experimenting.” Eventually, they came up with deep-dish pizza.

But the idea that these two invented the dish is a bit of a stretch. It’s much more likely that an employee came up with the recipe—specifically their employee Alice Mae Redmond. She worked in Uno’s kitchen for about 17 years, but when she started, the crust just wasn’t right. “It was too hard to push,” she told the *Tribune* in 1989. “I had to make that crust better.” She added a dough conditioner but never revealed publicly what that secret ingredient was.

After sampling deep-dish pizza at Uno’s and elsewhere, that quote really rang true with us. Uno’s crust, with a relatively high fat content, reminded us of a savory, yeast-raised version of a Southern pie dough. We couldn’t find a lot of information about Redmond, but it would make sense that any cook working in that era would be very familiar with American pie crust and less so with Italian pizza.

In 1966, the founders of Gino’s East, another deep-dish pizzeria, lured her away to be their first pizzaiola, along with her sister, Ruth Hadley. Redmond tweaked the recipe a bit, but still reportedly used that secret dough conditioner until her retirement in 1989.

Back at Uno’s, other African American women took Redmond’s place, including Aldean Stoudamire. Another, Elnora Russell, was in charge of Pizzeria Due’s kitchen. Stoudamire, who started in 1957 and later stepped up to head chef, said customers didn’t expect to see African American women working the oven.

“Not too many people know it’s black cooks who make the pizza,” she told the *Tribune*. In another interview, she added, “When they find out, sometimes they look strange, ‘cause they expect to see, you know, an Italian.”



Alice Mae Redmond in 1974

Pizza in Detroit

Detroit-style pizza (see page 142) came out of the World War II era, too. Bar owner Gus Guerra was trying to figure out how to increase profits at his bar, Buddy's Rendezvous, when his mother-in-law suggested pizza. She showed him her recipe for a pan-baked pizza, and he was off and running. Different sources peg the invention of Detroit-style pizza to different dates between 1942 and 1946. While they claim the recipe harkened from Sicily, Guerra's pizzas had a couple of twists. For one thing, they are baked in rectangular blue steel pans that were designed to hold small parts for the nearby auto factories. Also, the cheese not only goes right up to the edges but drops down between the dough and the pan. That's what gives it such great caramelization, and it's what makes Detroit-style pizza so distinctive.

At Buddy's, Italian men—along with people from Poland and Yugoslavia, and whoever else showed up—played bocce, drank beer, and ate pizza. In 1953, Guerra sold the place and opened a new pizzeria, the Cloverleaf, several miles away, still serving his “Motor City Square.” Today, he's hailed as something of a godfather of Detroit-style pizza and customers still flock to Buddy's for the pizza and the bocce. Some of Buddy's employees spun off and opened their own pizzerias, which are also still going strong today. Former baker Louis Tourtois, for example, went to work at Shield's, formerly a fish-and-chips bar, then left to open his own pizzeria, Loui's.

In the last few years, Detroit-style pizza has seen a surge in popularity, and while it used to be offered only in the Motor City, you can now find it all over the country.

Sometimes you'll hear Detroit-style pizza referred to as “red top.” That's because the sauce is spooned on top of the cheese before or after baking.

In 2011, the demise of a small West Virginia factory led to a crisis in the Detroit pizza industry. The plant, Dover Parkersburg, had specialized in utilitarian products such as janitors' buckets, washtubs, and garbage cans, but also made the steel pans used by just about every Detroit-style pizzeria. In 2012, another company, which specializes in automotive stampings, got into the pizza-pan business and Detroit-style pizza was back on track.



The pans used to bake Detroit-style pizza were originally used to hold parts on the automobile assembly line, shown above in the circled portions.



Diners at Buddy's give a toast.



Buddy's Rendezvous waitress Connie and manager Irv sit down to enjoy some wine and pizza.

Pizza in Old Forge, Pennsylvania

One of the most curious regional pizza styles in the United States is centered in Old Forge, an old coal-mining town of about 8,000 people in Lackawanna County, Pennsylvania. The style itself is definitely unique, and it's served in about a half-dozen "pizza cafés" around town. It's a pan-baked pizza made with processed cheese and sweetened dough in the style of white sandwich bread, and there's a distinct lingo around it. A slice, for example, is called a cut.

There are several stories as to how this pizza got its start, but they are all lacking documentation. The most popular story seems to be that a woman known as Grandma Ghigiarelli found herself in the 1920s or '30s with a crowd of hungry card-playing miners in her family's bar and whipped up a pan-baked pizza. That's it. We couldn't find any other details. Philomena Ghigiarelli's obituary, dated December 1959, makes no mention of her famous pizza, although it confirms she ran a café, which continued to operate until 2017.

From there, the Old Forge style of pizza was born and the town now calls itself the "Pizza Capital of the World." The earliest evidence of pizza we could find in Old Forge is a newspaper ad from 1942. We also found a 1950 ad for a pizzeria serving "cuts" but it was from Hazleton, about 40 miles away. As best we can tell, Old Forge began referring to itself as a "pizza capital" in the 1960s, when the town struggled in the wake of mill and factory closures. This makes perfect sense, but what has puzzled us most is the heritage of this pizza. Old Forge and the surrounding area were home to many Italian immigrants. Back in Grandma Ghigiarelli's day, there were Italian delis in the area that could supply cheese and salumi. Presumably, there was a know-how about Italian

bread dough, too. And yet this pizza bears little resemblance to anything Italian. The camaraderie among the pizzerias here and their commitment to this style of pizza is charming, even if it's so different than the pizza we found everywhere else.

Pizza in St. Louis

St. Louis has its own distinctive pizza style, too. Although the facts once again are elusive, it appears it made its debut a little later than the others. Before there was a style, there was just regular pizza, dating back to the late 1930s, when Colucci's Italian restaurant began serving the dish. In 1947, Melrose Café and Pizzeria was advertising as the only place in St. Louis to find "the original Neapolitan" pizza. The style seems like nothing that you find in Naples, either then or now. Melrose, located in the bottom of an apartment building by that name, was run by Italian immigrants Amedeo Fiore and his wife, Elizabeth. How they developed their recipe is unknown.

Today, St. Louis-style pizza is noted for its thin crust, a tavern cut (that is, cut into small squares), and Provel, a processed cheese (see page 2:300). Fiore mastered the tavern cut technique. A 1947 newspaper article shows him cutting the pizza with scissors into small squares. (Given that Melrose was a restaurant, the term "tavern cut" may be a misnomer.) The same article says the Fiores used a "layer of sliced provolone." Did the reporter mistake provolone for Provel? The latter was in use by 1947, so it's possible, but in our view, doubtful.

In newspaper accounts over the years, several pizzerias have been given credit for originating the Provel-focused St. Louis style: Parente's, which opened in the 1940s; Luigi's Restaurant, which opened in 1953; and Farotto's, which opened in 1956 or 1957.



Melrose Pizzeria in St. Louis was owned by Amedeo Fiore (standing).



Old Forge hails itself as the Pizza Capital of the World. We think the denizens of Naples might take issue with this claim.



This 1947 ad for Melrose Pizzeria boasts the "atmosphere of Old Naples in St. Louis."

BACK IN THE OLD COUNTRY: 20TH-CENTURY NAPLES

The mass emigration of Italians that had begun in the 19th century continued into the 20th. The country's south was still treated as a backwater, with jobs and modern improvements mostly focused on the north. Illiteracy was widespread. When the former slave Booker T. Washington visited in 1910, he wrote that the conditions endured by Sicilian peasants were worse than the conditions of African American farmers even "in the most backward parts of the Southern States in America."

Italy was still having trouble feeding itself. For a nation whose cuisine was dependent on wheat, it wasn't growing nearly enough. In the lead-up to World War I, Italy imported 57 million bushels of wheat annually; most of it came from Russia, with only about 5% coming from the United States.

In the hopes of helping supply keep up with demand, the government in 1915 ordered mills to sift out less of the wheat's bran and germ, making the yield greater and the bread browner. Additional decrees aimed to stretch bread supplies further by adding fillers, including chestnuts and lupines. This "wartime bread" was notably awful, and it still wasn't enough. After World War I, Italy was even further behind. Between 1920 and 1922, wheat imports jumped to 94 million bushels annually, more than half of which came from the United States. Flour imports jumped from 91,000 to 733,000 bushels annually. Meanwhile, a rapidly growing population meant there were more mouths to feed. If the Mediterranean Sea was blocked by a foreign power,



In the early 20th century, Italy had a grain shortage, which influenced the way it milled its flour.

MUSSOLINI'S "BATTLE OF WHEAT"

When Benito Mussolini took power in 1922, he focused tremendous energy on the wheat deficit, taking a series of rather extreme measures to prop up local wheat production, which became known as the "Battle of Wheat." Money was put into the development of better farm equipment; fuel prices were lowered to make agriculture cheaper; grain silos were built; educational campaigns were mounted. Wheat-growing competitions were launched to get the local population involved, and wheat awareness came to be seen in patriotic terms.

In 1925, Mussolini levied duties on imported wheat, and in the next few years he increased the tariffs four times. The Battle of Wheat was in full swing. With import prices pushed higher, farmers planted wheat to fill the gap. As a result of all of these efforts, production increased and imports decreased. However, it didn't solve the wheat shortage problem, and in fact it created some new ones. The import tariffs had the effect of boosting consumer prices. What would have cost \$45 per ton before the duties now cost \$75, which could gobble up more than 10% of a poor worker's annual wages. Wheat was planted on marginal lands that would have been better off planted with other crops. The focus on farm animals decreased, causing a cascade of other problems including meat shortages that led to rising imports of animal products.

In the end, the Battle of Wheat may have increased profits for some large producers, but it was a distinct disadvantage for average wheat consumers.



The delivery of grain to Naples in 1947



A medal celebrating Mussolini's victory in the Battle of Wheat

In Italian groceries, it can be confusing to see Italian flour labeled “Manitoba,” named for the wheat-producing province in Canada. In the early to mid-20th century, Italy imported much of its wheat and flour from North America, including both the United States and Canada. Back then, there were Italian newspaper articles touting the water-absorption qualities of strong Manitoba flour. Italy still imports a lot of wheat, but in recent years it’s been getting more from France than North America. Regardless, the name “Manitoba” has stuck.

Italians could lose access to many of the items they relied upon. They could starve.

These tough times would continue to play a role in the way pizza developed throughout the century.

WORLD WAR II

The Second World War didn’t help matters. In 1940, Italy had entered on the German side. By October 1943, with the Allied forces battling north from Sicily, it had switched sides and joined the Allies. Meanwhile, the German troops stationed throughout Italy turned into an occupying force. The Italian Campaign, as this grueling series of battles throughout the country came to be called, would last two years. Throughout this period and continuing even after the war, the country was in tatters.

The conditions for Italian civilians were more dire than the Allies had anticipated. A series of messages between Italy and Washington in 1943 painted a grim picture: “Immediate urgency exists

Food was scarce for many in occupied Italy and rationing of bread and pasta was common.



for flour.” When an officer in Washington learned how many tons of wheat would be required to prevent starvation, he reported, “It almost knocked me out of my chair.”

“Whatever it costs we can’t let them starve.”

Food shipments commenced, but the provisions were minimal. At different points, combined bread and pasta rations for Italian civilians were as low as 150 g / 5 oz per day. This was one of their main foodstuffs. Now they were relying on North American flour just to survive. (The character of that flour, made from different wheat than that historically grown in Italy, surely changed the nature of pizza dough, too.)

Naples was particularly hard-hit. Norman Lewis, a British-born writer who served in Naples during this time, described the aftermath in his book *Naples '44*. “The city of Naples smells of charred wood, with ruins everywhere, sometimes completely blocking the streets, bomb craters and abandoned trams,” he wrote. It had been bombed by the Allies and then by the retreating Germans, who targeted anything that might be useful, including the water supply. Desperate Neapolitans tried to drink seawater. To feed themselves, they picked dandelion greens in fields outside of the city, forced to trek farther and farther on foot each day as close-by fields were scoured. They trapped birds in nets and tried to pry limpets from rocks. “It is astonishing to witness the struggles of this city so shattered, so starved, so deprived

LA PIZZA

Pizza and pizzaioli appeared in Neapolitan art and literature for centuries (see page 10). The love song “The Pizza” written by Alberto Testa and famously performed by Aurelio Fierro (at right) in 1966 tells the story of a woman who is first wooed by, then married to, a man who tries everything to please her, including outings to fancy restaurants and a diamond ring—but all she wanted was a pizza.

Originally written in the Neapolitan dialect, “The Pizza” is translated into English below:

*I met you
a mouth as a red cherry
a skin perfumed as rose’s leaves
I met you
I wanted offer you
paying by installments too
a diamond (ring) of 15 carats
but you wanted the pizza
the pizza, the pizza
with tomato on
with tomato on
But you wanted the pizza
the pizza, the pizza
the pizza with tomato on
the pizza and nothing more
I took you*

*where the best restaurants are
where eating while sea sings
I took you
delighted of this scenery
I ordered . . . a grilled grey-mullet
but you wanted the pizza
I married you
the neighbors . . . the crowd of relatives
makes a lot of compliments
I married you
at once between hurrah and claps
came a cake of five layers
but you wanted the pizza
and have the pizza
and take the pizza*



of all those things that justify a city's existence, to adapt itself to a collapse into conditions which must resemble life in the Dark Ages," Lewis wrote.

Under these conditions, pizza wasn't just a treat; it was a near impossibility. With some 100,000 jobs lost in Naples alone, money was scant. Lacking access to flour (along with everything else), pizzerias closed. In this light, the oft-told story about pizza's rising popularity in the United States—that thousands of American servicemen had tried the dish while overseas and demanded more of it upon their homecoming (see page 54)—doesn't make much sense.

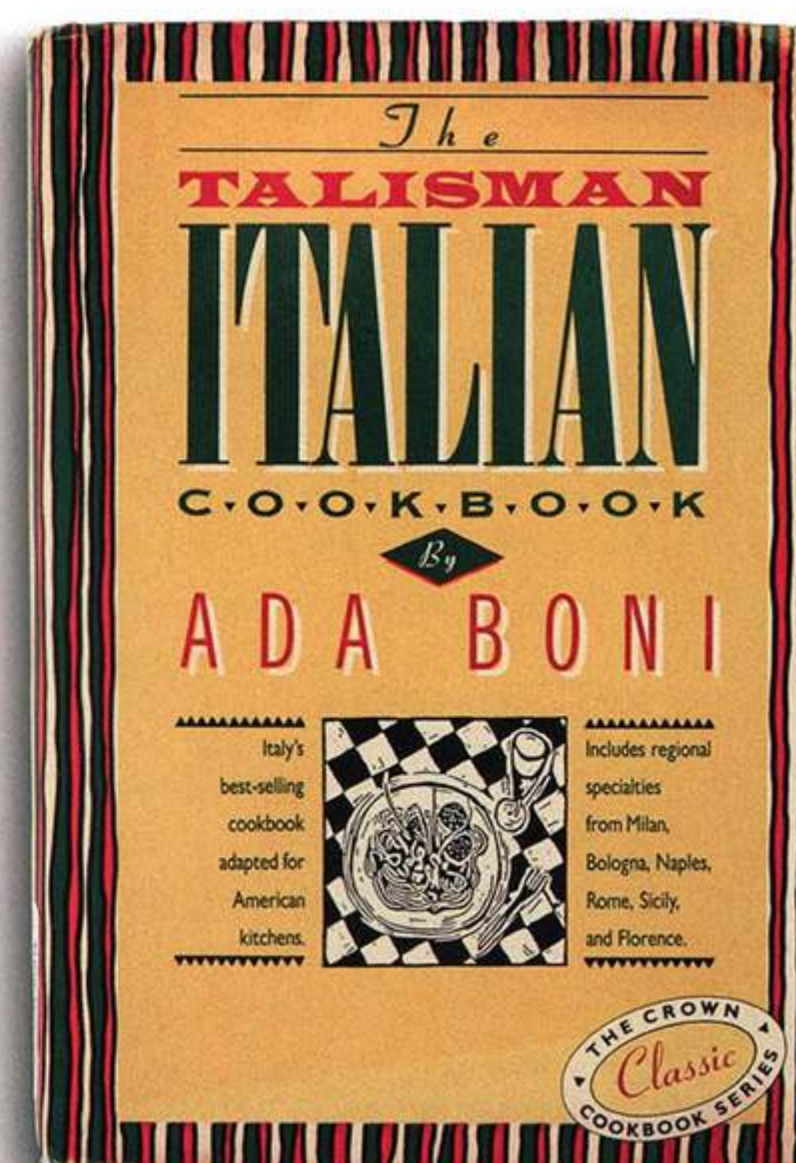
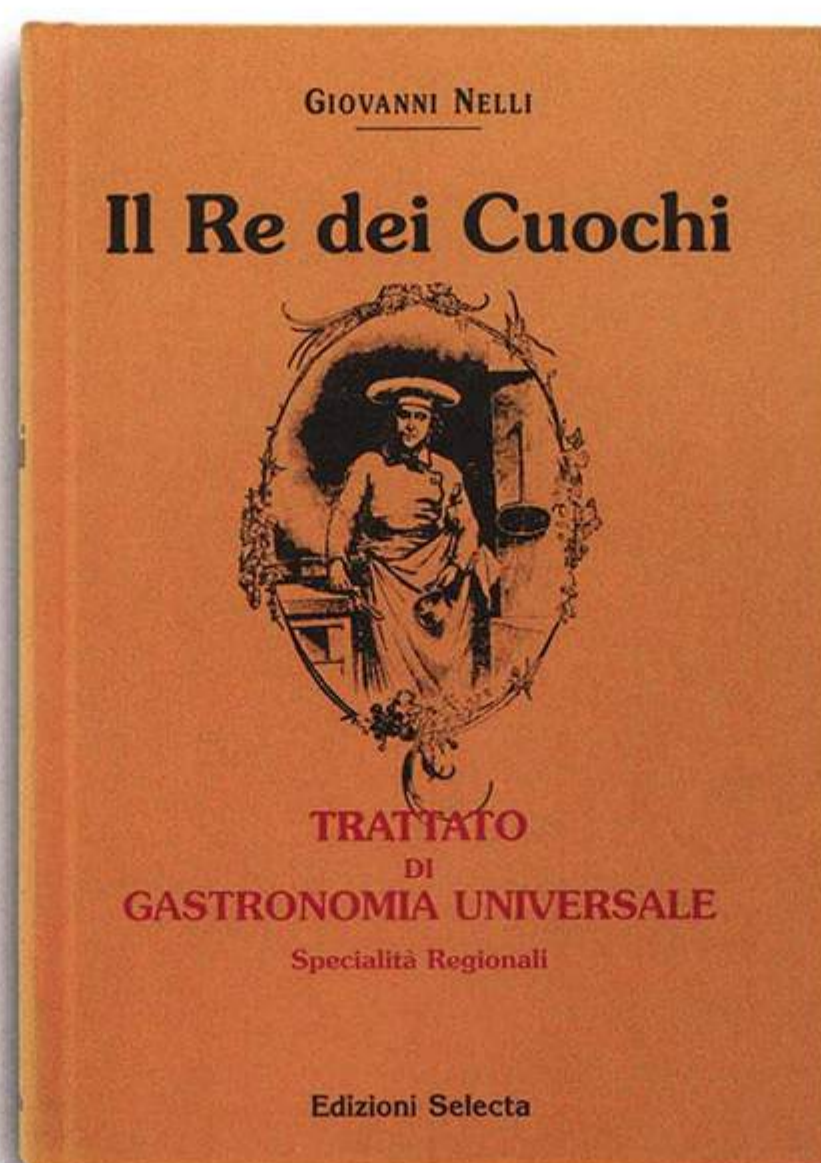
Military personnel commented on the absence. In *Yank*, a weekly military magazine published during the war, Sergeant August Loeb wrote in 1945 that "the people of Naples still can't get pizza (a kind of cheese and tomato pie) with real mozzarella . . . or many of the other things that were plentiful before the war." Italians finally had hope, however, and were "looking forward to entertaining the American tourists, all of whom they expect will be millionaires. . . ."

PIZZA OUTSIDE OF NAPLES

The tourists did come, and American postwar prosperity meant many of them had money to spend on Italian cuisine. Americans, as we know, were quite familiar with pizza by the 1950s, and when they toured Italy, they expected it would be on menus everywhere they went, perhaps not understanding the hyperlocal nature of Italian cuisine (see page 19).

To be sure, we found some evidence of pizza spreading outside of Naples both before and after World War II, but it was relatively scant. For example, we found blurbs about pizzerias in Rome as early as 1893. By 1948, an English-language guidebook had proclaimed, "Many are the pizzerie in Rome. . . ." We found help-wanted ads for pizzerias in Turin as early as 1925. We found several modern-day references discussing pizzerias that had opened in Milan in the 1920s or 1930s. (We had doubts about the stories' accuracy, though, after noticing several different places alleged to be the "first" pizzeria in that city.) And so on.

We also found some relevant recipes. The earliest Italian recipe we could find for a savory pizza that resembles what we eat today was from a 1904 cookbook, *Il Re dei Cuochi*. It called for a basic dough and had variations with anchovies or cheese (which, unusually, was added to the dough in addition to being sprinkled on top). Curiously, the cookbook was from Florence, not Naples, but it specified the recipe was for "Pizza alla napoletana," indicating it was a regional dish from Naples. Pizza was also



Both *Il Re dei Cuochi* and *The Talisman Italian Cookbook* have remained in print over the last century.

included in one cookbook that holds a dear place in the hearts of Italians: Ada Boni's 1927 *Il Talismano della Felicità* (*The Talisman of Happiness*), which became a must-have for middle-class Italian families. (For more on Boni, see page 70.) But for the most part, if pizza was included in an Italian cookbook, it was positioned as a strictly regional dish. And styles and toppings varied from region to region.

All in all, evidence for pizza outside of Naples was still rather sparse, even into the 1950s. It wasn't necessarily a focus among Neapolitans, either. In the 1968 classic *The Cooking of Italy*, American journalist Waverley Root speculated that pizza had gotten so popular in the United States by this point that it "has even been reintroduced to Naples—largely, it must be said, for consumption by tourists." (He added, however, that the reintroduction may have rekindled local interest in the dish.) In fact, we suspect there may have been more pizzerias in the United States at this point than there were in Italy. Unfortunately, trying to track pizza's postwar spread around Italy is surprisingly difficult, except for one story about how pizza reached Northern Italy—a kind of Pied Piper of pizza.

Tramonti and the Spread of Pizza

In the 1950s and 1960s, Italy experienced what has come to be called an "economic miracle," with strong growth that transformed its character from primarily rural to industrial. Still, the economic disparity between Northern and Southern Italy continued to linger. Per capita income in the south was half of what it was in the north. Like the economic disparity



Many Italians were reliant on food relief in the postwar years.

ADA BONI: QUEEN OF ITALIAN COOKING

In the 1920s, a Roman magazine editor named Ada Boni wrote a remarkable cookbook that became *the* go-to manual for home cooks all across Italy. Then it crossed the ocean and became *the* go-to manual for home cooks making Italian food in the United States. The thick tome was called *Il Talismano della Felicità* (in English, *The Talisman of Happiness*), and it was remarkable in both its breadth, including hundreds of recipes from the regions of Italy, and its staying power over the decades. In 1981, the *New York Times*'s Mimi Sheraton called it a must-have for American home cooks' libraries, ranking it up there alongside Julia Child's *Mastering the Art of French Cooking* and a small handful of other well-known cookbooks.

Naturally, among its nearly 900 recipes, *Talisman* included pizza. Whereas Pellegrino Artusi's cookbook of a few decades earlier (see page 8) only included a sweet tart that was called pizza, Boni's recipe for pizza alla napoletana is recognizably pizza as we now know it. In the first edition there were 13 recipes for savory, pizza-like flatbreads (some of which were called pizza), though not all of them would seem like the kind of pizza commonly eaten today. But in the English-language edition, her basic pizza recipe hits the mark. It calls for canned tomatoes, anchovies, mozzarella, and oregano, all of which feel authentically Neapolitan. The dough is made with lard, but still, it's definitely pizza as we know it.

Talisman was a common wedding gift in Italy that was passed down through generations. When the book was first published in the United States in the 1950s, it was one of few manuals of real Italian cooking available in English. Boni, then, played a major role in shaping how Americans see traditional Italian cooking. She died in 1973 at age 92, but the *Talisman* cookbook is still a part of many cooks' libraries even today, nearly 100 years after it was published.



Ada Boni in 1960

of the 19th century, this mid-20th century imbalance led to another wave of mass migration, except this time, the migration was internal—millions of people moved from the Italian countryside to the cities, from south to north.

Among them was Luigi Giordano. He was born in Tramonti, a municipality of 6,000 near the Amalfi Coast and about 50 km / 30 mi from Naples. Looking for business opportunities, Giordano made a series of decisions during this formative time in Italy's modern history that would play a role in pizza's spread. In fact, he became something of a Pied Piper of pizza, both by opening his own pizzerias and enticing dozens of his old Tramonti neighbors to do the same. Over the decade, hundreds, if not thousands, would follow in his footsteps.

Before Giordano came along, there wasn't a real pizza tradition in Tramonti, and he certainly had no experience in the field. He had served during World War II, stationed in Novara, in the Piedmont region. After the war, he decided to go back to Novara. Fresh fior di latte mozzarella was part of Tramonti's food culture, but the cheese was unknown in the north. Sensing an opportunity, he started a cheese-making business in the late 1940s. The problem with fior di latte is that, as a fresh cheese,

it doesn't keep, and sales weren't as brisk as he'd hoped. To address the problem of unused cheese, he took a leap and opened the first pizzeria in Novara in the early 1950s. He called it Pizzeria A'Marechiaro, and it's still open today.

With this success, he reached out to family in Tramonti, asking them if they wanted to come north and do the same. At this time, barriers to entering the pizza business were low. Moreover, tourists were beginning to seek out pizza in Naples and elsewhere. Opportunity was ripe.

Giordano would identify a good location, preferably between a military barracks and a railroad station. He'd help get everything ready and teach the newcomer how to run the business. The newcomer would eventually take over, paying Giordano off in installments. The pizzerias were required to use fior di latte mozzarella from his cheese business.

Then he'd do it all again in another location. Over time, he widened the circle and offered old friends in Tramonti a similar deal. Some Tramonti residents made their way north even without Giordano's help, opening pizzerias on their own. In many of these cities and towns, they provided a first introduction to pizza.



The view of Mount Vesuvius from Tramonti, Italy

With every member of the family working in the pizzeria, often seven days a week, the Tramonti emigrants were able to get ahead. The pizzeria workers sent money home and maintained strong local ties. When they paid visits back home, the locals marveled at their cars, their clothes, and the houses their money bought. It was “a kind of gold rush” mentality, as one publication described it.

According to Carlo Capello, an anthropologist at the University of Turin who studied Tramonti emigration, working in pizzerias was seen as the best—or perhaps, only—option in the mid- to late 20th century. Even into the 1970s, children would finish middle school and their parents would send them north to work with relatives to learn the trade. “Being a pizza chef was, I don’t know, like being

an engineer for us,” one Tramontini told Capello. Giordano, the Pied Piper of pizza, grew to an almost mythological figure whose nickname became “Gig-gino the millionaire.”

The pizzeria business became another part of Tramonti’s identity, part of its culture. Today, entrepreneurs from Tramonti are seen as the instigators of pizza’s popularization in Italy’s north. In the last few years, there has been an increasing push to have Tramonti recognized as a part of Italy’s pizza culture, and there is even an organization dedicated to this—the Associazione Pizza Tramonti. On our pizza-tasting tour of Italy, we visited several pizzerias that highlighted their Tramonti roots, including Piccola Piedigrotta and Pizzeria Montegrigna Tric Trac (see pages 189 and 188).



Pizzeria Montegrigna Tric Trac might be all the way up north in the Italian region of Lombardy, but its founders hail from Tramonti.

THE MARKETING OF TRAMONTI PIZZA

In recent years, the people of Tramonti have made a more concerted effort to publicize their success in the pizza business, and with that has come a bit of showmanship. Numbers are hard to come by. We’ve seen claims that 3,000 people from Tramonti are in the pizza business—or better yet, 3,000 pizzerias were founded by Tramontini. A researcher gave a conservative estimate of 650 pizzerias. Given Tramonti’s population size, that’s still considerable. It’s also substantial, considering there are an estimated 15,000 pizzerias in Northern Italy today.

Some of Tramonti’s story hinges on a tradition of cheese making, although we wondered about that. We didn’t see a single cow on our travels through Tramonti. Promotional materials include claims that Tramonti’s pizza history dates back to the Middle Ages, when local bakers made hardtack to feed ships’ crews on long journeys. Hardtack, of course, isn’t pizza. There are also claims that Tramonti dairies produced the fior di latte mozzarella used on the famous pizza margherita

supposedly made for the queen of Italy in 1889, though as we’ve shown earlier, that story is legend, not reality (see page 23).

Still, it’s understandable why Tramonti is embracing its pizza ties. While the Amalfi Coast is a popular tourist destination, visitors had long bypassed the tiny municipality. Now that pizza is hot, it makes sense to get on the map. They’ve hosted a pizza festival in town and conferences have been organized around the topic. There are efforts to highlight an heirloom tomato variety called King Umberto or Re Fiascone. Journalists have been writing about Tramonti’s wine.

Carving out their own niche, the pizzaioli of Tramonti say their style is different from that of Naples. The dough is more rustic than the Neapolitan style, and the pizza is baked longer, at a lower temperature, making for a crispier crust. Some pizzaioli with Tramonti ties use whole wheat flour; some also flavor their dough with fennel seeds, which they say is traditional.

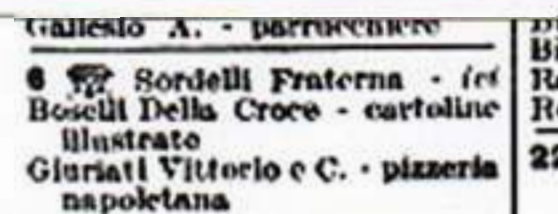
PIZZA IN ITALY IN THE 20TH CENTURY

The 20th century brought many changes to Italy, with mass emigration of Italian citizens to North and South America and other parts of Europe, followed by two world wars. By the early 20th century, pizza in Naples was no longer food for the impoverished and was available across the city. Newspapers, guidebooks, and recipe collections make it clear that pizza was known and available in Italy outside of Naples as well. Toward the second part of the century, we started to see regional styles both develop and spread within Italy. We also saw evidence of American pizza in Italy, and the “true” Neapolitan pizza becoming outnumbered in the pizza industry in Italy, setting the stage for the development of the AVPN (see page 74). For the historical references on early pizza in Italy, see page 10, and for the historical references on pizza in the US, see pages 34 and 56.

1902

Il Paese di Cuccagna

From Matilde Serao's novel set in Naples: “on the doorstep, two seamstresses were waiting, chattering, till the seller of pizza passed, the schiacciata (flatbread) covered with tomatoes, garlic, and oregano, cooked in the oven, and sold for three cents, a penny, a coin, each piece. The pizzaiuolo, in fact, did pass, but he was carrying his wooden tray, all greased with oil, under his arm, without even a bit of pizza; he had sold everything, and was himself going to eat, down in the Porto neighborhood, where his pizzeria was.”



1904

Guida Generale di Milano

This Italian guidebook includes a listing for a pizzeria napoletana in via degli Spadari, Milano.

1905

Vocabolario Metodico

Filologico Comparato

La pizza defined as schiacciata or focaccia

Mitica pizza, vero oro di Napoli

«Come si chiama» disse la regina, moglie di Umberto I. «Margherita, in onore onore»

1929

Corriere della Sera

Article about how pizza, “the real gold of Naples,” caught on in Milan in 1929

1931

Touring Club Italiano—Guida

Gastronomica d'Italia

Guidebook lists pizza as “one of the most famous and characteristic specialties of Neapolitan cuisine, for which the pizzerie are famous, which have taken over many cities outside of Naples. It essentially consists of a large round cake/tart, half a centimeter thick, made of leavened bread dough, on the surface of which oil is poured and on which various ingredients are placed, such as mozzarella, tomatoes, anchovies, mushrooms, according to taste, in addition to oregano as seasoning. Pizza is baked in the oven and served very hot.”



1932

Personal inscription

Famous orchestra leader Carlo Zecchi sent Gigino Dell'Amura, proprietor of Pizza a Metro (see page 162), a note of thanks for “the unsurpassed pizze and superhuman delights of the stomach, the smell and the sight.”

1939

Le Vie D'Italia

A lengthy article called “Pizza to Conquer the World” described pizza both within Naples and its spread. It cites pizza's arrival in Rome “some forty years ago: and it appeared in the capital as an elegant novelty.”

★ Vorrebbe «preparare le brioches in casa» la signora Gemma Bassati di Casapinta, provincia di Vercelli. «Ma non riesco a trovare la farina adatta cioè di grano duro. Manca. Inoltre non riesco ad eseguire due ricette nelle quali si cita il corn-strup, per mancanza di questo strano ingrediente».

1971

La Stampa

Article describing Manitoba flour as a strange, difficult-to-find ingredient. It was usually sold wholesale in sacks of 50 kg / 110 lbs each (meant for professionals), while in the market only the “double zero weak flour” was available.

1972

La Stampa

Mention of Pizzeria A'Marechiaro di Luigi Giordano, the first Tramonti pizzeria in Northern Italy

no a riempirsi gli occhi di luce, il corpo di sole, lo stomaco di pesce fritto, di trenette al pesto, di cima alla genovese, con un po' di focaccia, la pizza bianca ligure, da addentare con l'aperitivo. Eppoi, a inebriarsi coi vini liguri, della cui eccellenza già si è detto. Fanno il pieno, come lo facciamo noi, del resto, da portare a casa nelle città dai

1979

La Stampa

Article mentioning “pizza bianca ligure” among typical dishes from Liguria, without explaining its preparation

1980

La Stampa

Article calling pizza bianca “the simplest among the infinite existing variants of pizza”

La manifestazione ad Amsterdam

Anche la pizza avrà un campione

Una raccomandata mi ha informato qualche settimana fa che all'origine della civiltà, quando l'u-

1981

La Stampa

Article describing the difference between pizza alla napoletana and pizza alla romana: pizza alla napoletana has a slightly higher thickness with the classic cornicione around (raised edges); pizza alla romana is thinner and crispier.

1981

La Stampa

Ad for a pizzeria serving pizza a metro in Torino

1982

Il Libro della Pizza

The first Italian pizza-centric cookbook, *The Book of Pizza*, was published.

o alla regina d'Italia, la famosa ricetta tricolore

della pizza Margherita

ato a proposito. Eppure il prodotto ha reso famoso al mondo l'immagine dell'Italia: ed è solo oggi che la pizza napoletana è arrivata a qualcosa di certo. L'avevano chiamato perché la regina Margherita voleva una pizza che fosse italiana. Lei aveva detto: «La pizza era an-

1989

Corriere della Sera

Article about the 100th anniversary of pizza margherita (based on the Pizzeria Brandi story, see page 23). It states there are 12,000 pizzerias in Italy. Veneto is the region with the highest number of pizzerias, followed by Emilia-Romagna and Lombardia. Naples is in the middle of the ranking, “favouring quality instead of quantity, still considering pizza a form of art.”

Pizza all'uso di Napoli.

E' una piccola caratteristica napoletana, pressappoco come i maccheroni. A Napoli quasi tutte le trattorie di secondo ordine, e molti caffè s'intitolano *Pizzeria*, appunto perchè vi si vendono le pizze.

1909

Nuova Cucina delle Specialità Regionali
Description of Neapolitan pizza: "take the leavened dough to make bread and to knead it with oil and salt. Then spread it on an oiled baking tray, and lay ½ anchovies, a bit of mozzarella or another young cheese, few pieces of tomato on top, arranged as ornaments, and cook it in the oven."



1914

World War I was declared, following the assassination of Austro-Hungarian Archduke Franz Ferdinand. Italy entered the war as part of an alliance with Austria-Hungary, but later switched and declared war on them in 1915.

1919

The Treaty of Versailles was signed, bringing an end to World War I.

1924

Guida d'Italia del Touring Club

Guidebook entry about Roman cuisine: "For a quick snack . . . pizza (the Romana is thinner than the Napoletana, which calls for pieces of anchovies among the seasoning ingredients)"



1925

La Stampa

Ad for a pizzeria in Turin

1927

Corriere della Sera

Article about a pizzeria in Milan, which opened in 1927; note that travel guides and other sources document a pizzeria in Milan as early as 1904, which likely meant the earlier pizzeria had closed in the intervening years.



1939

World War II broke out when German chancellor Adolf Hitler invaded Poland.

1943

The Italian Campaign began resulting in the invasion of Sicily. Naples was occupied by Allied forces.

1945

On May 8, Germany surrendered, ending the war in Europe. Japan surrendered on August 14, ending World War II.

1956

La Stampa

Reference to the first pizzeria of Savona, which opened in 1956. The pizzeria was known for its patrons signing, drawing, and painting on the napkins, which become a real art collection.

1956

Storia della Pizza

The story of the birth of the margherita pizza (see page 23) is revived in this early pizza history.



1960

Italian trademark application

Application to trademark Pizza a Metro, but the pizzeria had been in operation for many years

1962

Corriere della Sera

Article about pizza pugliese made with onions, olive oil, and grated pecorino. It's described as "not as widespread as the pizza napoletana but as delicious."



1965

Corriere della Sera

Article affirming that until 1950, the Neapolitan tomato was sold more abroad than in Italy, a result of the Southern Italian migrants who brought pizza and spaghetti abroad with them. After 1950, the trend was reversed, and by 1964 the Italian market was three times that of exported tomato sales.

Nata a Napoli, ora sta a Milano in 357 locali Ma la pizza abita qui

1989

Corriere della Sera

Article about pizza in Naples with stats: in 1965, there were 6 pizzerias in Naples; in 1989, there are 357. Of the 357 pizzerias, only 27 make Neapolitan pizza, 31 make American-style pizza, and the rest make styles from the regions of Italy. Pizza from Northern Italy is said to have a very thin, cracker-like crust with no rim, while pizza in Southern Italy has a high cornicione and a soft dough.

Ma l'ultima novità modenese, quasi una moda, è la pizza al metro. La Pizzeria Storchi, in viale Storchi 87, e lo Smeraldo, di Pozza di Maranello sono specializzati in questa versione del tipo.

1990

Corriere della Sera

Mention of pizzerias in Modena specializing in pizza a metro



1991

Corriere della Sera

Article about the strength of the pizza business in Italy, even in spite of a recession (brought on by the Gulf War) that has harmed the restaurant industry overall. The headline reads "Pizza Won the War." The article states that there are over 700 pizzerias in Rome and 1000 in Milan.



1995

Corriere della Sera

Article mentioning Angelo Iezzi winning the world title for his al taglio pizza and his pizza school. It states he uses American flours and employs a "flour technician."

PIZZA'S SECOND COMING

We've talked about the spread of pizza, but we haven't yet talked about quality. Through much of the 20th century, Italy's pizza scene wasn't exactly viewed as top-notch. Back in the 1950s, President Dwight D. Eisenhower made an offhand comment that New York pizza was much better than what he found in Naples. There were jokes about a possible international incident, but there's no question the remark was cutting. The pizzaioli of Naples responded by throwing a pizza party for 50 high-ranking American and Italian officials, hoping to charm them.

Any praise seemed to be short-lived. Sure, there were good pizzerias all over Italy, both then and now. There were probably great pizzerias, too. But by and large, Italian pizza wasn't particularly adored (especially when you compare it to today). Italians didn't do much to show off their invention.

For more on the AVPN rules, see page 3:43.

Antonio Pace (bottom) is one of the founders and president of the AVPN, which he started in order to spread the traditional methods of Neapolitan pizzaioli, such as drizzling olive oil over a marinara pizza, like this pizzaiolo from Port'Alba in 1967 (top).



It would not be surprising if, during the second half of the 20th century, many people outside of Italy had not had the foggiest idea that pizza was Italian and instead thought it was American. Pizza's role in American-made popular culture certainly fueled its spread. (In fact, people still pose this question to the internet today: "Is pizza American or Italian?") If you happened to be Neapolitan, this could feel a little embarrassing.

In 1977, newspapers breathlessly reported that "an American was selling pizza to Italians" at an international food expo overseas. It was Ira Nevin, a prolific inventor specializing in pizza ovens. "Lots of Europeans are interested in American pizzas," he was quoted as saying. This state of affairs did not sit well with certain segments of the Italian population. The way they saw it, the Americans had not only stolen pizza, but ruined it. In 1984, advocates began pushing the Italian government to set up rules that would protect "true" Neapolitan pizza. "Pizza is not what it was," one parliamentarian said. Meanwhile, a pizza contest, judged by Italians, had given an award for a pineapple pizza. "It went beyond the very limit of good taste," said a disgusted Italian. "Would you eat spaghetti with jam?"

That disgusted Italian was Antonio Pace. Just a month earlier, Pace and a group of Neapolitan pizzaioli had helped form the Associazione Verace Pizza Napoletana (AVPN) to promote and protect the institution of real Neapolitan pizza. (For more on the AVPN, see page 3:43. For more on the characteristics of Neapolitan-style pizza, see page 3:35.) They began by creating a list of standards outlining what, exactly, Neapolitan pizza was. The rules were extremely detailed, elaborating on each step of the process. Everything from the flour to the tomatoes to the oven type and baking time was specified (see page 3:43). (The rules are so strict that some of Naples's oldest pizzerias don't qualify.) They purport to codify the way pizza was made in Naples for hundreds of years, but the very notion of rules for a centuries-old foodstuff, created mainly as a cheap meal for the poor, is incongruous. Nineteenth-century pizzaioli were just trying to get by. But the AVPN is as much about pizza making as it is about marketing, and the ultimate goal was to help Naples benefit from its centuries-old invention.

The campaign to elevate Neapolitan pizza was multipronged. In the 1990s, panels of Italian pizza experts toured the United States, bemoaning the quality of American pizza. In fact, much of what they saw wasn't even pizza—frozen pizzas with the flavor of cardboard, pizzas with pineapple on top, extra-large pizzas stuffed with pounds of cheap cheese, and

pizzas baked in electric ovens! One representative noted that what he saw was “a crime to humanity.”

The AVPN set up training schools and a certification process for pizzerias to prove they make “authentic” Neapolitan pizza. (To date, 835 pizzerias around the world have been certified.) Other organizations took up other aspects of the cause, including the Associazione Pizzaioli Napoletani (APN), which runs similar programs focused not on pizzerias but on the pizzaioli. They’ve been supported by both the business community and the government.

The gambit paid off. The rules helped elevate Neapolitan pizza, putting it on a different plane than other styles of pizza. They also created a level of quality assurance for the product and helped professionalize the job of pizzaiolo. In Pace’s worldview, being a pizzaiolo was both art and craft, and emphasizing its historical roots gave Neapolitan pizza an automatic air of “authenticity.”

In 2009, the European Union agreed to register Neapolitan pizza as a Traditional Specialty Guaranteed (TSG) product, meaning that only pizzas that meet a set of rules can be labeled “Pizza Napoletana.” Ironically, a pizzeria in Turin, far from Naples, was first to receive the designation.

The crowning achievement for Naples and its pizzaioli came in 2017: a committee of the United Nations, UNESCO, named the art of Neapolitan pizza making as a piece of Intangible Cultural

Heritage. Everything from the kneading to the fermenting to the tossing to the baking was recognized as an important part of cultural history. Naples hailed the news with celebrations in the street.

“Finally,” Gino Sorbillo, a prominent Neapolitan pizza maker with 10 pizzerias in Italy and the US, was quoted in the *New York Times* as saying, “the world recognizes the capability of the pizza maker. We make a product that has conquered the world.”

Neapolitan pizzaioli and UNESCO officials (from bottom left to right: Antonio Starita, Sylvain Bellenger, Enzo Coccia, Andrea Coccia, Gino Sorbillo, Dario Franceschini, Ciro Coccia, and Marco Coccia) celebrating the UNESCO classification of Neapolitan pizza’s cultural heritage in 2017.



CAPUTO FLOUR

In the mid-1990s, back in what *New York Times* restaurant critic Frank Bruni called “less self-conscious pizza times,” when the debate over what constituted real, “authentic” pizza wasn’t even a whisper, an Italian-food importer in New Jersey received an urgent phone call requesting a specific flour—Caputo. Fred Mortati, whose family has run Orlando Foods since the 1940s, had never heard of it, but he knew what to do. He called a friend at a Naples tomato cannery and, this being the ‘90s, asked him to check the local phone book for a Caputo mill.

When Mortati reached Carmine Caputo and told him a Midtown Manhattan Italian restaurant called Naples 45 wanted his flour, Caputo was skeptical. Out of the blue, some company in America, one of the largest wheat producers in the world, wanted his flour? “He basically said, if you send money, I’ll send flour,” Mortati recalled, laughing.

In the years since, Caputo flour has exploded in popularity. In the 1990s, most US pizzerias were using American ingredients; today, many seek out something made in Italy. Mortati said Caputo flour went from 0.3% of Orlando Foods’ imports to “at least 1,000 times that.”

For the Caputo family, it’s a funny kind of return to their roots. Around the turn of the century, two Caputo brothers immigrated to New Jersey and opened a factory to produce candied fruits for Italian pastries. In the 1920s, though, they decided to marry two sisters from Capua, their Southern Italian hometown. Antimo Caputo, the great-grandson of one of those brothers, said they sold the New Jersey factory and returned to Italy. They used the profits to buy a mill and pasta factory in Capua.

Later, Antimo’s grandfather bought a mill in Naples, where Mulino Caputo is located today. Outcompeted by bigger manufacturers, they jettisoned the pasta factory. Now pizza flour is a huge part of the business, and the success had a lot to do with the New Jersey company, Orlando Foods.

“Thanks to pizza, thanks to friends like Fred (Mortati), we discovered a new market in the United States,” Antimo Caputo said. Pizza makers, who he called “the soul of pizza . . . are the best ambassadors.”



The Caputo family; Antimo Caputo, for whom the company is named, is fourth from the right



PIZZA IN POSTWAR AMERICA

In 1953, Dean Martin sang the Billboard hit “That’s Amore,” a song written for *The Caddy*, a movie he also starred in. Even though the song is nearly 70 years old, we’re sure you know the hook:

*When the moon hits your eye like a big pizza pie,
that’s amore*

*When the world seems to shine like you’ve had too
much wine, that’s amore*

It’s both campy and catchy—“a charming, if goofy, parody of popular Neapolitan organ-grinder music” is how one 20th-century commentator described it in the *Guardian*. It’s not an Italian song. It’s not an American song. It’s an American notion of Italy, and all those record buyers recognized the sentiment.

Whereas in the 1940s, pizza was still unknown in enough circles that journalists felt the need to define the word, by the 1950s it was firmly ensconced in the culture. The transformation was stunning. Within a decade, pizza had gone from being strange and exotic to trendy and fun, from esoteric to crowd-pleasing. Although there were already some distinct differences among regional styles, pizza had become as American as . . . well, the hot dog. By 1957, the *Saturday Evening Post* devoted several pages to the “tremendous pizza craze that has swept over the country,” noting that a Long Island entrepreneur outfitted a bus with ovens and trolled

the suburbs like an ice-cream man would, except he was selling hot pizzas and his loudspeakers blared the Neapolitan classic “O Sole Mio.”

By 1958, there was a kosher pizzeria in East New York. In 1959, *New York Times* food editor Craig Claiborne reported that Woolworth’s in midtown Manhattan had opened a pizza stand in its food section. Another department store was selling pizzas by the thousands, though its pizzas, made with bagels, weren’t anything like those back in Naples. “The American way of life, the free enterprise system, and the capitalistic interplay of supply and demand have accounted for the advances,” *New York Times* columnist Herbert Mitgang wrote in 1956.

Portion size helped, too. In the United States, unlike back in Naples, pizzas were made large, and eating one alone just didn’t make sense. It was food for a group.

Marketing also played a major role, and pizza mixes were among the first foods advertised in a medium that was spreading quickly in American households: TV. Between 1950 and 1960, the number of television sets in the United States jumped from about 6 million to 52 million, and advertising increased, too. In a 1957 television ad, two teens drawn in cartoon style pull up in a car and ask a third teen to come join them for pizza. Then they learn they can make it at home using Chef Boyardee pizza mix.

In a city full of pizza joints, New York has an inordinate number that use the name “Ray’s” in various permutations—Famous Ray’s, Famous Original Ray’s, Original Ray’s, World Famous Ray’s. But somehow none of these pizzerias, including the original Ray’s (Ray’s Pizza, opened in 1959) had owners named Ray. Ralph Cuomo, owner of Ray’s Pizza, sold a second location to Rosolino Mangano, who in turn renamed it Original Ray’s Pizza and then renamed it again when another place called Famous Ray’s opened. Mangano went on to open 20 more locations. Others soon glommed on and somehow “Ray” and “pizza” had become inextricable. There are currently nine pizzerias in New York City with “Ray” in the name, while four have closed.

From the 1950s on, pizza was an everyday part of American life, from frozen pizzas made to be sold at the grocery store (previous page) to pizza nights (at left, below) and pizza served at festivals (at right, below).



There is some debate about who first ordered pizza using a computer. Open Culture traced the event to December 1974, when Donald Sherman, a man whose communication was impaired by a neurological disorder, placed an order from a Michigan State University lab. The computer converted Sherman's text to an electronic voice. "It may not be very long before we're all able to use computers to communicate," a local TV reporter said at the time.

The teens dance and it takes just minutes to make the pizza. "Real pizza pie with the chef's touch in it!" It was now possible to enjoy both pizza and television at once. By this point, Hollywood stars were also on the pizza bandwagon. Jackie Gleason joked about his pizza habit on *The Honeymooners*. Lucille Ball learned to toss pizza on an episode of *I Love Lucy*. Frank Sinatra was said to have a huge pizza habit. Liberace loved pizza. So did James Dean.

Demographics played a major role in pizza's miraculous transformation. After the Second World War, teenagers became a significant force in the marketplace. (They would become even more significant in the 1960s and 1970s as the baby boom generation matured.) Pizza was ideal for the teen crowd because it was fast, cheap, filling, and, best of all, new. "In teenage circles," one journalist wrote in 1959, "pizza parties are now THE THING!" General Mills' fictional Betty Crocker solved the "Problem of the Puzzled Parent" who wondered how to please a group of teens: start with refrigerated pizza dough, of course. And the fact that women were more likely to have jobs outside the home in this era created a greater need for a quick dinner option.

The postwar economic boom meant there was more money to spend on dining out.

"[Pizza] fit so well in the culture of the times," wrote the historian Harvey Levenstein. "It was regarded as an ideal family food, equally acceptable to all ages and both sexes. Its taste hardly departed from the tried and true, yet its form could be readily accommodated to the era's newer, more casual way of eating: children's parties and snacking in front of the television set. The informal, communal way it was eaten in restaurants made it particularly popular with teenagers, and by the mid-1950s boisterous 'pizza parlors' dotted the main streets of Italian neighborhoods, their oversized booths for six or eight crammed with voracious young eaters."

To some Italians, the state of affairs was bewildering. In 1959, actress Sophia Loren said when she first came to the United States she was astonished to see that everywhere she looked, people were eating pizza. Growing up in Naples, pizza was poor people's food. "So I think America not so rich after all," she told the *Los Angeles Times*. "Then I find eating pizza here is like eating hot dog—for fun."

In the '50s and '60s, pizza was linked to youth culture and viewed more like an activity than simply a meal.

How to toss a PIZZA PARTY

Just be sure it's a Chef Boy-Ar-Dee pizza. It's out of the box and into the oven in 15 minutes. And all the fixings for a man-size pizza are complete in one box. Complete with grated cheese. There's nothing else to buy. Collect compliments for saucier sauce, flakier crust—peppier pizza all around. All for just pennies a serving.

Fun idea: use some of the cheese to sprinkle a message on your pizza.

HAPPY HOLIDAY

For more fun ideas with pizza get the Chef Boy-Ar-Dee Pizza Party Book. It's full of recipes, games and fun!

Chef BOY-AR-DEE PIZZA
outsells any other mix by two to one

American Home Foods, P.O. Box 46, Morris Plains, N. J.
I have enclosed 10¢ plus the box top from a package of Chef Boy-Ar-Dee Pizza. Please send me the Pizza Party Book.

NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Complete in one box

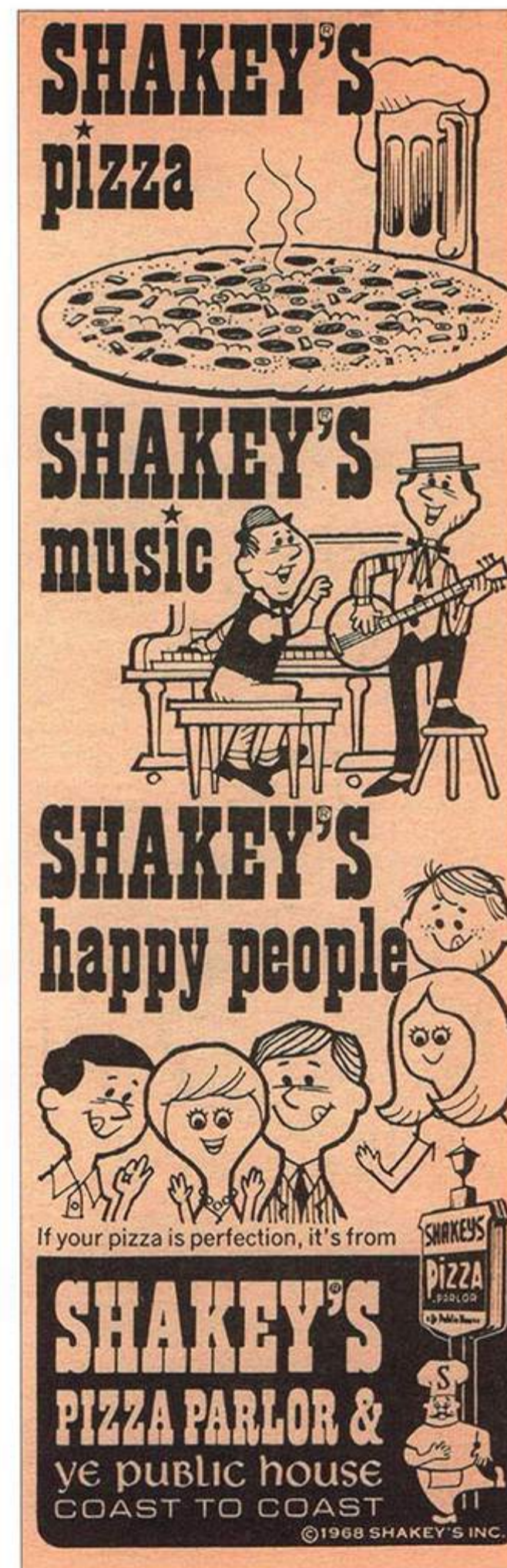


It continued to snowball. As pizza got more popular, people started opening pizzerias, which exposed more people to pizza, which created opportunities for more pizzerias, and so on. People from all walks of life wanted in on the action. Pizza made by Mexican Americans was a huge hit at the 1952 Texas State Fair. Pubs in Florida, Wyoming, and Iowa started serving pizza. And, fatefully, the pizza craze came to the attention of some businessmen and -women in the West and Midwest, who would create something even bigger. These businesspeople had a keen understanding of how pizza's economics would play out in the newly burgeoning field of restaurant franchising. With their work, pizza's Italian roots would get lost. Soon, it would be fully American.

TECHNOLOGY AND THE RISE OF CHAINS

The franchise concept has been around for at least 200 years and is a way to grow businesses. By the 1950s, it was gaining momentum, ultimately creating the fast-food industry. The soft-drink industry started this way. Drugstores also proliferated thanks to the economics of franchising. McDonald's, Dunkin' Donuts, and Kentucky Fried Chicken all got their start before 1955. The business practice would utterly transform the way America ate, creating a common fast-food diet from coast to coast (and eventually around the world).

In 1954, "Big Ed" Plummer and Sherwood "Shakey" Johnson opened Shakey's Pizza Parlor and Ye Public House in Sacramento, California. It



Shakey's Pizza was the first franchised pizzeria, setting the stage for the large chain pizzerias that now dominate the pizza market. The Santa Monica location is also where Nathan ate his first pizza.

featured not only pizza but also live Dixieland music. The concept took off, and the pair decided to open another Shakey's in 1956, this one in Portland, Oregon. The next year, they decided to sell the pizza parlor model to others, making it the first pizza company to take up the franchise model—by the 1970s, Shakey's had around 500 outposts.

Within a few years, more pizza chains were established, including those that dominate the industry even today.

In 1958, brothers Frank and Dan Carney founded Pizza Hut in Wichita, Kansas. Their opening-day plan included giving away pizza to generate interest. A year later, Pizza Hut had its first franchise store, in Topeka. At that time, a Pizza Hut franchise was intentionally cheap—just \$100 to get in, plus \$100 per month. Within 10 years, the company had more than 300 franchises, including international outlets;

it was known for its family-friendly atmosphere and tomato sauce with some spice to it. Today, Pizza Hut is the second-biggest pizza chain in the world by gross sales.

Little Caesars was founded in 1959, with its first location in a strip mall in Garden City, Michigan. Three years later, owners Michael Ilitch, the son of Macedonian immigrants, and his wife, Marian, sold their first franchise. Today, there are almost 4,500 outlets. The main marketing strategy involves selling two pizzas for the price of one, and it's the number three chain in the world.

In 1960, Jim Monaghan, a postal worker, told his brother, Tom, about a pizzeria for sale in Ypsilanti, Michigan, near Ann Arbor. Tom was an iconoclast who had tried, and failed at, other endeavors, and he had no pizza experience. But he embraced the business wholeheartedly, working day and night

Take our \$2.00 and find out why Pizza Hut serves more pizza than anyone else in the world.



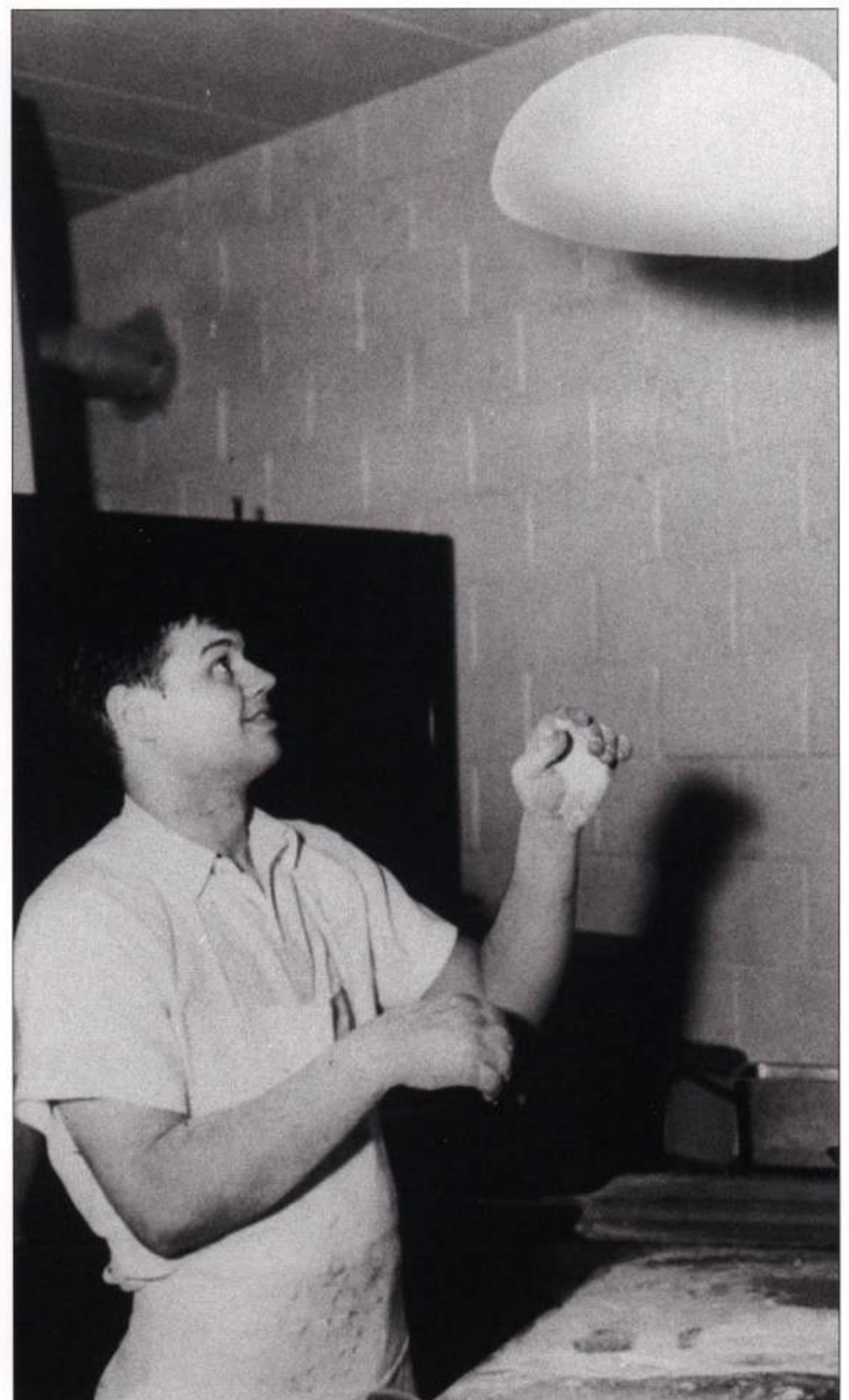

The secret of Pizza Hut's success is really no secret at all. A great pizza and a great place to enjoy it just about sums it up.

Sure we take a little extra time rolling out the fresh dough, and maybe we do ladle on sauce when others brush it on, and yes, it is true we do use sliced mozzarella cheese. But should that really make all the difference? A lot of folks think so.

But add to that the warm, friendly atmosphere of the Pizza Hut itself, courteous table service, a time-saving phone-ahead carry-out service, and the extra special attention given to children and family groups, and you have the whole story.

Great pizza and a great place to enjoy it. So, take our \$2.00, find our address in your telephone directory and pay us a couple of visits.

PIZZA HUT
we serve the family circle



Pizza Hut started in the late 1950s and was opening franchises within a year.

Entrepreneur Tom Monaghan, now owner of the Detroit Tigers and founder of Domino's Pizza, flipping pizza dough when he first opened his business in 1965

to make Domino's Pizza a success. The company started offering franchises in 1967, and today it's the number-one pizza chain in the world.

Tellingly, Monaghan's efforts weren't so much focused on making the best pizza. Instead, he wanted to make them quickly. (He was once timed making a pepperoni pizza in 11 seconds.) Today, it's easy to forget that free delivery was an innovation. A few pizzerias offered it as early as 1950, but Monaghan made free delivery central to his business model. Not only did it force almost every other pizza enterprise in the country to offer the same service, it also made pizza even more readily available to everyone from families on the go to carless college students.

None of these enterprising pizza makers started with the idea of re-creating the pizza their mama used to make, or even the pizzas the Italian restaurant down the street turned out. Instead, they regarded pizza as a business opportunity—and a

very good one at that. Most kinds of restaurants require knives and forks; pizzerias don't. Actually, plates aren't even required. With home delivery as a focus, pizzerias don't need waitstaff or bussers, tables or chairs. (Later, thanks to the popularity of take-and-bake pizza at Costco, grocery stores, and chain pizza companies, ovens weren't even needed).

Pizza found astounding success thanks to these new businesses and franchises. In 1934, there were about 500 pizzerias in the United States; by 1956, there were 20,000. By the late 1960s, Americans were eating 2 billion pizzas annually. It was part of the standard fare for school lunches, hooking youngsters who would become lifetime consumers.

By 1984, there were more pizzerias in the United States than there were hamburger joints. "Pizza, an Italian immigrant, has dethroned a hallowed native American gastronomic institution," the *Chicago Tribune* reported. "Any way you slice it, pizza is now Numero Uno, more American than apple pie."

In 1970, in what it called its "First Annual Pizzarama" issue, *New York* magazine did something wild: they awarded first place to Goldberg's Pizzeria, run by a Jewish man from Chicago who made deep-dish pizza. The hate mail was immediate, and very New York. "You clods must be putting us on," one reader grouched. The article was "so bad that I just regard it as an ethnic slur," another complained, adding that the reviewers were most likely "non-Italians with appetites jaded by dry martinis, Instant Breakfast, and Spam."

THE MINNESOTANS BEHIND THE FROZEN-PIZZA EXPLOSION

When Totino's frozen pizza first hit the market more than five decades ago, it was a sensation thanks to the hard work of Jim and Rose Totino, a pair of high school dropouts who learned to make the homestyle food of their immigrant parents—and market it to their friends, their region, and eventually the entire nation.

After the Totinos started their family, Rose developed a reputation for her homemade Italian specialties; she often brought pizzas or pastries to school events. At that time, pizza wasn't standard fare in Minnesota, but the PTA parents gobbled it up. After the Second World War, Jim and Rose believed they could market pizza more widely by opening their own pizzeria, so they went to the bank for a loan. "What's pizza?" the loan officer asked. Rose was prepared. She had hauled along a portable oven, and the pizza she baked in the bank's lunchroom won over the loan officer.

In 1951, Jim and Rose opened Totino's Italian Kitchen in northeast Minneapolis, and it was an immediate success. By 1962, they had come up with another idea in the hope of selling more Italian food to their clamoring customers: freeze it. Jim found a manufacturer of prebaked

pizza crusts and then jury-rigged an old turntable so it would dispense tomato sauce as each crust spun.

They managed to crank out 75 cases of pizza on their first day. After another loan, they upped production while learning the intricacies of distribution and marketing as they went along. Rose, a self-proclaimed people person, made the rounds with her portable oven and frozen pizzas, winning over distributors and grocers in Minnesota and beyond.

The Totinos weren't the first entrepreneurs to come up with the idea of frozen pizza, but other businesses were small-scale operations. The Totinos took the idea of frozen pizza national. By 1969, they had locked in 75% of frozen pizza sales in the United States. In 1975, they sold the company to Pillsbury for \$22 million. Rose, who had completed only 10th grade, became Pillsbury's first female vice president.

Rose and Jim Totino's frozen pizza, developed in a little Minneapolis kitchen, remains a national force. In 2017, Totino's Party Pizza was the fourth-best-selling brand in the United States, with sales of \$347.2 million.



CHEF-INSPIRED PIZZA

In 1971, a uniquely influential restaurant called Chez Panisse opened in California with a then-radical concept. Alice Waters wanted to make fresh, local, seasonal ingredients the centerpiece. “I think lettuce was my first passion,” she has said, without a hint of irony. She also had a thing for pizza, ever since going to an old Bay Area Italian restaurant called Tommaso’s. Chez Panisse was French-inspired, not Italian, but that didn’t matter. They began serving individual pizzas as early as 1974.

In 1980, Waters had a wood-burning oven installed (inspired by the one at Tommaso’s) and pizzas became a favorite with diners. Unique toppings were the stars of these pizzas, including goat cheese, wild nettles, or foraged mushrooms. These were pizzas that looked beautiful and tasted even better.

A few years later, accomplished Austrian-born chef Wolfgang Puck saw Waters’s oven, hired her

oven builder, and took the idea even further. In 1982, he and his American wife, Barbara Lazaroff, opened Spago, in West Hollywood, which was a dazzling and instant success. Puck presided over the operation from an open kitchen, lit like a stage. He hired Ed LaDou to make pizzas, which turned out to be revelatory. “It was like being an artist who’d worked with 10 colors all of his life and then got to use 300,” LaDou once said. Smoked salmon and caviar. Duck. Truffles. All baked in a wood-fired oven like Waters’s. Puck knew exactly what he was doing. “Let’s face it,” he told a *Newsday* reporter. “Everybody really likes pizza more than caviar or foie gras.” Food writer Ruth Reichl saw it more broadly: “He took the pretension out of big-deal dining,” she wrote, “and made pizza the food of the stars.”

It’s hard to overstate how big this change was. Before that, there were only a few things you could legitimately put on pizza without nearly starting a riot: sausage or pepperoni, green peppers,



Artisan pizza can trace its roots to the pizza nights at Chez Panisse in Berkeley (top) during the 1970s. It really took off in 1980 when Wolfgang Puck (bottom) opened Spago in Los Angeles; pizza would never be the same.



mushrooms, or onions. Cheese and tomato sauce were mandatory. Now, pizza was an anything-goes proposition. Smoked gouda? Yes. Lox? Yes. Caviar? Wasabi? Why not? They were freer to innovate because they weren't looking to Italy, pizza's birthplace, or even New York, where there were long-standing, if unwritten, rules. California's bounty of fresh produce gave them an incredible palette from which to draw. And the cuisines of its large immigrant populations, many from Asia and Latin America, provided inspiration. Diners were enthralled.

Puck and Lazaroff would go on to open several more upscale restaurants; they also launched a chain of inexpensive cafés that served pizza and salads, and created a line of frozen California-style pizzas. In 1997, the *New Yorker* called Puck “the most financially successful chef in history.”

LaDou, meanwhile, left Spago to help curate the menu at California Pizza Kitchen in 1985. As Reichl wrote, the restaurant “was not remotely Italian,” noting it “seems born to be cloned.” Now there are more than 250 locations around the world, along with a line of grocery store frozen pizzas. And, of course, you can now get pizza with all sorts of unusual toppings all over the country, including the Original BBQ Chicken Pizza.

The Rise of Artisan Pizza

The genius of Waters, LaDou, and Puck was to look at pizza not as a humble breadstuff but as a canvas for a meal that was creative, fun, and simultaneously approachable and gourmet. For them, it was all about the toppings. They worked not as typical pizzaioli but as chefs, thinking about ingredient combinations and layers of flavor.

Waters's focus was less about inventive toppings than it was about the quality and freshness of the ingredients. She obsessed over every detail, from the sourcing of the cheese (local, of course), to the bespoke herbs sprinkled on top. Ingredients, unique combinations, and a single-minded focus on quality. It was a whole new way of looking at pizza.

Chris Bianco took up this mantle early on. He started carefully making artisan pizzas in a Phoenix grocery store in 1988, and later went to Italy to study with pizzaioli. Back then, pizza seemed like an odd thing to be *that* obsessive about, particularly in the middle of Arizona. But that's where he opened Pizzeria Bianco in 1994. He worked and worked, and the pizza was so good that people would wait hours to get in the door. The fact that in 2003 he was recognized with a James Beard award for best chef in the Southwest—that's chef, not pizzaiolo—says something about his approach.



Artisan pizzas like those made at Spago (top left), Pizzeria Beddia in Philadelphia (top right), and Pizzeria Bianco in Phoenix (above) pay close attention to detail, resulting in high quality and innovation.



When Bianco started, what he was doing didn't really have a name. Today, we'd call it artisan-style pizza, featuring good dough, quality toppings, and thoughtful compositions. Indeed, using the word "artisan" in relation to pizza would have seemed ridiculous a few decades ago. Now you see it everywhere. California paved the way. The movement bears some similarities to the craft beer movement, where passionate beer drinkers began brewing as a reaction against the mass-produced watery beer juggernaut. It's also got a lot in common with the artisan bread movement of the 1980s and 1990s. Not coincidentally, that's where Nancy Silverton came from.

With partners, Silverton runs two pizzerias, Pizzeria Mozza and Triple Beam Pizza, both in Los Angeles and both wildly popular and highly regarded. At Mozza, she took her inspiration from Neapolitan-style pizza (more on that later). At Triple Beam, she was inspired by the bakery Antico Forno Roscioli in Rome (see page 172). She studied in Italy but has a bit of Waters in her, too, using a chef's approach to creating her pizzas, whether it's the fresh mozzarella delivered almost daily from a favorite producer in Northern California or the unexpected topping combinations made with California's homegrown best. Here, wild nettles and borage have a place on pizza. "It reflects the spread of a certain kind of haute pizza culture across the

country," critic Frank Bruni wrote in a 2007 *New York Times* review.

There's also a bit of Waters in Razza Pizza Artigianale, a New Jersey pizzeria that favors locally sourced ingredients and was one of the most memorable experiences on our international pizza tour (see page 225), and in Lovely's Fifty Fifty, a Portland, Oregon, pizzeria where the pizzas are, truly, lovely (see page 259).

There's also a big movement toward "authenticity." You see it in the throwback joints in New York that are focused both on quality and on serving up a real New York experience. Even the lowly slice is getting attention. Frank Pinello's Best Pizza, an old-school slice joint with some modern-day twists, qualifies (see page 218). So do Paulie Gee's Slice Shop, Upside Pizza, and F & F Pizzeria, to name a few of our favorites.

Californian Tony Gemignani has roots in the idea of authenticity, too. He first gained attention in international dough-tossing combinations and then turned his focus toward making the best pizza possible, again winning international honors. He makes pizzas in just about every style imaginable, but all of them come under an overarching motto: "Respect the craft."

Quality and authenticity have been major forces behind the proliferation of pizza in America in the 21st century, but pizza has also become hip.



Artisan pizza is now found all over the US, including at Pizzeria Mozza (top left) in Los Angeles, Razza (bottom left) in New Jersey, Lovely's Fifty Fifty (bottom middle) in Portland, and Tony's Pizza Napoletana (bottom right) in San Francisco.

A RETURN TO “REAL” ROOTS

The examples here are American versions of pizza—arguably good ones, not the English muffin, cocktail frank, and chili sauce versions we saw in the earlier days. Still, the Italians weren't necessarily excited about these new developments. Americans had co-opted and changed their historic, homegrown food into something else. Something bigger and heavier. Something baked in a newfangled oven. Something that, in most cases, didn't give so much as a nod to Italian tradition.

But since 1984, the Naples-based Associazione Verace Pizza Napoletana (AVPN) has been working to position Neapolitan-style pizza at the top of the pizza pyramid (see page 74). While more marketing campaign than natural occurrence, the AVPN has helped fuel a more recent American interest (and sometimes obsession) with Neapolitan pizza, as has the Associazione Pizzaiuoli Napoletani (APN), which trains and certifies the people who make the pizza.

In 1994, Antica Pizzeria in Los Angeles was the first in the United States to be certified by the AVPN. By the early 2000s, there was a Neapolitan-style pizza craze. Today, there are around 100 AVPN-certified pizzerias in the United States. Neapolitan pizza schools have also sprung up in the United States and Italy. Now, hundreds of years after it was invented on the streets of Naples, Neapolitan-style pizza is suddenly hot. In a world where there were already tens of thousands of pizzerias and numerous pizza styles, the original pizza feels like something new.

Today, having a badge from the AVPN or APN has become a way to assert a certain kind of authenticity while also signaling some standards of quality. Kesté, in New York, is the main outpost of the APN. Pizzaiolo Roberto Caporuscio and his daughter Giorgia run an APN training school there, too.

But there are many other pizzerias serving Neapolitan-style pizza without either organization's official stamp of approval. Anthony Mangieri's original Una Pizza Napoletana got high praise for its traditional Neapolitan-style pizza. In more recent years, he's embraced a newer Neapolitan trend called *canotto* (see page 135) with the same attention to detail.

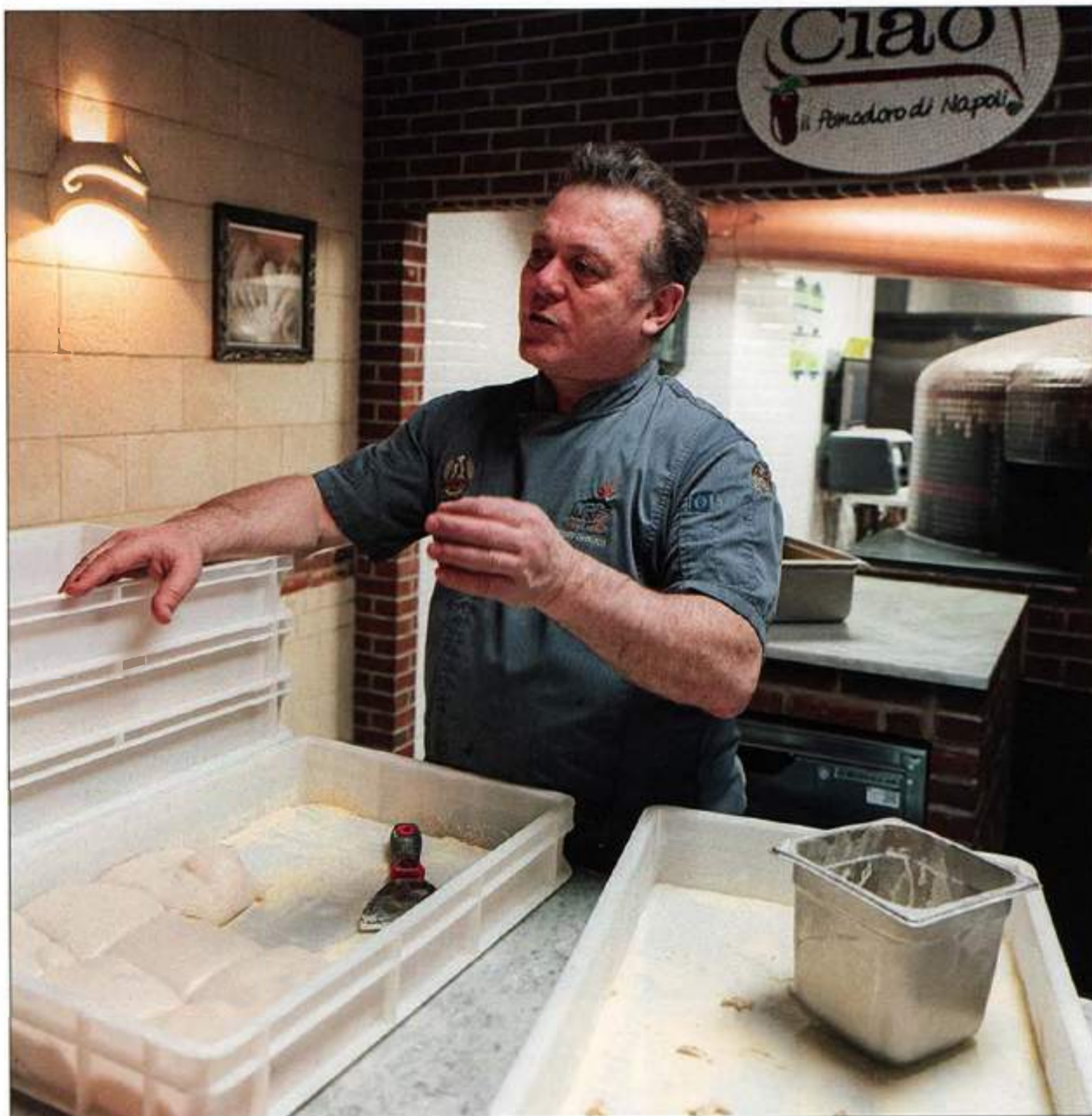
There have been reactions to these developments, too. Some people have bemoaned the over-complication of what is essentially a peasant dish. They've complained about the absurdity of some of the toppings or the prices.

There will always be cheap pizza. New York, in fact, is home to many \$1(ish) pizza slice joints, many

of which opened in the wake of the 2008 recession. Countless children eat pale and soggy school lunch pizza every day. You can log in to a website and get two pizzas delivered for the price of one. Every grocery has multiple freezer cases full of cardboard frozen pizza or take-and-bake pizzas and pizza dough available in their bakeries.

And yet, this era in pizza is also a great time for those who value quality.

With the creation of the AVPN and the APN, Neapolitan pizza spread across America. Roberto Caporuscio (top) of Kesté and Anthony Mangieri's Una Pizza Napoletana (bottom), both in New York, are well known for their Neapolitan-style pizzas.





Pizza is integral to Neapolitan culture. Pizzaioli like Enzo Coccia (above), Franco Pepe (see page 161), and Gino Sorbillo (next page) are highly esteemed for their craft.

PIZZA IN ITALY TODAY

It's time to consider how far we've come. In the 1800s, pizza was regularly described as disgusting and strange, a dish fit only for the poor. For most of that century, it was contained in Naples. It wasn't Italian food; it was Neapolitan food. With millions of Italian immigrants, it traveled to the United States, Argentina, and Brazil, and then came back around the globe again in the mid-20th century. Only then did it begin to permeate Italian cities and towns other than Naples.

Now in the 21st century, Italians have reclaimed this product as their own. Especially Neapolitans. "When you are in Naples, you can't separate pizza from our culture," Antimo Caputo, of Mulino Caputo (see page 75), told us.

If we visited Naples 50 years ago, we're doubtful we would have seen it that way. Maybe not even 20 years ago. But today, pizza is part of Naples's

identity. You can see it in the reverence Neapolitans and others have for their pizzaioli. You can see it in pizza-related billboards, newspaper articles, and morning TV segments; in the lines outside top pizzerias; in how chefs from the United States, Japan, and elsewhere come to study the art of pizza; in how Naples pizzaioli are lauded when they visit other countries.

"What people want is the identity, a food with a strong identity," Caputo said.

But it's bigger than just Naples. If, as Alexandre Dumas wrote in 1835, pizza is the "gastronomic thermometer of the market," the temperature right now is hot all over Italy. After publishing highly regarded Italian restaurant guides for 23 years (and mostly snubbing both Naples and pizzaioli), Gambero Rosso (see page 152) put out its first guide specifically devoted to pizzerias in 2005.



The quest for “authenticity” (which we saw hints of even back in the early 1900s) has now taken on even more significance. Pizzaioli everywhere have come to scrutinize and fetishize Italian ingredients, techniques, ovens, even pizza peels, as they aspire to make the perfect pizza.

It’s ironic, wrote historian Carol Helstosky in her book *Garlic and Oil: Food and Politics in Italy*, that a cuisine “built of scarcity and necessity now constitutes a formalistic language where the attention to the smallest detail is mind-boggling.”

Not that we’re complaining. Pizza has thrived for so many years precisely because it’s adaptable to the local culture, to the whims of chefs and pizzaioli, and to the economics of the marketplace. In the last decade or so, it’s gotten better, and it’s been elevated to a new kind of status, spurring even more new ideas.



CHAPTER 2
THE WORLD OF PIZZA

UNITED NATIONS
OF PIZZA





 **NATIONS UNIES
DE PIZZA**

OUR PIZZA MISSION	92
WHAT CONSTITUTES A STYLE?	94
QUALITY TRANSCENDS STYLE	113
BUT THAT'S WHAT I GREW UP ON!	115
THE CLOSE ASSOCIATES OF PIZZA	123
PIZZA STYLES	125



THE WORLD OF PIZZA

Pizza is arguably the world's most popular food; it's available in one form or another in almost every country on earth. Yet it's one of the most varied dishes in the world because wherever pizza went, it mutated into different local styles. This was partly to adapt to different religious food rules, ingredients, and tastes, as well as respond to socioeconomic and cultural influences. But those obvious things—kosher, halal, or vegetarian pizza, for example, or pizza with curry or other spices—are not the whole story. There is no discernible reason why pizza in Detroit should be thick and bready, or why Chicago should simultaneously adopt both very thick and very thin pizza. It just happened that pizzerias in these places made modifications that were accepted by their clientele.

These different styles are essential to understanding the worldwide phenomenon called pizza, but they also complicate the picture. How do we talk about the perfect New York pizza? Or the ideal pizza of Naples? And in Naples does that mean the so-called “true” Neapolitan pizza governed by its own organization (see page 74)? Or should it be the pizza that you actually find at Naples's best pizzerias?

These questions exist because a specific flatbread with toppings started as a street food among the urban poor in 19th-century Naples and became popular (see page 17). Because it was a food of the poor it received scant attention from the chefs making refined food for the rich; however, it became

something of a sensation within Naples. Which by itself is hardly surprising. Every city, town, village, and hamlet in Italy has its own characteristic dishes, many of which you can find only by actually traveling there. This might have been the fate of pizza, but for the fact that wretched social changes forced a third of Naples's population—more than 1 million people—to leave in a multi-decade diaspora (see page 22), mostly to the Americas.

Other Neapolitan food specialties—spaghetti, for example—also traveled with the immigrants and became popular in the lands where they settled. But none sparked interest comparable to pizza, particularly in the United States, which adopted pizza wholeheartedly. It was from the US that pizza would spread throughout the world, including throughout the rest of Italy. Later, as a reaction to re-imported pizza, a second diaspora of pizza began in Naples, taking a native view of pizza to the world (see page 74).

In this chapter, we look at the many iterations and modifications pizza has taken as it traveled around the world. We spent months traveling, too, and eating pizza in many of these places. One of our main goals was to better understand pizza styles and to create our own taxonomy instead of just following what we read online. We were surprised by what we found on more than one occasion. Here we'll talk about what constitutes a pizza style, including the “styles” that fell short of the mark, as well as the ones that completely confounded us. We also offer a look at the major styles established around the world.

For more on our travels around the world, see page 149.

NEW DISCOVERIES

There are limited ways to alter the characteristics of a pizza to create a new style (see page 98)

We searched for the archetypal New York Sicilian pizza and couldn't find it in the wild (see page 101)

Bar/tavern style pizza doesn't meet our criteria for a distinct style (see page 105)

There is no single defining Roman-style pizza found in the city of Rome (see page 107)

The pizza you grew up with might not be good (see page 115)

The best representations of a style are sometimes not from where it originated (see page 120)

In an homage to pizza's birthplace, we created a map of Italy made from its most iconic pizza, the margherita, floating in a sea of red wine.

OUR PIZZA MISSION

For more on flammkuchen, also known as tarte flambée, see page 3:23.

The word “pizza” comes from the same linguistic origin as “pita” in Greek or “pide” in Turkish. All around the Eastern Mediterranean, cultures used a word phonetically similar to “pizza,” “pita,” “pide,” or the like to refer to any of a wide variety of flatbreads or flat pastries like tarts (see page 7).

Pizza is one of the world’s most popular foods and is eaten all over the globe.

What we call “pizza” in this book is the culinary descendant of that specific topped flatbread from 19th-century Naples, and it had some other influences along the way. This leaves out many pizza-like dishes, such as flammkuchen, an Alsatian flatbread with a topping of fresh cheese, onions, and bacon. Many cultures have flatbreads and a good many of them have come up with some sort of topping to make a more satisfying meal. Most of these topped flatbreads originated independently of pizza from Naples, and some are even older than the pizza we’ve defined here. As good as those may be, we don’t count them as “pizza” for the purpose of this book (see page 4).

Our mission involves exploring, documenting, and comparing widely different styles of pizza. It’s a daunting, and even delicate, task. We did our best to be impartial, but be forewarned: we can’t promise to love your favorite pizza.

We don’t focus on the pizza made by large chains in this book. Certainly, they serve a purpose, but this book is dedicated to home pizzaioli and small-scale independent pizzerias. Sometimes, what was once an independent pizzeria became a regional or even nationwide chain, as is the case with Pizzeria Uno (see page 64). We discuss these cases only when there’s an important historical reason to do so.

Furthermore, we are focused only on high-quality pizza. New York City, as a case in point, is awash with 99-cent slice shops that sell a product full of compromises to meet their price point. Oddly, these tend to be independent pizzerias, not chains, because the chains evidently figure that their brand value is worth more than that. While making the cheapest possible pizza may be an interesting challenge to some, that part of the market isn’t what we are concerned with.



YOU CAN GET PIZZA IN (ALMOST) EVERY COUNTRY ON EARTH: WE CHECKED

Let's say you're in downtown Nairobi and have a hankering for pizza. You're in luck! Kenya's capital city has a number of pizzerias. How about Palau, in the Western Pacific? Sure enough, you can get pizza there, too. Ditto for Mongolia and Kyrgyzstan. Even Vatican City, the smallest country in the world with just 0.44 square kilometers of area, serves pizza in the Vatican Museum. P'yongyang, North Korea, got its first pizzeria in 2009. An entrepreneur opened a pizzeria in Kabul, Afghanistan, in 2001. (He said one of the toughest tasks was finding someone—anyone—who knew how to make pizza.) Even Nauru, an island nation that depends on imports for nearly all its food, manages to have a restaurant that serves pizza, despite a 23% unemployment rate (one of the highest in the world).

In fact, there's pizza in every country on earth—with just two exceptions. (Yes, we checked. We built a list of the world's nearly 200 countries

and searched for pizzerias one by one. In cases where we couldn't find what we wanted online, we called the embassies.) We couldn't find any evidence of pizza in tiny Kiribati (an island that is in grave danger of being covered in water). Nor could we find pizza in Tuvalu, an island northeast of Australia that is the fourth-smallest country in the world.

We went through this exercise to see if our theory held true: that pizza (along with bread) is one of the world's most universally accepted foods.

Different countries tend to favor different toppings, and customs vary. In Israel, for example, many pizzerias keep kosher, which means they don't offer meat with their cheese pizzas. In Bangladesh, Pizza Hut's menu is 100% halal. In some countries, pizza is food for the well-to-do, while in others it's a cheap meal. But all around the globe, it's a food that's universally recognized.



Beijing, China



Giza, Egypt



Bequia, the Grenadines



Bouches-du-Rhône, France



Dubrovnik, Croatia



Nairobi, Kenya



Mysore, India



Cambridge, England



Doha, Qatar

Putting khoresh ghormeh sabzi, an herbaceous Iranian stew, on top of pizza may seem unconventional, but according to the queen of Persian cuisine, Najmieh Batmanglij, it's actually quite authentic. Prior to the 17th century, Persians didn't eat rice but would frequently top flatbreads with dishes like khoresh ghormeh sabzi, even adding kashk, a creamy fermented yogurt.

WHAT CONSTITUTES A STYLE?

For more on the spread of pizza in America, see page 53.

A key feature of pizza is that it comes in many different styles. No other food we can think of has as many established stylistic variations as pizza. The styles can be radically different—the crust might be thick or it could be thin. It could be crisp and stiff, or soft and limp. The toppings might be a small addition to what is basically a serving of bread, or they might fill the contents of a deep-dish pan with only a thin layer of crust underneath.

We couldn't tackle making pizza in these myriad ways unless we came to grips with the stylistic differences. The good news is that the process by which a pizza style comes into existence is in some ways relatively easy to study because it is not some long-lost historical process. It's happening right up to the present day. Chicago deep-dish pizza is claimed to have been invented in 1943, which is quite recent compared to most foods.

So-called Roman *al taglio* pizza isn't a style by our reckoning (see page 107), but even if it were, its inspiration started in 1998. The pizza gourmet, or pizza *degustazione*, movement in Northern Italy started in 2005 (see page 141). Other nascent styles are trying to get off the ground right now—the *canotto* or lifeboat style of Neapolitan pizza, with a large rim or *cornicione*, began trending over the last five years (see page 135).

The first thing to realize about pizza styles is that they were all created at pizzerias. So far as we know,

there isn't a single pizza style covered in this book that was invented at home by somebody's grandma, including the so-called Grandma-style pizza of New York (see page 101). There are, of course, some grandmothers who ran pizzerias (see page 66), but that is quite different.

Pizza can be made at home, but in urban 19th-century Naples it usually wasn't a home dish because the oven was large, expensive, and not commonly found among the people who ate pizza, many of whom didn't have kitchens. Instead, pizza was something you bought either from a street vendor or a pizzeria. This tradition continued in America, where pizzerias introduced Americans to pizza and became the primary driving force in the development of new styles.

Second, at least until recently, pizza styles did not originate with the self-conscious desire to make a new style. These days a new pizza "concept" might be dreamt up by a trendy restaurateur or anointed by a branding consultant, but in all of the cases that we have studied the idea is much simpler: the pizzeria is just trying to be successful. The changes that it makes to its pizza might be an effort to make it better. It might be in response to other local customs or tastes. Or, as we suspect in some cases, it might be quite accidental.

Pizza with smoked salmon and salmon caviar was the invention of Wolfgang Puck in the 1980s in California. He was seeking to make pizza an upscale dining affair. A similar impulse, including using the same fine-dining ingredients, arrived in Italy with the pizza gourmet movement in 2005.



HOW STYLES DEVELOP

Almost every chef varies the dishes on their menu in some way, be it making changes as required by season, the availability of ingredients, customer feedback, or happy accidents in the kitchen. The difference with pizza is that most pizzerias make only one style of pizza, and their business will live or die by its success. It's easy to add a new topping or flavor, but if you change the style—meaning the whole look and feel of the pizza—you are playing with fire. Another difference is that most chefs in most restaurants are trained in their profession, either through formal education or by long apprenticeship. This option isn't always available to most would-be pizzaioli. Until recently there were no pizza-training schools anywhere. Conventional chef training would be only tangentially useful; culinary schools typically do not cover pizza. Even at the management and ownership level, a surprising number of pizzerias are opened by people who have no background in food service at all.

When a pizzeria makes a different style of pizza, whether accidentally or on purpose, the reaction from customers is likely to be negative—or that is the lore in the business, anyway; change something and everybody complains. However, every now

and then some new idea catches on and the pizzeria becomes successful. Of course, most pizzerias make conventional pizzas, otherwise a new style would be born with every successful pizzeria. But occasionally a pizza is distinctive and different enough that there is potential. Soon, success breeds imitation. The original successful pizzeria may open other branches. The chef/pizzaiolo may be hired by a rival, or they may leave to start their own pizzeria. Or a new pizzeria starts out from scratch to copy the now-successful protostyle. If the imitators fail or the expansion stops, then the story ends. The other crucial requirement in the development of a style is that multiple independent pizzerias must be making the same type of pizza—otherwise it's not a style, it's just one pizzeria's recipe.

In the world of pizza, though, you'll sometimes see particular pizzerias or even small chains making dubious claims that they've invented a new pizza style. As the marketing value of a pizza style has grown, so have the number of pizzerias that claim to have their own. But for us, if multiple independent pizzerias in different cities or regions aren't making something recognizably the same, then it doesn't count as a true pizza style.

For more on the rise of pizza chains, see page 145.

Neapolitan-style pizza, which originated in the birthplace of what we define as pizza, has inspired several other styles of pizza, notably *canotto* and *artisan*.



THE WIDE WORLD OF PIZZA-LIKE THINGS

There are countless varieties of topped flatbreads all over the world that are unrelated to pizza, which was born in Naples. Often, you'll find these other topped flatbreads referred to as cousins of pizza, such as, say, "Spanish pizza" or "Georgian pizza." We don't see them that way. All of them were born elsewhere and grew up completely separately from

pizza. It would be like calling tea "Chinese coffee," or some such. They're both beverages containing caffeine, commonly served with sugar or cream, but they're unrelated. Here's a snapshot of some of these pizza-like things.



Coca

With its yeasted dough, thin crust, and variety of toppings, Spanish coca has a number of things in common with pizza, but several significant differences. You won't find cheese on your typical coca, and it's most commonly bought at bakeries, where slices are served at room temperature. Common toppings include caramelized onions and red peppers, but you'll also find coca with mushrooms, tomatoes, bacon, anchovies, or any number of other toppings. There are also sweet varieties of coca, which sometimes include lard or eggs in the crust. Sweet coca toppings can include pine nuts, sugar, anisette, fresh fruits, or candied fruits.



Flammkuchen

This pizza-like thing goes by several names. In French, it's tarte flambée, in German it's flammkuchen, and in the Alsace region it's flammkueche, all of which mean "pie baked in the flames." Traditionally made in a wood-fired oven, flammkuchen consists of a thinly rolled dough topped with crème fraîche, thinly sliced onions, and smoky bacon. See our recipe based on this flavor combination on page 3:23.



Khachapuri

A traditional cheese-and-flatbread dish from the Republic of Georgia, khachapuri comes in a variety of shapes and sizes, using doughs ranging from pizza-like to phyllo-like, and is cooked using multiple methods including baking, sautéing and spit-roasting. The name means "cheese bread," and the most well-known example of the dish is perhaps adjaruli khachapuri, a baked flatbread topped with a mixture of Georgian cheeses, with an egg cracked on top as it nears completion in the oven and a knob of butter for good measure.



Lahmacun

This thin, topped flatbread of Armenian or Turkish origin comes out of the oven soft like Neapolitan pizza, with a crispy rim. It's typically topped with minced beef or lamb, onions, parsley, tomatoes, and spices. It's another cheese-less form of flatbread, and it grew up separately from pizza.

Another pizza-like thing is pissaladière, which is a flatbread said to have originated from the Liguria region of Italy and also Nice, France. Topped with onions, olives, and anchovies, it's served at room temperature.



Sfincione

Sfincione is a type of focaccia that's baked with a thin layer of tomato sauce on top. It's usually sold at bakeries, not pizzerias, in Sicily. It's kept at room temperature and meant to be eaten at room temperature. Sfincione may have inspired pan-baked Sicilian pizza, as they do share some characteristics, but we'd define sfincione as a Sicilian type of focaccia, not Sicilian pizza. See page 3:125 for our recipe.

CHARACTERISTICS THAT DEFINE THE STYLE

Style makes sense only when it helps classify a distinctive set of pizza characteristics—things that identify the pizza in question and differentiate it from others. The typical characteristics that come into play with pizza styles are the thickness of the crust (super thin, thin, medium, bread-like), the crust texture (soft or crispy), the crumb texture (tight or open), the amount of toppings and sauce (a little, or so much that you need a deep-dish pan), and, in some cases, what order the toppings are placed on the dough (see page 2:207). Style definitions can also include specific ingredients (San Marzano tomatoes on Neapolitan pizza or Wisconsin brick cheese on Detroit-style, for example) and a whole list of other things. Techniques for making and shaping the dough and the cooking method can also define a style. Some styles, like the AVPN Neapolitan pizza, have complicated rules that also specify the preparation process or other attributes that are not visible in the final pizza (see page 3:43).

The largest single component of a pizza is the crust. It's also typically the *only* part that is completely under the control of the pizzaiolo because very few, if any, grow their own tomatoes or make their own cheese. As a result, crust is almost always central to the definition of a style of pizza; most pizza styles are anchored by their focus on a specific attribute of the crust. As an example, one can vary the thickness of the crust. This has resulted

in extremes ranging from very thin pizza to thick, bread-like crust. No matter what thickness of crust you start with, human curiosity is going to drive people to try something different. It is inevitable that pizzaioli would experiment and try to make a wide range of crust thicknesses. The idea to make the crust thinner or thicker is so obvious that it is unlikely to have a single inventor or single point of origin. That explains why we found super-thin-crust pizza from central New Jersey to São Paulo. For this reason, it makes more sense to call this style thin-crust pizza than to claim that it comes from a particular place.

Grilled pizza is a similar case: the grill is a general-purpose cooking tool, and it is inevitable that people would use it to try to grill pizza. Since the heat is intense and from one side (if cooking with indirect heat), it works well only with a thin crust. We view grilled pizza as a baking variation on a thin-crust pizza. This simple fact appears to have been independently rediscovered again and again. It is found at Al Forno, in Providence, Rhode Island, but it would be absurd to call it “Rhode Island style” because it is really only found at that one place. Indeed, “Rhode Island-style” pizza is a local term for sfincione (see previous page) in Rhode Island bakeries. Grilled pizza is also found at restaurant 1893 in Buenos Aires, which is hardly surprising because the grill, or parrilla, is a mainstay of Argentinean cooking. Grilled pizza is also the topic of numerous books for home grilling enthusiasts.

For more on the geographic range of thin-crust pizza, see page 105.

For more on how to grill pizza, see page 2:414.



Grilled pizza, like this one from 1893 in Buenos Aires, doesn't meet our criteria to be considered a style in its own right. Instead, we consider it a cooking method.

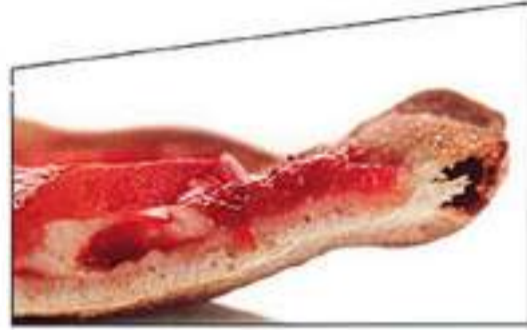
THE PARAMETERS OF A PIZZA

The options for pizza styles are finite—given the relatively simple components, there are only so many ways they can be manipulated to develop a new style. The most central element is the crust: its thickness and texture—is it crispy or is it soft—are usually what makes pizza styles distinct. Whether or not there is a noticeable rim is another factor, or whether or

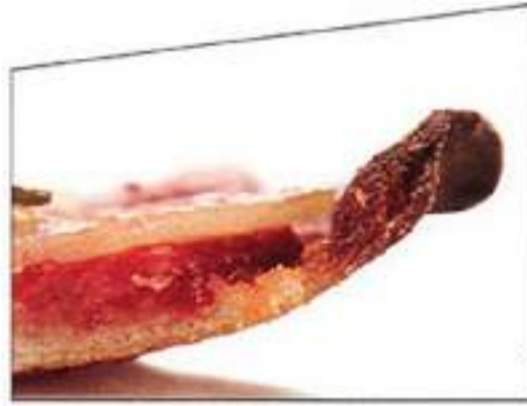
not the pizza is baked in a pan. Think about the soft crust of a Neapolitan or the thick, bread-like crust of a New York square slice. Of course, cheese and toppings are players as well, and when the sauce is applied can be part of what makes a style distinct.

CRUMB RANGE

Here, we show the range of interior crumb from thin (and virtually nonexistent) to very thick, with pizza gourmet at the outer end of the spectrum. Within the range, the quality of the crumb also varies, from dense to very open and back to a tighter crumb.



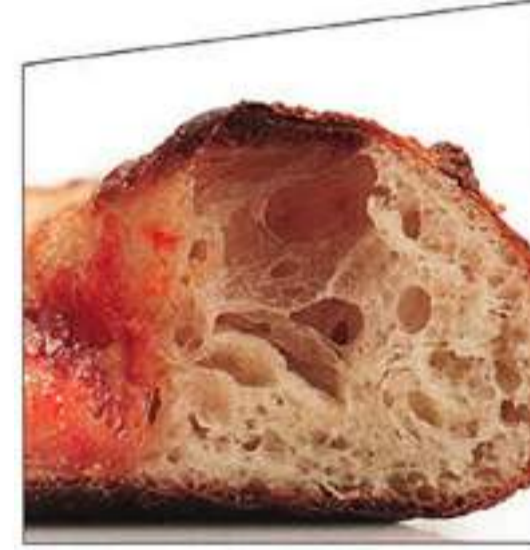
Brazilian thin-crust



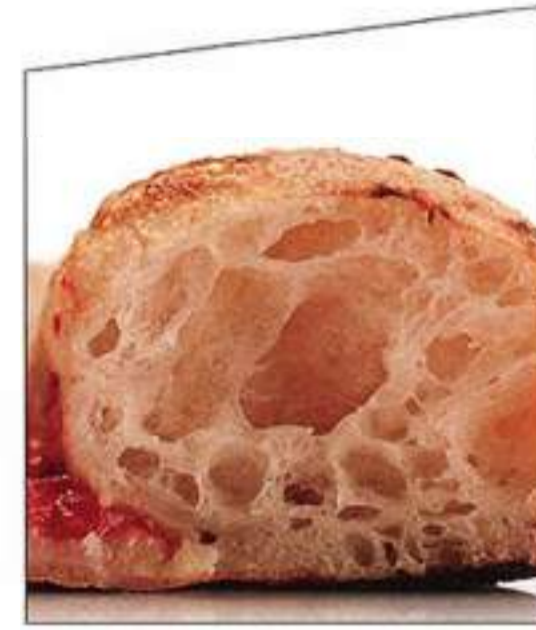
Thin-crust pizza



Deep-dish pizza



New York pizza



Neapolitan pizza

RIM RANGE

The range of rims does not correspond to the range of the crumbs, though pizzas with large rims do tend to have an open crumb within the rim. Neapolitan is the best example of this.



Detroit-style pizza



New York square pizza



Deep-dish pizza



Thin-crust pizza



Brazilian thin-crust

TOPPING RATIO

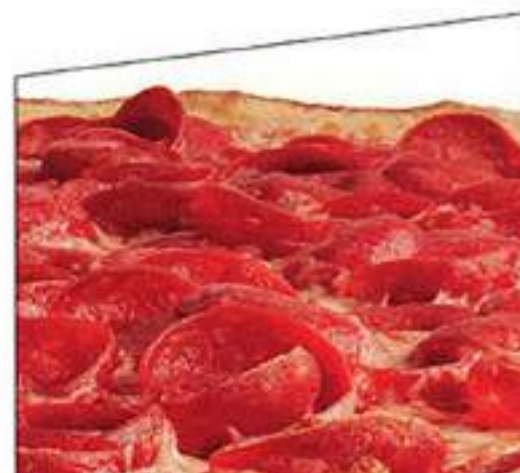
The amount of toppings varies by style and pizza size, but the sturdier crusts typically support more toppings. (There are exceptions to this—here we have pizza gourmet at the lowest end of the spectrum since it typically has under 300 g of toppings to the thick layer of crust.) We cover recommended topping weights by style on page 2:348.



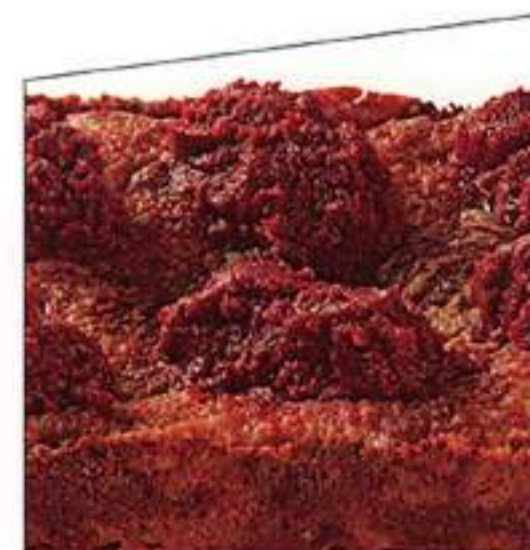
Pizza gourmet



Neapolitan pizza



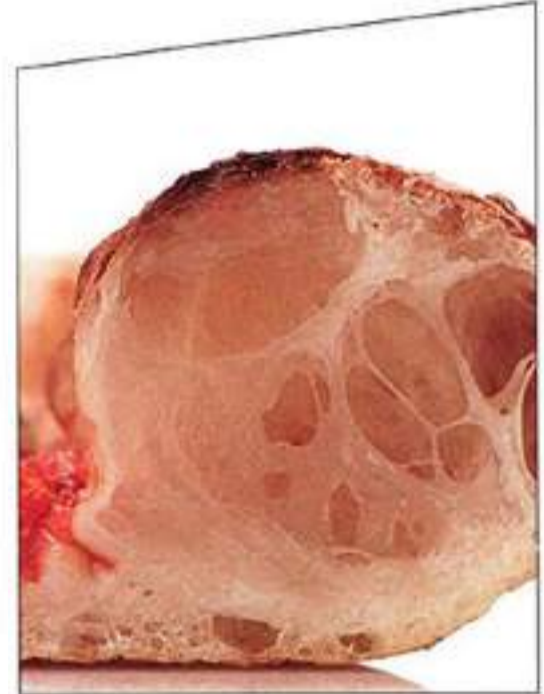
Thin-crust pizza



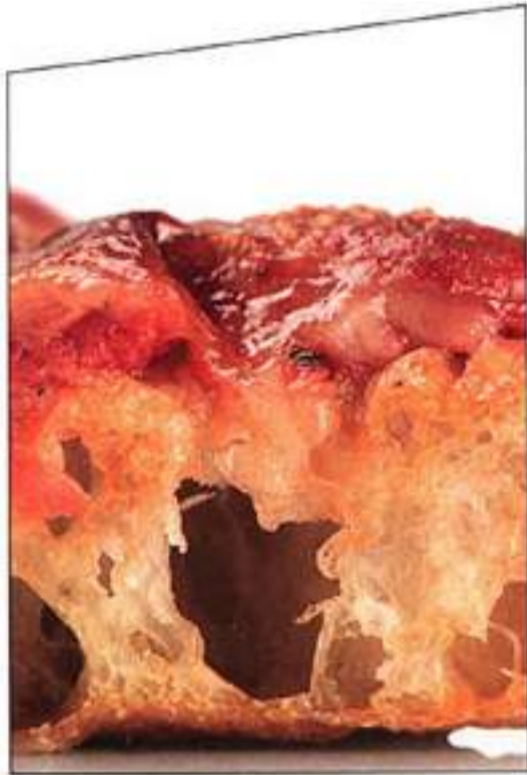
Detroit-style pizza



Brazilian thin-crust



Artisan pizza



New York square pizza



Detroit-style pizza



Al taglio pizza



Pizza gourmet



Al taglio pizza



New York pizza



Artisan pizza



Neapolitan pizza



Canotto pizza



New York pizza



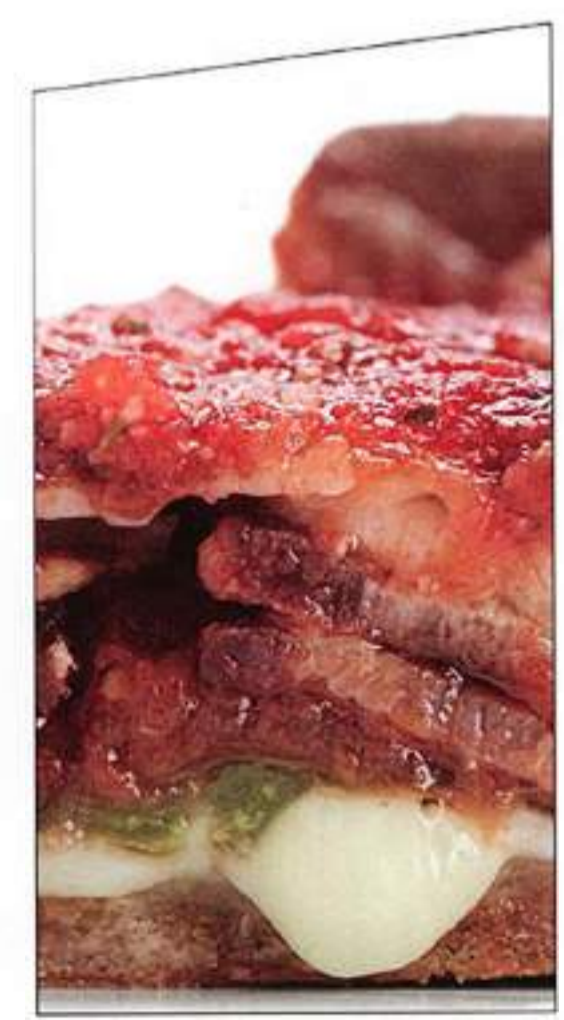
Artisan pizza



Al taglio pizza



New York square pizza



Deep-dish pizza



Love it or hate it, the classic toppings on a Hawaiian pizza are ubiquitous. But nothing about this pizza is “Hawaiian.”

In South Florida (and, of course, Cuba), you can find something called Cuban pizza. The pizza is pan-baked with a doughy crust. The cheese is abundant and often a combination of mozzarella and gouda (a cheese also found in Cuban sandwiches). Particularly Cuban toppings include picadillo, ground chorizo, or plantains. One of the most famous Cuban pizza joints is Rey Pizza, started in 1985, with multiple locations around Miami open 24 hours. Although this pizza is “Cuban,” we wouldn’t define it as a style.

Toppings Do Not Make a Style

We found topping combinations or flavors mistakenly termed a style numerous times in our research. For example, in our way of thinking, a “Hawaiian pizza” (actually invented in Toronto, Canada; see page 57) isn’t a Hawaiian style—it is a very specific combination of pizza toppings that has ham or “Canadian bacon” (which isn’t actually from Canada) and pineapple on it. Whether you love it or hate it, it isn’t a broad style but rather a single flavor and topping combination analogous to margherita. Similarly, a “pepperoni pizza” is just that—a pizza with pepperoni on it. That does not make pepperoni a “style” of pizza.

Many internet lists of pizza styles fall into the trap of naming a particular combination of toppings and sauce as a style. We define style as the characteristics that affect the basic structure of the pizza and go beyond a topping and sauce combination.

PROVENANCE ISN’T ENOUGH

Another common pizza style fallacy, in our view at least, is defining pizza styles by the ownership of the pizzeria. That’s why some lists will include “Greek diner pizza,” named for the pizza one finds at diners in the northeastern United States, many of which are run by immigrants from Greece. Although there may be some stylistic similarity, if one looks in detail it is actually a diverse class of different pizzas. Think of it this way, nobody would say that Thomas Keller makes “Yountville-style” food, even though his flagship restaurant the French Laundry is in that town. Nobody else in the world, much less anyone else in Yountville, cooks exactly the way Keller does. Conversely, Keller’s restaurants outside Yountville, like Per Se in New York, do follow his culinary vision rather than following a culinary tradition of the city he’s in.

Sometimes, a style is defined very specifically, such as with Neapolitan pizza outlined by the AVPN, an organization that has laid out exacting rules for what qualifies as “vera pizza Napoletana,” true Neapolitan-style pizza (see page 3:43). Many of these so-called traditional rules seem to serve the trade organization and sponsoring manufacturers more than the pizza itself. For most styles, though, there aren’t any pizza police. So who gets to define them? That’s like asking who decides what words mean. The meanings of words emerge from how people choose to use words. Lexicographers memorialize these meanings in dictionaries; they’re not *deciding* the meanings so much as keenly *observing*, recording, and analyzing how the rest of us use them. We view the pizza style definition problem like lexicographers would, by looking to common usage. “New York-style” pizza, for example, is a social construct created by the people of New York and their pizzerias.

That social construct is in part a statistical statement about “typical” features found in the city, but there is no good way to specify what “typical” really means. Our solution was to determine the parameters of the style by looking to the pizzerias that are generally held to be the exemplars of the type. That point became apparent in our ultimately unsuccessful search for “New York Sicilian” pizza. Just because food expert X has a taxonomy of pizza that defines a Sicilian pizza by a set of characteristics doesn’t mean that one can actually find the beast in the wild.

THE STRANGE CASE OF THE NEW YORK SICILIAN

One of the famous pizzas of New York City is the Sicilian. Had you asked us a few years ago, when we started this book, we would have said it has a thick crust (at least 18–25 mm or $\frac{3}{4}$ –1 in) and a fluffy, open crumb. It’s baked in an oiled pan, making a lightly crispy bottom. It’s topped with pizza cheese and tomato sauce, but it could potentially have any of the toppings you might put on a classic New York pizza. It’s served hot, either as a whole pizza or by the slice.

That’s more or less the definition we found in various pizza guides. It’s also similar to the definition offered by keen observers of the New York pizza scene, such as local pizza guide Scott Wiener (see page 153). With that in mind, we began experimenting with recipes in our Lab, working to overcome the pitfalls that arise with thick-crust pizza. Then we visited New York as part of our world pizza tour, eager to try the real, authentic New York Sicilian pizza. That’s when everything changed. We realized we

weren’t tracking a fluffy, light pizza; we were tracking a unicorn. Yes, a unicorn. It is a great example of a mythical creature that everyone can describe, yet doesn’t actually exist. It’s shared folklore that explains the origin of the unicorn, and it turns out the same thing can happen with pizza. While we can find plenty of definitions for it, the Sicilian pizza described does not appear to exist in any significant way in the real world.

First off, there is a naming issue. When we began our research, we saw a lot of “Best Sicilian Pizza” lists on the internet. Turns out *more than half* of the pizzas on the “Best Sicilian” list are not called “Sicilian” by the pizzerias serving them! Instead they list “square” or “Grandma-style” pizza. So, “Grandma-style,” “square,” and “Sicilian” are synonyms, then? That is the approach that list compilers seem to have taken. Technically speaking, our history research told us that Grandma-style pizza was invented in the 1980s, and it’s thin, not thick. But even though the original pizzeria (King Umberto’s in Long Island, New York) still exists, the historical definition of Grandma-style pizza as practiced by its originator has effectively been co-opted by other pizzerias. Based on common usage, New York pizzerias treat “Grandma-style,” “Sicilian,” and “square” as the same, and of these, Sicilian actually appears to be in the minority.

King Umberto’s is the creator of the Grandma-style pizza. The term has since been adopted to describe square pan-baked pizzas of all kinds, although we also encountered pizzas called Grandma-style that weren’t baked in this way.



For more on our travels to New York, see page 214.

Regardless of the name, when we made the trip to New York, we found only a few spots that served that fluffy, open-crumbed Sicilian pizza we read about. Instead of the pronounced alveoli, or air bubbles, that make for a fluffy, open crumb, we often found a thick, gluey gel layer (see page 370). In some cases, nearly the entire crust was gooey undercooked gel. When we saw how many of these pizzas were made, we realized why. In nearly every case we investigated, pizzaioli used the same dough for both their Sicilian and their classic New York pizza. It's difficult (though not impossible; it requires a lot of skill) to get a light, open crumb with the lower-hydration dough used for the medium-crust New York-style pizza. The pizzerias often used the same sauce, too, and then baked the bread-like pizza in the same oven as the thin crust.

The problems were amplified because their pizza ovens were almost always set for thinner pizzas, which is not the right temperature for a double-thick dough that needs to be baked for a longer period of time. This makes simple intuitive sense—increase the dough thickness by a factor of two to four times and it will take more time to bake. But in an oven set for a far thinner New York-style pizza, that can't happen because the toppings will burn if you leave the bread-like pizza in the oven that long.

This collection of square slices from our travels shows the range of what you get when ordering a Sicilian or Grandma-style slice in an NYC pizzeria. Some were great, some were bad, but they were varied enough that we can't consider either a consistent style.

Once you notice the gooey, undercooked gel, it is quite unappetizing. If you don't notice it, however, perhaps by telling yourself that the gooey part must be melted cheese, then we suppose you could enjoy the pizza. This is the only way we can explain the people lining up at places like Di Fara, L&B Spumoni Gardens, Prince Street, and others famous for their Sicilians. What we found at those places were big squares of undercooked dough with toppings. We acknowledge that as with any style, there are typically more bad examples than good, but the best ones we encountered were made by the young innovators, not the old-school places.

Why Sicilian?

The next question that comes up is, Why is it called Sicilian? It's not because it's actually made in Sicily. Today there are pizzerias in Sicily, but they generally serve Neapolitan-style pizza or a variation thereof. They do *not* make anything like New York's version of so-called Sicilian pizza. Sicilian bakeries do, however, serve a type of focaccia called sfincione (see page 96) that shares some characteristics with the idealized thick-and-fluffy Sicilian pizza of our dreams. It's usually sold at bakeries, not pizzerias. Like other bakery offerings, sfincione is kept in the bakery at room temperature and is meant to be



eaten at room temperature. Because it's baked in a lower-temperature bread oven, it doesn't suffer from the dreaded gel layer. It's possible that sfincione could be responsible for the shared image in people's minds of New York Sicilian pizza. But for us, sfincione is a Sicilian type of focaccia, *not* a Sicilian version of pizza.

Our historical research suggested another explanation. We came across an early mention of a recipe for something called Pizza Siciliana (Sicilian pizza). It came from a popular US cookbook called *The Art of Italian Cooking* by Maria Lo Pinto, first published in 1948, when few Americans had made pizza at home. The recipe, for a pan-baked pizza that could be made at home, was widely circulated. The recipe was also printed in numerous newspapers around the country. While the recipe really had nothing to do with Sicily, we wonder if it might have something to do with the "Sicilian-style" pizza myth in New York and surrounding areas.

These bits and pieces may help us understand how the term arose, but they still leave an interesting question: Was New York Sicilian *ever* a legitimate style that met the light-and-fluffy definition? The oral history from pizzerias that have made Sicilian pizzas continuously for decades is clear: they invariably claim that they have always made pizza exactly

the way they do now. If that's true, it would mean there never was a fluffy Sicilian and the idealized description was just a myth.

It's also possible that at one point in the past there was a critical mass of pizzerias serving fluffy Sicilians by baking them with different oven settings or prebaking them. But over time they lost out to people taking the shortcut of using the same oven and settings as the classic New York.

Perhaps Maria Lo Pinto's recipe led home cooks to refer to pan-baked pizza as "Sicilian style." Perhaps a clever pizzeria came up with the idea to market a pan-baked pizza as "Sicilian." Perhaps customers who knew sfincione saw the resemblance.

But back to our original mission in the lab: even after all that, we still wanted to create a light-and-fluffy thick-crust pizza recipe—to realize the unicorn in the flesh—and we succeeded. The secret is prebaking the crust without sauce to eliminate the gel layer (see page 370). It works great (and we found a few pizzerias in New York that do this, too). We think this is the pizza that New York "Sicilian" *ought* to be, but we call it New York square (which is the most common name for it anyway) out of respect for the actual place called Sicily and its rich food traditions that don't need to be embellished.

Regina-style pizza isn't well known outside of Canada, but this thick-crust pizza piled with a hearty layer of lunch meat, green peppers, and lots of deeply browned cheese has many hometown fans. It's sliced into squares and definitely requires a fork and knife.



WHAT IS A NEW JERSEY TOMATO PIE?

Central New Jersey and parts of adjoining Pennsylvania have a long-standing historical quirk: the oldest pizzerias didn't call their product pizza; instead it's called tomato pie. The term is also used by old-school Philadelphia pizzerias like Tacconelli's as a synonym for pizza. To confuse matters, other places like Sarcone's Bakery use the term to mean a type of sfincione—a thick focaccia baked with tomato sauce on top, sold and meant to be eaten at room temperature.

The two oldest and most famous tomato pie establishments that are still in operation are in New Jersey. Papa's claims to have been open since 1912, making it the oldest continuously operating pizzeria in the United States. The other was started by the De Lorenzo family in 1936, after a stint working at Papa's. One might naively think, as we did, that the tradition of the tomato pie is well represented by these two historical pizzerias. Except they make very different pizzas.

Papa's pizza has a crust that would be hard to distinguish from a New York pizza. De Lorenzo's pizza has a super-thin, cracker-like crust. Both De Lorenzo's and Papa's say that they are making pizzas the same way they always have. The trouble is that both Papa's and De Lorenzo's have decorated their pizzerias with photos from the old days, and the pizza in those old photos does not look much like the pizza they make today. But they do look similar to each other! In both cases, the photos depict pizzas with much puffier rims, which shows that the crust was more substantial.

We sampled tomato pie at other pizzerias in the area. Some were like the New York-style crust of Papa's, and others, like at Tacconelli's in Maple Shade, New Jersey, had the thin, cracker-like crust similar to De Lorenzo's. Within the New Jersey/Pennsylvania area there are lots of pizzerias with "tomato pie" on the menu, but the only commonality these pizzas share is they are "cheese down" or "sauce on top," meaning that the pizza is assembled with cheese on top of the dough and sauce on top of the cheese.

We don't think this order of assembly is enough to define a pizza style because it can be done for any style of pizza. We saw examples of this on Neapolitan pizzas at Pepe in Grani in Italy (see page 161), and it's our preferred method for Detroit-style and deep-dish pizzas. Putting the cheese on first is a viable idea for most types of pizza (see page 2:207) and has some strong advantages, such as keeping the crust from getting soggy, which is important in a pizza. This method also protects the cheese from breaking down, resulting in superior cheese pull.

It could be that tomato pie was once a well-defined style, and over time each individual pizzeria drifted a bit, making changes in their pizza. One by one the things that distinguished a tomato pie fell away until the only thing left was the order of assembly. Indeed, the 1940s photos from Papa's and De Lorenzo's show us that the tomato pie of that era was quite different than what either one of them is currently making. It's also possible there was never much commonality between the various tomato pie shops in New Jersey—they just shared a name.



Both Papa's Tomato Pies (left) and De Lorenzo's Tomato Pies (right) claim to make their pizzas just like they used to. When comparing their pizzas against historical photos from these pizzerias, however, you can clearly see the prominent puffy rim of the past just doesn't match up with the almost rimless crust of today.

WHITHER THE BAR PIZZA?

Most pizza styles are specific to a city or geographic region. One anomaly is bar pie or tavern-style pizza, which appears to belong to no specific geography—or to many, depending on who you ask. The tavern/bar pizza story goes like this: In the 1940s, a bar that wanted to increase its beer and liquor sales decided to make pizzas and give them to bar patrons for free as a snack to eat while drinking. The pizza was round, but to maximize the number of people it could feed it was cut into little squares. To make all the pieces uniform it was sauced and topped right up to the edge. In order to stretch the amount of pizza, the crust was made thin.

We have heard this story multiple times; the only trouble is that it always seems to be about a *different* bar in a *different* place! Vito & Nick's in Chicago has a story like this, claiming that they originated the style in 1946; it then spread to other places in the Chicago area and is often called Chicago thin-crust. (The name is a bit ironic because the pizza at Vito & Nick's is actually not very thin; it's more like a typical New York pizza.) Even if true, this does not explain why you can find pizza that meets this description all across the Midwest—as far south as St. Louis, Missouri; north to Minneapolis–St. Paul, Minnesota, and Duluth, Minnesota; east to Milwaukee, Wisconsin; southeast to Columbus, Ohio; and as far east as Darien, Connecticut.

In St. Louis, pizza like this is called St. Louis-style. It began at what appears to be the first pizzeria in St. Louis, the Melrose Pizzeria, which opened in 1945. Originally, its proprietor, Amedeo Fiore, used provolone cheese, but despite this and other differences, Fiore advertised his pizza as being the “original Neapolitan pizza.” A newspaper photo from the *St. Louis Post-Dispatch* in April 1947 shows him cutting the pizza into little squares with scissors. The myriad bar-related stories notwithstanding, the hard evidence shows that Fiore was cutting a thin-crust pizza into squares in 1945 in a pizzeria, not a bar. Consistent with this, we found a press photo from the 1950s showing a young couple in St. Louis about to eat a thin-crust, square-cut pizza, but in a restaurant. This photo calls into question many elements of the tavern pizza story. Why cut it into little squares if it was going to be eaten at a table as a meal? The square cut makes sense as a bar snack but much less so as a whole meal served in a restaurant. Also, why sauce it to the rim? That also makes more sense in the context of sharing among many people.

Compounding the issue is that the same sort of pizza, minus one feature—the square cut—is also found in New Jersey, New York, and Massachusetts. For example, Federici's of Freehold, New Jersey, makes round, thin, crispy pizzas sauced to the edge. They also claimed to have invented their style in 1946, during a three-month period of



Melrose Pizzeria is purported to be the first pizzeria in St. Louis. While the place was never a bar or tavern, pizzaiolo Amedeo Fiore is clearly cutting his pizza into the “party cut” in the photo above.

For more on cutting pizza with scissors, see page 3:302.

Ohio, West Virginia, and neighboring areas feature a pizza that is baked only with sauce; the cheese is added after baking. Some of it melts from the residual heat, but mostly it stays raw or partly melted. The pizza is otherwise thin, but square, yet its defining feature is the unmelted cheese.

Today, St. Louis pizza is known for being very thin (“like a communion wafer”) and for the unique taste of Provel cheese, even though that was a latecomer to the style.



This 1957 photo from St. Louis shows a couple eating thin-crust, square-cut pizza in what is clearly a restaurant.



Both Provel and Imo's Pizza, a St. Louis-area chain founded in 1964, have become associated with St. Louis-style pizza, but the reality is that they are both late developments in the St. Louis pizza scene. At some point, the St. Louis pizzeria Luigi's Restaurant replaced the provolone with Provel, a locally made cheese product based on white cheddar, Swiss, and provolone (see page 2:300).



Many early bar- or tavern-style places like Roma Gardens (above) and Eddie's Pizza (below) opened in the post-WWII years, often by young men returning from serving overseas.



People in Chicago say they have two distinctive pizza styles: deep-dish and thin-crust, also called tavern style. Certainly, there are pizzerias specializing in thin-crust pizza here, but it's not quite so distinctive as the deep-dish, which is clearly a local invention.

For more on the tavern-style pizzas we sampled, see page 247.

Bar- or tavern-style pizzas are found all over the Midwest and Northeastern parts of the US. We tried a good number of them but couldn't find enough consistency across the pizzas to meet our criteria for considering it a distinct pizza style.

experimentation that preceded their adding pizza to their existing family-run hotel restaurant.

Eddie's Pizza, established in 1941 in New Hyde Park, New York, has their version of the story, and they successfully trademarked (and have vigorously defended in court) the phrase "home of the bar pie." The Colony Grill in Stamford, Connecticut, making pizza since 1945, has their story. So does the Lynwood Café of Randolph, Massachusetts (started in 1949), and the Star Tavern of Orange, New Jersey (1945).

We have tried to look for clear proof that these stories are true, but that has been inconclusive. It is factual that many bars and taverns did sell pizza, and some gave it away to encourage bar patrons. The earliest example we could find after an extensive search of newspaper archives is an establishment called Roma Gardens, of Hackensack, New Jersey, which took out an ad on November 16, 1934, advertising free pizza on Saturday night. Similar ads started to appear in other New Jersey towns such as Millville and Fanwood in 1936.

The bigger mystery is this: Regardless of whether the square-cut, thin-crust, sauced-to-the-edge pizza started at one of the bars that makes the claim, or at Melrose Pizzeria in St. Louis, or at some as-yet-unidentified place, how did the combination of traits get so widely spread so quickly? The typical story we find with pizza styles is that, prior to the 1990s, they traveled very slowly from their point of origin. That's why they tend to be known from a single geographic area, such as Chicago deep-dish, Detroit-style, St. Louis-style, and Quad Cities. For example, deep-dish pizza originated at Pizzeria Uno in 1943, but it took until 1966 before there was an independent competitor (Gino's East), and there was no expansion outside of downtown Chicago until the 1970s (see page 62).

Yet this types of pizza is found all over the Midwest and all along the Eastern Seaboard of the

United States, appearing roughly in the first few years after World War II. It would be an extraordinary coincidence if super-thin pizza, sauced to the edge, was independently thought up by so many people at the same time. One of the most commonly told stories is that it was popularized in America by returning US servicemen who had been stationed in Italy. But there is strong evidence against this claim since relatively few US soldiers served in Italy, pizza wasn't widely known outside of Naples, and even within Naples wartime food shortages meant that pizza had not been served at the time of US occupation (see page 54). The origin stories of bar pizza give us an alternative twist—almost all of the historic bars and pizzerias we researched were founded in the immediate postwar years and involved the sons of Italian American families returning after their tour of duty. Many wound up expanding an existing family business to include pizza or starting a new pizzeria. While the war didn't educate the customers about pizza, it might have driven pizzeria labor, putting lots of young Italian American men on the job market at almost the same time.

The obvious possibility is that there is a missing pizzeria out there that acted as the originator of this style. One could easily imagine a bar or pizzeria in a port city that was popular with returning US servicemen on their way back home. The pizza was easy to remember because it had distinctive features like a thin crust and sauce to the edge. So when some of those servicemen chose to open pizzerias back home or add pizza to the family bar or restaurant, they copied it. Unfortunately, none of the examples that we know about fit this profile.

Faced with this pattern of facts and the lack of explanation, we can't really call bar-style pizza a regional style that hails from a single place. It clearly qualifies as a style—it's just not unique to a region. Instead, it's a variant of thin-crust pizza, with a wide geographic basis and no obvious geographic home.



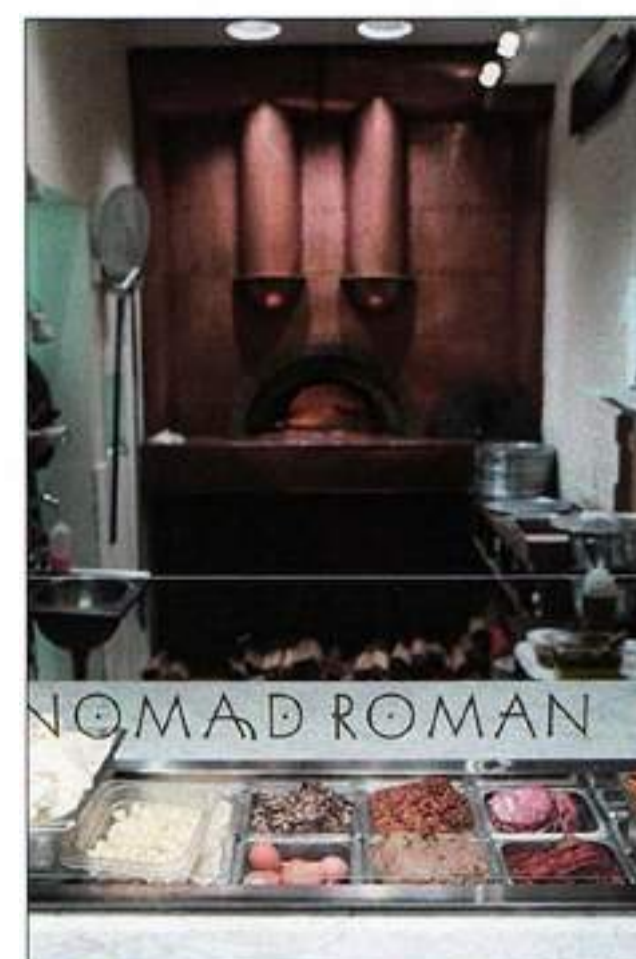
THE CONFUSING MESS OF “ROMAN-STYLE” PIZZA

Of all the pizza styles named for a place, so-called Roman-style pizza is perhaps the most problematic. It’s easy to see why people are tempted to call a pizza “Roman.” Who wouldn’t want to eat a culinary delight from the Eternal City? This issue illustrates a general phenomenon about pizza styles—or more generally, about people. People love a story when it comes to the origins of foods. On one hand, the pizza world worships authenticity (allowing mediocre famous older pizzerias to prosper), but on the other hand, any new pizzeria has to worry about how to differentiate itself from its competition: to be both “authentic” and yet new and different. Importing an unfamiliar style lets you have the best of both worlds—you can claim it is “authentic” Roman pizza (for example) yet still have it be fresh and new to your customers. In 2018, the industry publication *Pizza Today* proclaimed a “Roman-style pizza invasion” was imminent in the United States.

The trouble is, it’s not a single bandwagon; by our count at least five completely different things are all aiming to be Roman-style pizza. Indeed, when we visited Rome for our research we found that actual residents and pizzaioli there were mystified at the notion that there was a single style.

If we turn to the Gambero Rosso guide (see page 152) to see their top-rated pizzerias in Rome, the majority of them make what we classify as Rest-of-Italy Neapolitan (see page 134); basically, a Neapolitan pizza baked in a lower-temperature oven so the crust is a bit crispy. In Italy this style is confusingly known as classico, even among Neapolitans. This is what one finds at pizzerias like La Gatta Mangiona, Sbanco, Sforno, and Pizzeria Tonda. Giulietta, the pizzeria of Michelin-starred chef Christina Bowerman, serves a “Roman-style” pizza of this sort, as well as a more authentic Neapolitan, each baked in its own oven. Virtually every other city in Italy outside of Naples and Campania serves this type of pizza, so it is hard to see what makes it Roman.

Another very different idea about Roman pizza is that it has a super-thin, cracker-like crust. Such a pizza can be found at a few places in Rome, notably Da Remo, Ivo a Trastevere, and Pizzeria Ai Marmi, all located in the trendy neighborhood of Testaccio. It’s also found at Emma, a pizzeria in the historic center of Rome. This super-thin, crispy “Roman” pizza inspired New York City super-restaurateur Danny Meyer at Marta, Nomad Roman in Philadelphia, and AVE Pizza Romana in Paris. Despite this clear influence, it is a bit problematic as a candidate for “Roman style” because all of those places are



The owners of Nomad Roman, a pizzeria in Philadelphia, were originally planning to serve Neapolitan-style pizza. But when they discovered their oven wouldn’t get hot enough, they switched to making a super-thin, crispy pizza inspired by Emma, a popular pizzeria in Rome (see page 172).

For more on our travels to Rome, see page 168.

THE PUZZLE OF TOO MANY PIZZA CHOICES

On our world pizza tour, we noticed that pizzerias often offered what we considered too many choices. Buenos Aires, Argentina, was the overwhelming leader. Here, the menus often listed dozens of dough-and-topping combinations. At Pizzeria Güerrín, for example, we counted 113 different pizzas offered. Compare that to Italy, where the menu options tended to hover in the 30–50 range, although one Naples pizzeria, L’Antica Pizzeria da Michele, famously has just two choices, a margherita and a marinara, but that’s an outlier. There is also a pizzeria in Tokyo, Savoy, that offers only a margherita and a marinara.

In the United States, we found menus with 30-plus options, but we also found examples where all the toppings were presented as a simple list and customers could create their own mix-and-match combinations. Pizzerias in Japan tended to offer fewer choices (in the range of 2–15), although Pizzeria e Trattoria da Isa in Tokyo offered over 30.

Researchers have studied how people make choices, and numerous studies have concluded that too many choices can lead to paralysis and even unhappiness. Psychologist Barry Schwartz calls it “the paradox of choice.” People tend to agonize over the “perfect” decision, and once they make a choice, they continue to agonize over whether it was the best.

So why the long menus at pizzerias? One waiter in Argentina offered a clue. He said no one really reads them anyway. People just choose the toppings they want, and the pizzaiolo makes the pizza to order.



mostly very recent (in the historical sense): Da Remo claims to have started in 1976, Ivo in the 1980s, and Emma in 2014. And older Roman pizzerias, such as Pizzeria Ai Marmi and Il Grottino a Testaccio Dal 1936, serve pizza that's more akin to artisan style. Meanwhile, similar super-thin pizza has been in the American Midwest and central New Jersey since the 1940s (see page 105), and has even earlier origins in São Paulo (see page 44). Indeed, if one had to name a city for super-thin pizza, it should undoubtedly be São Paulo.

The linguistic origin of “pizza” originally referred to any flat baked good—including flatbreads, but also things as diverse as sweet pies and tarts (see page 6). This includes two types of focaccia that were traditionally made in Rome—pizza rossa and pizza bianca. They are found in bakeries like Antico Forno Roscioli and Antico Forno Campo di Fiore. There is no topping on pizza bianca, just a brush of oil, like other focaccia. It's cooled after baking and then sold at room temperature. Pizza rossa is similar; it just has a thin brushing of tomato put on before baking and is also sold at room temperature. By the standards of this book these are not pizza at all. They are bread. Of course there is nothing wrong with bakeries serving a product they have made for years, even if the name is confusing. The funny part

is seeing food guides, “best” lists, TV shows, and the like (for the most part created by Americans or other non-Italians) tout this bakery product as “traditional Roman pizza” because they misunderstand the linguistic origin of the name. This type of pizza is associated with Rome but Pizza a Metro da “Gigino” L'università della Pizza in Vico Equense claims to be the originator.

Pinsa Romana

Pinsa Romana describes either a pizza-like flatbread, the crust for the pizza-like flatbread, or the proprietary flour the crust is made from. The name “pinsa” seems to signal an ancient Roman flatbread, but is really a lot of marketing and bluster. Pinsa is said to have been created by Corrado di Marco—who claims to have learned pizza making from his grandfather who was a baker in Rome—after he discovered, in 1981, the “Pizzasnella mix,” a flour blend specifically for making pizza in teglia (pizza in a pan) that “revolutionized” the al taglio (by the cut) pizza market. Di Marco's company sells pizza flour, pizza mixes, and parbaked pizza bases. The Pinsa crusts are intended to be dressed and baked again in a Pinseria—a Pinsa restaurant. Basically, the entire endeavor is an amazingly audacious way to rebrand pizza as something else so they can sell



Inventor of the Pinsa Romana, Corrado di Marco (back left), at the Guidonia Montecelio headquarters outside Rome, Italy.

We consider Pinsa Romana to fit within our definition of pizza, but we don't consider it a specific style of pizza. Here's our take on Pinsa, which we topped with pickled Peppadew peppers, spicy Calabrese sausage, fior di latte mozzarella cheese, and parsley.



“authentic” flour and parbaked crusts to a worldwide network of Pinneria. Like many food fads and questionable food-marketing claims, Pinsa is touted as more “wholesome,” “healthy,” and “digestible” than conventional pizza crust. These claims are entirely unsupported. The digestible claim plays on the misguided Italian obsession with digestibility (see page 133).

While some of the Pinsa websites argue that Pinsa is different than pizza, most of them argue for Pinsa as a direct pizza replacement, claiming that it is “the product that is changing the pizza business.” We agree that Pinsa fits the definition of pizza used in the book. We can’t consider Pinsa to be a “style” of pizza because at the moment it is the proprietary product of a single company and its licensees. Although Pinneria are independently owned and operated businesses, the licensing agreements and requirements make them little different, for our purposes, than a franchised restaurant. For the same reason, we did not test Pinsa flour because it is not generally available to the public.

Nevertheless, Pinneria in Italy, the United States, and elsewhere actively promote themselves as the “true” or “original” Roman-style pizza. Indeed, Di Marco created the Associazione Originale Pinsa Romana, which is described as an association to “respect and protect” Pinsa. Thus it, too, becomes a candidate in the crazy mess of Roman-style pizza.

Al Taglio

The majority of pizzas are sold whole. That’s been true historically in Naples, where a pizza was considered to be a single serving for an individual person, as well as many of the other places that pizza traveled. In some pizza-mad cities—such as contemporary Naples, Chicago, or São Paulo—pizza sold by the slice is virtually unknown. But in other pizza-centric cities, a slice of pizza is an iconic street food, such as in New York City (see page 214) or Buenos Aires (see page 200). Rome, too, has numerous slice shops that cut rectangular slices off of large and rather undistinguished pizzas with moderately thin crusts and toppings baked on. This approach to pan-baked pizza by the slice is usually called *pizza al taglio* (literally, *pizza by the cut*), but it can also be called *pizza in teglio* (pan pizza). We were told that this type of pizza was introduced by bakers from the town of Termoli who moved to Rome in the 1960s, but we were unable to verify this.

Pizza by the slice in Rome would be a rather low-end product if it weren’t for the efforts of two recent innovators. Angelo Iezzi, of Pizzeria a Taglio Angelo e Simonetta and president of the Associazione Pizzerie Italiane, started the program to upgrade the pizza in the late 1980s through early 1990s, akin to what the AVPN sought to achieve (see page 74). He replaced the nondescript crust with a high-hydration,

We developed a High-Hydration al Taglio Dough (see page 2:158), along with recipes for pizzas in the vein of both Iezzi (see page 3:143) and Bonci (see page 3:146), neither of which we call “Roman.”



Pizzaiolo Angelo Iezzi, owner of Pizzeria a Taglio Angelo e Simonetta, makes his crust with a high-hydration dough, akin to focaccia. In this photo, you can see the open crumb of this square-cut slice.



The al taglio pizzas at Pizzarium in Rome are perhaps the most famous in the city.

open-crust focaccia, and started holding the pizza cold in cases, then reheating it to order.

This formula was a success and Pizzeria a Taglio Angelo e Simonetta has been a neighborhood pizzeria since 1987. However, it would likely have become yet another obscure neighborhood restaurant with a unique style if it hadn't come to the attention of Gabriele Bonci. Bonci is an expert baker, and his version of pizza al taglio is a well-executed, open-crust, focaccia-style crust that is fully baked in a long rectangular pan with only a coating of oil or a thin smear of tomato on top—unlike Iezzi's, which almost always has the toppings fully baked onto the base.

Once the prebaked crust is cooled, additional sauces and toppings are placed carefully on top, then it goes into a refrigerated glass case. As with Iezzi's pizza, servers use scissors to cut a length of pizza to order, then reheat it (see page 3:324) and sell it by weight. In some cases, fresh toppings, like arugula,

are stripped off before reheating and then added back once the pizza is warmed.

Bonci has essentially made his pizzas as open-faced deli sandwiches. Very delicious open-faced sandwiches, to be sure, but it prompted us to ask—is this really pizza? It is a close call, but ultimately we decided that it was, in large part because it was developed within the tradition that has a direct connection to more conventional pizza. It would be hard not to call what Iezzi makes pizza, and it's a clear derivative of pizza as we know it because the toppings are all baked onto the crust. But then, in the context of improving Iezzi's pizza, Bonci simply optimized the production in a different way by having two prebaked bases (oil and tomato) and adding the other toppings later. Not only was Iezzi's pizza the inspiration for Bonci, but in our view that inspiration is also what makes it pizza in our definition.

Bonci's method has many advantages. The baking is done the night before, requiring a minimum of skilled labor. The dressing of the pizzas is done prior to service, with top-quality ingredients and combinations that will reheat well. The act of portioning by weight takes little time or skill. The net result is that this high-quality pizza is efficient in terms of labor costs. Cold-holding and the toppings not being baked onto the crust also guarantee that the quality is good—which is particularly important for some of Bonci's ingredient combinations.

The success of Bonci's pizzerias in Rome, called Pizzarium, and its outposts in the United States, called Bonci's Pizzeria (two in Chicago, one in New Orleans), along with the media attention stoked by Bonci's outsized personality, have made his version much better known than Iezzi's, even within Rome.

Could this be "Roman style"? Unfortunately, the phenomenon is still new enough that there are few other pizzerias in Rome emulating Bonci. The *Gambero Rosso* guide awards "Le Tre Rotelle" (three pieces) as their highest distinction for pizza al taglio, and it lists only one pizzeria in Rome at that level: Bonci's Pizzarium.

In the United States, the only pizzerias we have visited so far that feature a good facsimile of Bonci-style pizza are those owned by Bonci himself. Doubtless this will change over time; the Roman Pizza Academy of Miami (see below), run by Massimiliano Saieva, offers a Roman-style pizza school

designed to teach students exactly how to make Bonci- or Iezzi-style pizza. At Rione in Philadelphia we were served a pizza that instantly reminded us of Iezzi's—it turns out that the pizzaiolo trained at Iezzi's school for "Roman" pizza. After spending most of his career at his eponymous pizzeria in Rome, Iezzi is now branching out and opened a pizzeria on the Upper East Side of New York City in 2018 called PQR.

Rione, a pizzeria in Philadelphia, touts itself for serving authentic Roman-style al taglio pizza. After trying the square-cut slice pictured below, we have to admit that it's very reminiscent of the pizza Iezzi makes.



PIZZA SCHOOLS

It used to be that you learned to make pizza through lots of trial and error and, hopefully, a long stint working under an experienced pizzaiolo. Now, you can go to pizza school. The Scuola Italiana Pizzaioli began offering courses in Caorle, near Venice, in 1988, and today, there are pizza schools all over the world, including San Francisco, Beijing, São Paulo, Toronto, Frankfurt, Russia, Chicago, and, of course, New York and Naples. Some pizza classes are casual, evening-long affairs with cocktails and are meant for amateurs. Others feel more like boot camps, including one offered by famed Italian pizzaiolo Enzo Coccia that lasts four weeks.

We enrolled in a number of pizza schools and visited others as part of our research for the book. We took classes in making Neapolitan pizza at Accademia della Pizza Napoletana in Los Angeles, the Authentic Detroit Style Pizza Maker Program in Detroit, and the Roman Pizza Academy in Miami. We also visited the Associazione Verace Pizza Napoletana headquarters in Naples and the Kesté Pizza School in New York. From our tenure as pizza students as well as our visits to different pizza schools, we were able to better codify our definitions of pizza styles and how they compared to what we experienced during our travels.

Some other notable ones are the North American Pizza and Culinary Academy in Lisle, Illinois, Scuola Nazionale di Pizza in Rome, and Pizza University & Culinary Arts Center in Beltsville, Maryland, which is a test kitchen created by pizza oven manufacturer Marra Forni.



Our head chef, Francisco Migoya (left), learning to make pizza at the Vera Pizza Napoletana headquarters in the US.

What to Make of It All?

Other recent “Roman-style” pizzerias we have encountered in the United States are even more distant echoes of anything we found in Rome. So, what are we to make of this mess? “Roman-style” pizza doesn’t mean very much in current usage: the pizzas that are promoted as “Roman style” don’t share any common characteristics. Some are super thin and have a cracker-like crust. Some are just focaccia without the toppings. Some merely amount to marketing hype. Others are open-faced sandwiches based on a thick, open-crumb focaccia. Initially we hoped to sort this out and find the “true” Roman-style pizza, but we have reluctantly concluded that there isn’t one.

Instead, there is a mad rush to exploit the fame of Rome by calling all sorts of different pizzas “Roman style” based on the thinnest of excuses. The contenders are mostly brand new, in the grand scheme of things—dating from the late 1950s at the oldest.

None of them seems to have a more legitimate claim than the others. They are, *at best*, pizzas that were very recently invented at a pizzeria in Rome. None of them has a long history in the city. The oldest—the super-thin pizza—has a much longer history elsewhere and thus is quite possibly an import. None of them has enough market share that they typify pizza across the city.

It is a bit disappointing since Rome has a long and rich culinary history. To us, it seems disrespectful to that history to make up claims in a crass attempt to appropriate the legitimate culinary reputation of Rome. But we don’t see much of a way to stop it, either. We confidently predict that “Roman-style” pizzerias will continue to open all over the world, regardless of how different their products are from one another, and regardless of how tenuous their connection to Rome actually is.

Here we’ve gathered a collection of photos showing the diversity of pizzas we ate while traveling in Rome. As we discovered, there’s really no such thing as “Roman” pizza, and we sampled different styles including al taglio, Neapolitan, and thin-crust.

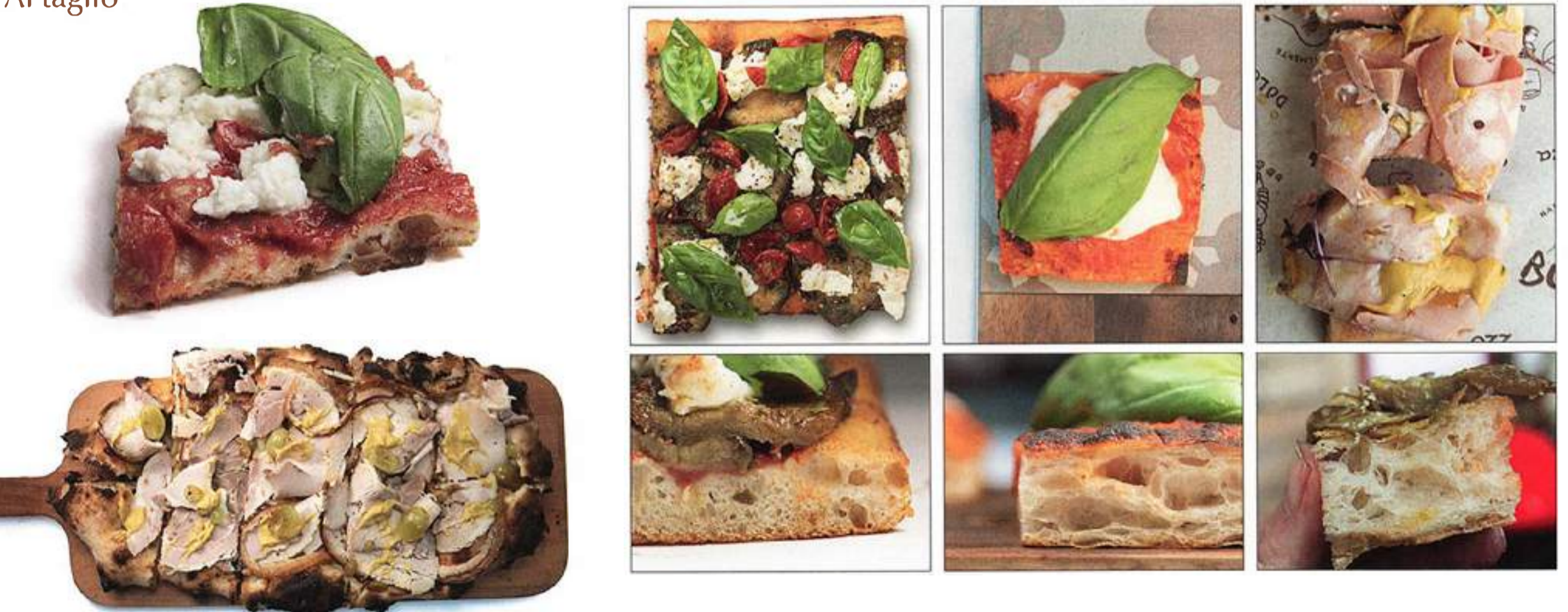
Thin-crust



Neapolitan



Al taglio



QUALITY TRANSCENDS STYLE

When we started this book, our default assumption was that styles of pizza would be like styles of cuisine. French food and Japanese food, for example, are unique, with different base ingredients, palettes of flavor, and aesthetic rules. Each has some dishes that aren't to everyone's taste, but both cuisines can be great, and both cover great diversity.

We naively assumed this would be true for different styles of pizza. The crust may be thick or thin, soft or crispy, but surely the best examples of each style would have equal culinary merit. We expected to find pizza that was not to everybody's taste—for example, some people love super-thin pizza, some love deep-dish—but our entering assumption was that these aesthetic differences were akin to the difference between a baguette and brioche, or between soups in Japanese and French cuisine. We did find this was true in some cases, but much to our surprise, several pizza styles had such huge and persistent culinary flaws that it made little sense to chalk them up to differences in their cultural aesthetics.

The first pizza we tried in Chicago was seriously low on salt in the crust. Maybe it was an off day, we thought. Somebody simply forgot the salt. But when the pattern occurred again and again, it became clear this was part of the style, at least as defined by common usage. (This was true for both deep-dish and thin-crust pizzas.) Also, every pizzeria knew we were coming so we expected they were offering us their best work.

They must have recognized the low-salt problem at some level because we saw forms of compensation. One Chicago pizzeria let us taste their sauce separately, and it seemed almost poisonously salty. While that may sound like a reasonable adjustment, if you think about how sauce is distributed on the crust, you quickly realize it doesn't solve the problem. What would solve the problem is simply adding more salt to the dough, and yet that solution seemed elusive (much like the persistence of saltless bread in Tuscany, a problem that has been going on for, oh, 700 years; see page 118).

A similar thing happened when we visited New Haven, Connecticut, a city famous for its distinctive pizza style. At every pizzeria we visited, even those that were on nationwide "best pizza" lists, we all felt the dough needed salt. The pizza had several other flaws, too. Every place we visited, the crust was both dense and hard, which brought to mind the very worst in frozen pizza.

In addition, several (but not all) of the famous pizzerias of New Haven burn their pizza. That was our experience at Frank Pepe Pizzeria Napoletana. After we ate and photographed several burnt pizzas, the next pizza that came from the kitchen looked perfect to us. That's when Gary Bimonte (owner, and grandson of Frank Pepe) noticed it and called out to the waiter, "You can't serve that!" and insisted the pizza go back in the oven. We're well aware that flavor in baked goods develops by browning. Sometimes the flavor improves right up to the point where some of the crust is on the verge of being burnt. That's what's going on in the leoparding that's characteristic of pizza in Naples (see page 366). But while flirting with the burn can be good pizza technique, embracing it wholeheartedly is way too much. You wind up with an acrid, bitter taste. The pizza at Frank Pepe's crosses that line and turns into a 6 mm ($\frac{1}{4}$ in) thick piece of acrid, burnt hardtack. After seeing die-hard fans of New Haven pizza, like our tour guide Colin Caplan (see page 153), tuck into it, we know there are people who either don't mind or might even actively prefer this crust. Food preferences are intensely personal, and we have *no* right to tell Colin or anybody else what they should like.

Still, while taste is personal, our training and experience tell us this pizza style is deeply flawed because it contains specific design choices that are inexplicable in the context of general cooking know-how. You don't forget the salt. And you try not to burn it. The fallacy in our thinking that every style of pizza would be good, just different, like French and Japanese cuisine, is that both the French and the Japanese worked hard to perfect their cuisines over a long period of time. Any obvious flaws in the design were worked out long ago. Pizza styles, on the other hand, are locally popular but have not been through a comparable process of improvement. At the end of our tour, we could conclude only that some styles are so deeply flawed that even the supposedly best-executed examples are terrible.

We know this is kind of a shocking statement. Or anyway, it shocked us and prompted some soul searching. Who are we to condemn the local pizza style of an entire community? Could we be judging bad examples? Are we elitist food snobs who can't appreciate authentic lowbrow food? Perhaps we just don't "get it"? One of our expert local pizza guides stopped at one point and said, "Wow, you're really

For more on our travels to New Haven, see page 228.



To us, the pizza served at Frank Pepe Pizzeria Napoletana, an iconic New Haven pizzeria, was burnt (see above). We may think this is a critical flaw, but many people love this style of pizza.

judgmental.” It took us aback. Then we realized not only was he right, but we were fine with that because we think it serves you, our pizza-loving readers. You can’t make something good if you are unwilling or unable to acknowledge that some things are bad. There’s a distinction between stylistic differences (thin versus thick crust; mountains of cheese or hardly any; the preference for leoparding in Neapolitan style, etc.) and severe culinary flaws (a tough crust, an undercooked gel layer, a bitter burnt-to-a-crisp rim, all of which we’ll discuss in

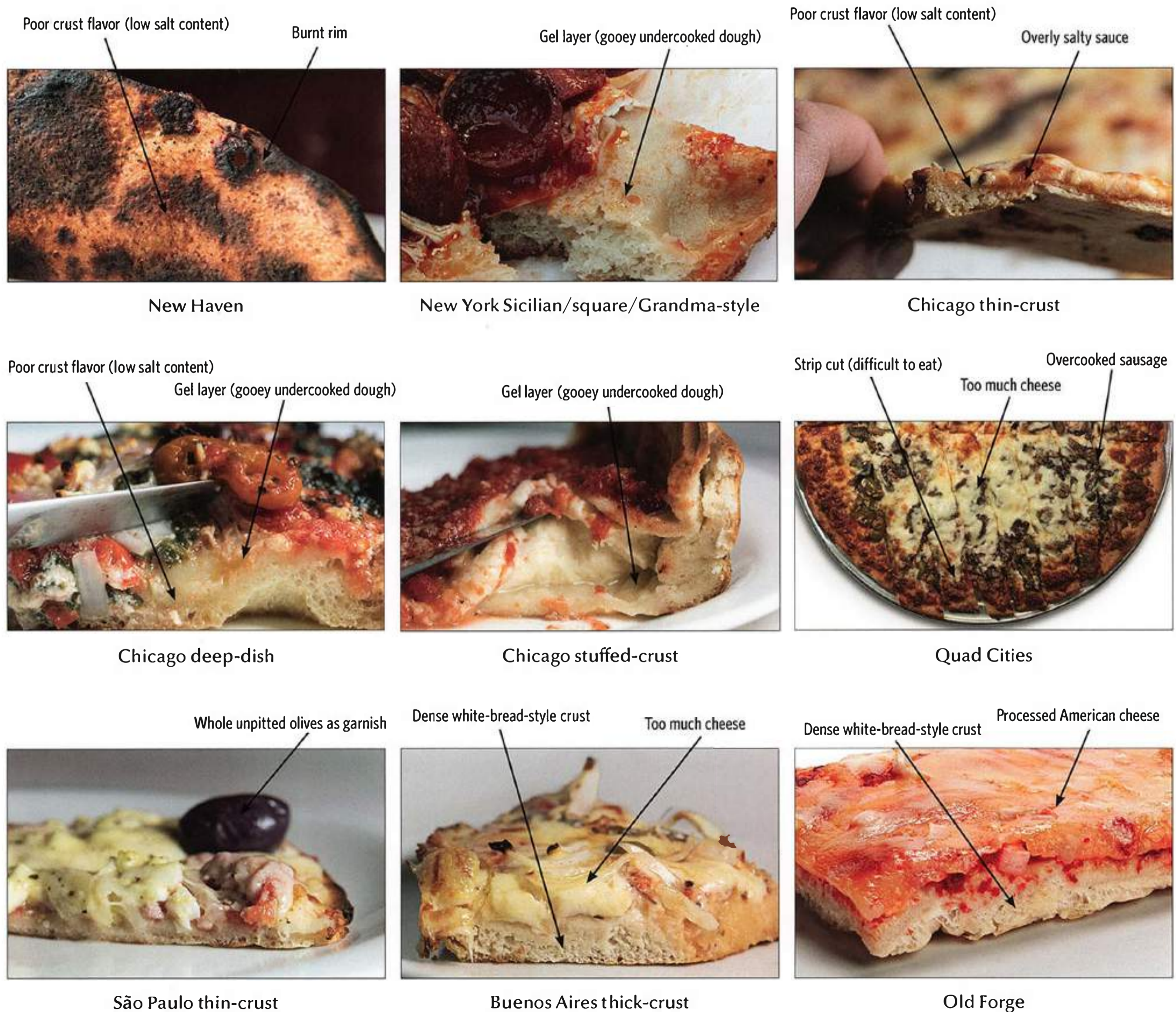
this chapter). While the former can be a matter of personal preference, the latter makes for objectively lousy pizzas.

Our job in writing this book is to describe pizza as it currently exists and tell you how to make excellent pizza. You can’t make a good product if you’re unwilling to recognize a bad one. However, we realize that some of our readers might want to make “authentic” versions of pizza styles in the real world, so we’ve included notes that help with this.

PIZZA DESIGN FLAWS

In making this book, we ate a lot of pizza (see page 153), and after all that tasting we have concluded that some pizza styles come with their own innate design flaws. We’re not talking about style quirks, like Neapolitan crust being soft, or matters of taste, like whether you prefer a thin crust

or a more bread-like pizza. These are inborn issues that inhibit a pizza’s quality and the experience of eating it. Some of these problems can be mitigated by technique, which we have endeavored to do in the recipes in our Iconic Recipes chapter (see page 3:3).



BUT THAT'S WHAT I GREW UP ON!

When we pointed out the flaws in pizza styles to locals, we often heard the same rebuttal: “But that’s what I grew up on!” While we all have a special relationship with our food memories, it made us think. How could people actually like a gummy, undercooked crust? A sooty, blackened rim? We could conclude only that after eating the same pizza for years, they had fallen in love with it, flaws and all.

Something like this is known to psychologists as Stockholm syndrome, named for a bank robbery that involved hostages that occurred in Stockholm in 1973. Oddly, after the ordeal was over, the people who were held as hostages came to sympathize and identify with the criminals that held them. Of course, the actual Stockholm effect is not relevant to us—pizza styles are not life or death. What we have termed the culinary Stockholm effect is this: if you grow up held hostage to bad food (specifically pizza), you might develop a taste for it to the point that you love it and defend it against heretical fools like us who point out its flaws.

This makes it sound like the pizzerias are holding the children of their community hostage—and in a sense they are—but the interesting thing is that it also works the other way around. The pizzerias are held hostage to the whims of the consumers. Once a pizzeria has found success with a recipe, they are understandably reticent to change it. A successful pizzeria often has everyone telling them they are great, and that is reinforced if they stay busy. Long waits for customers to get a table do not tend to motivate restaurateurs to rethink their recipes.

By the time the community is full of people who grew up on that particular taste, the pizzerias really can’t change. Indeed, many long-operating pizzerias have stories about how customers complain about even the smallest modifications. This can be particularly problematic when change isn’t a choice, such as when a supplier goes out of business. Both the customer and the pizzaiolo are locked in. It is a stable situation that resists change and lets the status quo go on for a long time.

The “I grew up on it” answer is also wrong-headed in another way. The essence of growing up is learning things that you didn’t know as a child. That particularly applies to our taste in food. As adults, we can enjoy beer, wine, spicy food, and dishes from other cultures that we would have either not known about as children or would have spit out. Most of us *did* spit out a new food at some point in first trying it (habanero peppers, for example). Conversely, almost no adults yearn for a jar of strained carrots or warm

bottle of infant formula despite the fact that they quite literally did grow up on them.

We came across an essay on *Vice* that brilliantly explores the conundrum of how our tastes mature, and its title says it all: “The Pain and Sorrow of Learning Your Beloved Childhood Pizza is Trash.” It’s by Peter Rugg, who returned to the Quad Cities after a 20-year absence. His experience in the wider world let him see his childhood pizza as an outsider would, and he concluded that “the choices made at every stage [of] making it are so nonsensical, the motivations so hard to trace, that it rises to the level of *legendarily terrible*.” Having been to the Quad Cities, we completely agree. Unfortunately, the same can be said of other styles as well, to one degree or another.

Quad Cities pizza has a medium crust reminiscent of a New York pizza. It is widely claimed (including by the Quad Cities pizzerias) that they put a lot of dark malt syrup in the dough for added sweetness, but it was undetectable to us. Next on the assembly list is a tomato sauce that is applied in great quantity. It supposedly is spicy but, like the malt syrup, it’s pretty hard to taste any spice in the actual pizza. The next stage is to apply a thick layer of precooked pork sausage, which has a consistency a bit like a sloppy joe—i.e., wet crumbles of ground meat. On top of this is a thick layer of cheese. Finally, the whole thing is “strip cut,” meaning that the pizza

For more on our travels to the Quad Cities, see page 248.

The pizza we grew up eating has a profound effect on us. These emotional ties to potentially subpar pizza run deep and can cause otherwise sensible people to defend pizza that is, in our view, fundamentally flawed.



is cut in half with one cut, then turned 90 degrees and cut into four or five parallel strips, all with a hinged cutter, like the sort you'd cut paper with (see page 3:300).

The whole effect creates a pizza that falls apart when you try to eat it. The cheese forms a top layer that comes off by itself when you try to pick the pizza up. The juices from the sauce and meat layer soak the crust so that it is soggy and completely limp. The strip cut accentuates the problem because it is hard to pick up the strips. This combination may not sound bad, but trust us that Rugg is right in saying that it is legendarily terrible. While the sausage pizza is a Quad Cities classic, other varieties like the “taco pizza,” which features taco meat, Heinz taco sauce, and a garnish of the better part of a bag of tortilla chips, are not an improvement.

Some of the culinary mistakes found in pizza are easily remedied—for example, the low-salt crusts we found in Chicago can be fixed with more salt. In the case of Quad Cities pizza, by the time you fixed each of its design flaws, would anything distinctive be left? Would the repaired version still be “Quad Cities” in some sense, or would you simply wind up with a New York-style pizza with pork sausage on top? It's not a question we can answer—it is up to the people who are fans of the style. And they may like it the way it is, which is just fine.

If the pizza you grew up on conjures up images from childhood, or is an emblem of your cultural identity, more power to you. We just can't put those intangible factors in a recipe. Nor can we tell our

readers how to inspire those warm and fuzzy feelings in people who did not, in fact, grow up on it. Our job is to describe how to make the best pizza possible—for people who did not grow up on it, and who thus are not willing to overlook the flaws. This requires an objective eye, and yes, a judgmental palate.

PIZZA AND THE EMPEROR'S NEW CLOTHES

The attachment of locals to their pizza is perhaps understandable, if not necessarily totally in sync with reality. But how do you explain pizzerias with significant culinary flaws making it onto countless “best pizza” lists? How come no one seems to be loudly proclaiming there are significant problems? And how come so many pizzerias are doing the same things? A great example of persistent bad food from outside the world of pizza is the terrible bread of Tuscany and adjacent areas of central Italy (see page 118). It tastes bad, and consumers anywhere else in the world would not accept it. So why does it endure? Well, it takes some courage to come out and say that the bread (or some other lauded food) is terrible. It's the old story of the emperor's new clothes—no one wants to be the first to admit that the emperor is naked. It is a human reaction to fail to speak up in such a situation. Food writers and critics, chefs, and others appear to be quite reticent to criticize the Tuscan bread (and certain styles of pizza for that matter). They make up absurd rationalizations to explain away the practice. While it is understandable, this



The underside of a Quad Cities pizza slice reveals the sogginess that forms from the sauce and meat layers, rendering it difficult to eat.



Here you can see the popular topping combination of Quad Cities pizza, which includes tomato sauce, pre-cooked pork sausage, and lots of cheese.



also helps the phenomenon continue. If people complained, maybe it would change.

If you compare the quality of food in Florence over time with, say, the quality in London over the last few decades, you would find that the food in Florence has always been excellent, with little apparent improvement. In contrast, the food in London has improved enormously, and while that occurred for many reasons, the legion of complaints and jokes about bad British cooking were certainly a factor in British chefs taking action to revitalize their cuisine.

Saltless Tuscan bread is a particularly apt analogy here because we found that a lot of regional pizza styles put miniscule amounts of salt in their dough. Every famous pizzeria we went to in New Haven, for example, served us pizza dough that tasted unsalted. The paradox is that some of these same pizzerias—Frank Pepe’s, Sally’s Apizza, and Modern Apizza, for example (see page 228)—appear on many “best pizza” lists, despite the fact that the pizza has a dense, tough crust rendered flavorless by not enough salt, and is served burnt.

Who wants to be the first pizza “expert” to say that New Haven pizza is terrible? We have some insight into this because as we mentioned our findings on New Haven to people in the pizza world, their eyes got wide and they said things like, “But you’re not going to say that in the book, are you?” Of

course, the more we got that reaction, the more we knew we *had* to do just that.

One reason for Frank Pepe’s being listed as great is that their signature pizza—the white clam pie—is actually quite brilliant as a concept and a flavor combination. The topping is simple: fresh-shucked clams, oil, garlic, and grated pecorino cheese. This is notable for breaking the so-called Italian rule for never pairing seafood with cheese. Rule-breaking aside, it’s an unlikely topping for a pizza—clams can become rubbery if you are not extremely careful about how they are cooked, and a hot pizza oven seems like a bad method for gently cooking them. But we must admit that, in the version we had at Frank Pepe’s, the clams were *not* rubbery (despite the crust being burnt) and the topping combination was delicious. However incredible the topping, it is still presented on a hard, dry, saltless, burnt crust, but it is possible that a visitor would still be impressed. The white clam pie at Zuppardi’s Apizza, a less well-known but still fairly famous New Haven pizzeria, at least omits the burnt aspect. Incidentally, while it may sound like we just don’t care for New Haven pizza, we do believe that it is historically interesting—we argue that it is likely to be closely related to the ancestral 19th-century pizza of Naples that first came to the Americas (see page 39).

Many of the pizzerias we tried with long storied pasts, including Frank Pepe’s in New Haven, served pizza that disappointed us. Their clam pizza (top left) featured a great combination of toppings, but the crust was undersalted and dry. Zuppardi’s Apizza, another New Haven pizzeria, served a similar white clam pizza (right), which was better executed. See page 3:73 for our Apizza recipe inspired by Zuppardi’s.

THE OLD-SCHOOL DISEASE

“We haven’t changed anything from my grandfather’s original recipe,” Gary Bimonte, the grandson of New Haven’s Frank Pepe (see page 231), is fond of saying. At Detroit’s Cloverleaf, they like to say the recipe hasn’t changed since 1946. Pat Revello, an owner of a pizzeria in the “pizza capital of the world” (Old Forge, Pennsylvania; see page 121), proudly told a reporter that 40 years into the business, they were still using the original cheese grater. At Louie & Ernie’s in the Bronx, the pizzaiolo told us he’s been using the same bucket to measure water for decades. “If I lost the bucket,” he said half-jokingly, “I’d have to close the pizzeria.”

These pizzerias have their long history as a key business asset, so it’s not surprising that they promote the cult of the past, cherishing every detail from grandpa’s time. It’s the type of story that fits a certain nostalgic narrative about the past: come here to have pizza made just as they did in the old days, without the modern imperatives that lead to shortcuts and lower quality. That resonates with some consumers. But it also raises an interesting question—why was it, exactly, that your grandpa

alone achieved pizza perfection? Is it really the case that nobody could improve upon the recipe? Or has talent just skipped the last couple generations, awaiting the next culinary genius to be born into the family? What happens when new flour or other ingredients come out? Or old suppliers go out of business? These and other questions turn out to be worth asking because across the world we have yet to find a really famous old pizzeria that makes pizzas that are any good.

That is true in Naples, where tourists flock to L’Antica Pizzeria Da Michele and Pizzeria Brandi (see page 167). They each claim to be among the oldest in Naples, and they are certainly the most famous. Brandi claims to have invented the margherita (but didn’t; see page 23). Da Michele served Julia Roberts in the film version of *Eat, Pray, Love*. To eat the best pizza in the city of Naples, however, you need to go to a pizzeria that was founded by a living pizzaiolo. Pizzerias run by Attilio Bachetti, Enzo Coccia, Ciro Salvo, or his brothers Francesco and Salvatore Salvo, or Antonio Starita (see pages 158, 163, 164, 166, and 167) are among the ones to seek out. They are excellent for an important reason—they

THE TERRIBLE BREAD OF TUSCANY

Tuscany is one of the most beautiful places on earth, in just about every sense. The landscape is beautiful, the cities are beautiful, and within them lie some of Europe’s greatest artistic achievements—Tuscany was where much of the Renaissance played out. The food of Tuscany is legendary, and its wines are so famous that the best are called the Super Tuscans. It would be perfect, but for one thing. Their bread is perhaps the worst in the world. It’s called pane sciocco—that’s literally “bread without salt”—and it’s made that way *on purpose*. This fact is so shocking that when a visitor first encounters it, they think that surely there must be some mistake. How could it be possible for people who make all sorts of wonderful food and drink to have this awful bread?

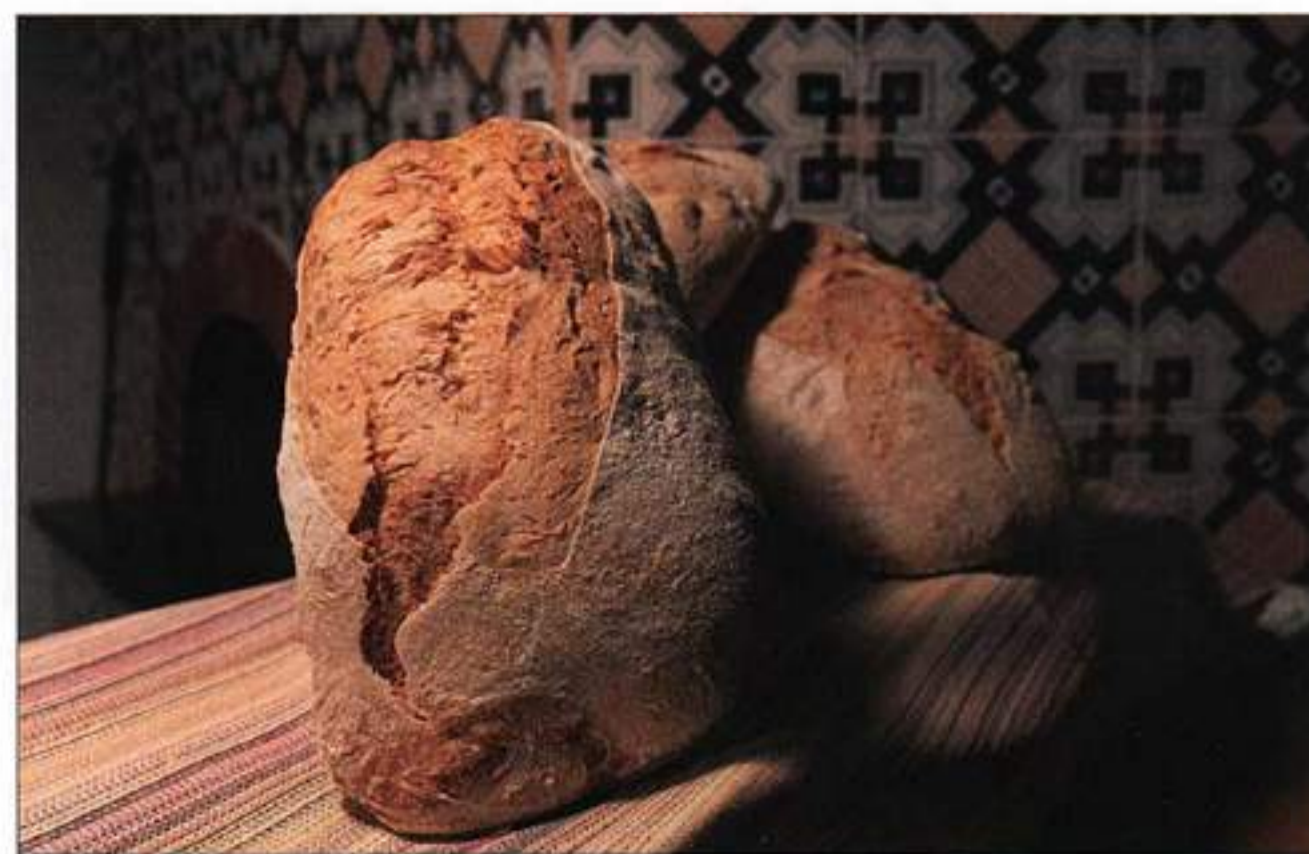
Salt plays a crucial role in the flavor of bread—and pizza. Without salt, both bread and crust lack critical flavor components. On a chemical level, salt helps slow the yeast down, allowing for longer fermentation, which helps develop flavor. Salt also helps strengthen the bubble walls in the rising dough, which contributes to structure and volume.

Why omit a simple ingredient that Tuscans use throughout the rest of their cuisine? One answer stems from a trade dispute between the city-states of Pisa and Florence in the year 1100. Pisa had access to the ocean, and thus to salt, and refused it to the Florentines, who adapted with saltless bread. The problem with this theory is that Pisa also has unsalted bread, as does the rest of Tuscany and parts of several adjoining regions.

Another explanation popular in the Umbrian town of Perugia is that Pope Paul III put a tax on salt in 1540, which led to a revolt and a war in which the army of the pope invaded Perugia. Historians Zachary Nowak (see page 23) and Ivana Di Biase investigated documents from the time and found no mention of the Perugians giving up salt in their bread for the war. Of course, even if that war figured in the story, it would explain only

Perugia, not the other places. Intrigued, Nowak and Di Biase found a line in Dante’s *Divine Comedy*, written in Florence in 1320, with a reference to unsalted bread, meaning the custom was far older than the salt tax.

The parable of the terrible bread of Tuscany tells us a lot about how food customs are created and maintained. There undoubtedly was some reason people made bread without salt at one point in time, but today it is equally lost to both the people on the street and scholarly historians. Once a food tradition gets going, it can continue on its own momentum indefinitely, even if it means eating some really bad bread—possibly for 700 years, in this case.



Pane sciocco from Tuscany’s capital, Florence



are run by pizza-obsessed people who refuse to rest on their laurels.

The lesson is obvious when you think about it—the road to quality is not about keeping everything the same. It's about continually seeking out the best. That doesn't mean that the "new" pizzerias in Naples are brand new, nor does it mean that they radically reject old methods. But they do learn and improve. Many of these famous pizzaioli did have fathers and grandfathers who were pizzaioli—and they will be the first to tell you that their current pizza is better than anything of their father's or grandfather's generation.

The correlation between fame, longevity, and mediocrity seems especially true in New York City, where once again the most famous old pizzerias weren't very good. We felt that way at Di Fara, the famous Brooklyn pizzeria run almost single-handedly for over 50 years by owner and pizzaiolo Domenico DeMarco. Fans brave hours-long waits, yet they keep coming. The level of support stumped us because the pizza was deeply flawed—with a crust of undercooked dough as the fatal flaw, but plenty of others on display as well. We shared our critique with several New Yorkers in the pizza business, and they didn't disagree with us on the technical flaws we recounted. Still, they defended the place, repeating

Dom's incredible story, his commitment to pizza, his decades in the business, and suggesting that some slippage was inevitable over time. We respect Dom's commitment and all the time he's put in, but we need to judge the *pizza*, not the man or the career.

It is also the case that the flaws in Di Fara pizza are not the type that seem to be due to a lowering of his standards or changes with his age—if anything, it is the opposite. The problem lies in deliberately continuing to use the same methods. The origin story is that Dom, an immigrant from Caserta, Italy, opened Di Fara in 1965 without any prior pizza-making experience. Dom is quite candid in saying that initially he didn't know what he was doing. Over time he experimented and found his style, and at some point evidently stopped innovating, since the claim is that he has done everything the same since then.

Since he has personally made almost every pizza since 1965, there is little reason to doubt him on the sameness of method. But just like with grandpa Frank Pepe in New Haven, there is no reason to think that Dom discovered the perfect way to make pizza—it's only by continued experimentation and critical analysis that one can do better. It seems impossible that he would be making the same pizza he made 50 years ago given the changes to ingredients over that time.

L'Antica Pizzeria Da Michele (left) and Pizzeria Brandi (right) both claim to be the oldest pizzerias in Naples. Captive to their own self-touted traditions, these pizzerias were not, we found, good examples of the pizza in Naples.



Left: De Lorenzo's in New Jersey is an outlier in the old-school disease phenomenon: it's an old-school place that served good pizza.

Center: Scottie's Pizza Parlor in Portland isn't burdened with the long history of a regional style. Instead of worrying about making pizza just like the old guard, Scottie worried about making his pizza great, and it shows.

Right: Paulie Gee's Logan Square in Chicago, serves pizza that's a great example of a style, in this case Detroit, that is better than the actual pizza made in its namesake city.

In Naples, old-school disease is primarily a tourist phenomenon. Locals who are in the know go to the good places. In New York City, however, the long shadow cast by the cult of old-school pizza holds back the quality of pizza in the city for everybody. Although there are plenty of tourists at famous old New York pizzerias, the crowd is mostly locals. Partly this is a complete failure on the part of New York food critics to call out the bad pizza in the same way that they would call out a three-star restaurant that was slipping. Partly it is the storytelling power of old-school disease. New York is also a victim to a peculiar type of urban provincialism where people who live there don't see any reason to objectively consider food from anywhere else. This is why real innovation often comes from other places. The new breed of New York pizzaioli are adapting ideas from progressive artisans from elsewhere.

We think this is a material part of what makes Portland, Oregon, such a great city for pizza (see page 254). Portland was blessed with a unique circumstance—there simply weren't any mediocre old-school pizzerias to confuse things. Instead, starting in the early 2000s, two artisanal bread bakers, Brian Spangler of Apizza Scholls, and Ken Forkish of Ken's Artisan Pizza, started making their own, very different styles of artisanal pizza (see pages 257 and 258). Portland then went through a culinary renaissance, with an intense focus on food of all kinds. This led to a whole generation of young pizzaioli striving to be great. Rather than have bad old-school pizza as their benchmark, they wanted to outdo Brian and Ken. There wasn't any "Portland-style" pizza that they had to follow—they could do whatever they wanted. The result is an amazingly vibrant pizza scene that has more great pizzerias

than New York City does (in our opinion), both in absolute numbers and relative to its size.

The search for new pizza styles by new pizzerias has interacted with old-school disease in a particularly strange way. Where do you go for great Detroit-style pizza? The answer is almost anywhere *except* Detroit! Within Detroit, their native style resides with the two old-school pizzerias that each claim to have invented it (see page 65). Outside Detroit, the style has been picked up by ambitious young pizzaioli who are using the basic framework to make their own fantastic creations, with an attention to detail that would have been strange in 1946 Detroit, where the style originated. So, Derrick Tung at Paulie Gee's Logan Square in Chicago (see page 244) or Justin De Leon at Apollonia's Pizzeria in Los Angeles (see page 263) make a better Detroit-style pizza (of their own interpretation) at every level than anything the home city offers.

Even more surprising is the answer to the question, Where is the best New York-style slice? While most people would argue whether it's a pizzeria in Manhattan or Brooklyn, for us it is no contest: the best New York slice is in Portland, Oregon, where Scottie Rivera of Scottie's Pizza Parlor (see page 261) makes an incredible rendition of it. The key problem with New York-style slices is that they are best when the pizza is fresh out of the oven. But what happens when it isn't? A slice shop can serve fresh slices only during its busiest time of day. Otherwise the pizza must be held—either hot or cold, and either one causes problems (see page 3:305). Scottie's solves the problem with a special reheating protocol involving two different ovens set at different temperatures. No New York slice shop bothers with that. Partly it's that New Yorkers have become inured to bad slices. Partly it's that competition from 99-cent slice shops has kept the quality pizzerias



from doing better. We think it's mostly because even the best New York slice shop just has not been thinking as hard about quality as Scottie has.

This is not to say that every old-school pizzeria that claims to exactly replicate the past is terrible—some are good. In each case the good ones are lucky enough that their founding family members did a good job. But equally, we suspect that they have both been willing to change things over the years. De Lorenzo's, for example, is clearly making different pizza than they did a few generations ago (see page 104). It is also true, however, that these pizzerias often don't stack up as favorably to the newer places that have generally adopted a fresh approach.

THE PIZZA CAPITAL OF THE WORLD

Old Forge, Pennsylvania, which refers to itself as the pizza capital of the world, is a town of nearly 8,000 people and is striking for multiple reasons. The first is how many pizzerias there are: about a dozen, which is a huge number for a town its size. If extrapolated to the United States, that would mean the country would have over 500,000 pizzerias—or over six times the number it actually has.

The pizza in Old Forge is itself unusual. It has a thick, white-bread-like crust that is baked in standard sheet pans and is topped with provolone, often in combination with American cheese, that sticks to your teeth and the roof of your mouth. The result is something that looks for all the world like elementary school cafeteria pizza.

Toppings are available, but only a fairly small list: sausage, peppers, onions, pepperoni, and (surprisingly to us) shrimp. We were told most people order the “red,” which is tomato sauce and cheese. To its credit, Old Forge red pizza avoids the gel layer that plagues New York Sicilian (see page 370) by

parbaking the dough without cheese or toppings to make what Old Forge pizzaioli call a shell.

The other principal pizza in Old Forge is “white pizza,” which is a sheet-pan-sized calzone or turnover typically with just cheese, or cheese and cooked broccoli. Locals will sometimes refer to the white pizza as a “double crust” pizza. Both the red and white pizza are sold by the “tray” (or pan) or by the “cut,” the local term for a large, square slice.

Old Forge approximates pizza al taglio, with its prebaked rectangular sheet pan crusts. If only the people of Old Forge would replace their cheese and toppings for some that are better tasting and make their crust recipe more interesting, they might have something. For our spin on Old Forge pizza, see page 3:137.

For more on our travels to Old Forge, see page 249.

This is one of several signs we encountered proudly declaring Old Forge as pizza capital of the world. We're not sure we agree, but they do have a disproportionately high number of pizzerias given their relatively small population.



SECRETS OF THE PIZZA BUSINESS REVEALED HERE

There are conventions for dentists, worm scientists, Star Trek fans, and even mermaids. So of course there's a convention for people in the pizza business.

The International Pizza Expo, held annually for nearly 40 years, attracts more than 19,000 attendees and fills a Las Vegas convention center floor the size of eight football fields with hundreds of exhibitor booths. Here, you'll find everything from the expected (displays of pizza ovens, pitches from sauce manufacturers, the latest in ordering and delivery apps) to some more unusual offerings: a screen-printing company that offers

branded T-shirts shrink-wrapped and compressed to the size of a business card; a "breathing" pizza box designed to combat soggy crusts; pizzas with fruit, pork rinds, peanut butter, and more. Attendees are mostly independent pizza operators, so a lot of the focus is on finding ways to shave costs and increase profit. Some of the latest ideas include self-service beer and wine taps, so no customer ever needs to go thirsty, and a phone service that auto-answers and tries to upsell callers who want delivery. There's also a much-watched competition, where pizzaioli show their skills at pizza tossing, dough stretching, and box folding (see below).



THE INTENSE WORLD OF PIZZA COMPETITIONS

Since at least the 1990s, pizza contests have been big business, and today they're held all over the world, often associated with pizza business trade shows. At these events, scores or even hundreds of competitors show off their skills and are judged by elaborately detailed criteria.

Some competitions focus on flavor. For example, the World Pizza Championships, held in Parma, Italy, awards prizes for the best traditional pizza and the best "freestyle" pizza, involving nontraditional toppings, among other categories. The Caputo Cup, sanctioned by the Associazione Verace Pizza Napoletana and held at various times in New York, Naples, and other locations around the world, awards prizes for New York-style and Neapolitan-style pizzas.

Others focus more on things other than flavor. The World Pizza Games, for example, includes competitions for the largest dough stretch, the fastest pizza-box folding, the fastest pizza making, as well as one of the most spectator-friendly events, acrobatic dough tossing.

Initially, Italian-born male pizzaioli tended to win the flavor-based contests. But in 2007, Tony Gemignani, an American, became the

first non-Italian to win the top prize in the category for traditional Neapolitan-style pizza at the World Pizza Cup. People in Naples were flabbergasted. Japanese pizzaioli, including three-time prizewinner Hisanori Yamamoto, have made their mark in some of the biggest competitions, too.

In 2015, Naples pizzaiaola Teresa Iorio was the first woman to win the prize for top Neapolitan pizza at the World Pizza Championships. In 2016, a 69-year-old woman who sold pizza from a market stall in Amish country, Pennsylvania, won the New York-style pizza category in the Caputo Cup. Pizzaiola Laura Meyer (at right, below), formerly head chef at Tony's Pizza Napoletana, was the first woman and first American to win the pan-baked pizza category in 2013 at the World Pizza Championships. She went on to win first place in the American division at the Caputo Cup in Naples in 2019.

Most of the pizza competitions offer cash prizes totaling into the thousands of dollars, but perhaps even more lucrative is the marketing buzz that a pizzeria gains by winning one of these contests.



THE CLOSE ASSOCIATES OF PIZZA

There are several pizza-like dishes that are traditionally made in pizzerias. The calzone is a pizza turnover. The dough is folded over the toppings, sealed (often by pounding a closed fist to merge the top and bottom dough), and then baked in the same oven as the pizzas (see page 3:161). In Naples if you deep-fry the pizza turnover instead of baking it, it's called pizza fritta (see page 3:159). We tried to find out why, and ultimately the answer is "because it is," but that is our condensation of a long, convoluted, and spirited discussion with our Neapolitan hosts and friends. After many philosophical discussions about whether a calzone is pizza, we can report that the consensus among Neapolitans is "No, but it is a close relative." When we went further and asked whether pizza fritta is pizza, the Naples consensus was "Yes, of course! Why do you ask such a stupid question?" This left us scratching our heads.

We don't believe these "close associates" should be counted as separate pizza styles because nearly any type of thin- or medium-crust pizza could potentially be made into them. A calzone in a New York pizzeria owes more similarities to the New York-style pizza offered at the same establishment

than to a calzone made in a top pizzeria in Naples, both in the dough and in the filling. Just to make things complicated, there are other variants we have been served in Italy, and rarely also in the United States. Some (but not all) calzones in Italy are finished with sauce on top. This is usually added after or toward the end of baking to avoid the gel layer. There's another pizza associate called the tennis racket. It is literally halfway between a pizza and a calzone—as if you were folding over the dough and stopped halfway. As a result it has a filled part that is like a calzone (the handle of the racket) and a flat, pizza-like part (the head of the racket). In general you must put holes in a calzone—otherwise trapped steam puffs it up, to the point that it can explode. The puffing (but not an actual explosion) is actively encouraged in the type of calzone known as the volcano.

Pizza fritta, on the other hand, really is a Neapolitan specialty. It is virtually unheard of in the United States and quite rare even in Italy once you get outside Campania. One could make a pizza fritta based on nearly any style of pizza, but strangely nobody that we are aware of does this. As a result, in



The tennis racket, served in Italy, is a pizza-like thing that crosses a calzone with a pizza.

While deep-fried, the pizza fritta served at La Masardona in Naples was surprisingly light and crisp. It was one of the best of this style that we tried during our travels (see page 160).





A calzone from Lucali in Brooklyn, New York



A montanara from Kesté in New York

this book we treat pizza frita as a variation of Neapolitan-style pizza (see page 3:34). The reasons why this fantastic-tasting item is so rarely made outside Naples are a mystery that we have been unable to unravel.

The montanara (see page 3:157) is another curious case. It is basically a Neapolitan crust that is deep-fried before being dressed with toppings and then briefly heated in the oven. In American terms it is like making a pizza with Navajo fry bread. Sure enough, such a thing exists: the El Rincon

Restaurante Mexicano in Sedona, Arizona, has been making something they call a “Navajo pizza” for more than 40 years. We don’t consider it pizza (one could equally call the base a sopaipilla, a fried bread from Sonora, Mexico, just to the south of Arizona). Regardless, the montanara is another special variation that seems to be offered in Neapolitan pizzerias, principally in Naples itself. In theory some other kinds of pizza could be adapted to use this technique, but given the typical size of most American pizza styles, you’d need a really big kettle of oil.

“ITALIAN” PIZZAS THAT ARE NOT PIZZA

For many centuries, the word “pizza” was used to describe any flat, round baked good (see page 7). In Italy today, there are still a multitude of things called pizza that have no relationship culturally or historically with the worldwide pizza phenomenon.



Pizza bianca (top) and pizza rossa (bottom) are both from Rome. These names usually refer to focaccia available at older bakeries, and are served cold.



Pizza alla campofranco is a specialty of Naples. It’s a stuffed deep-dish pie filled with cheese and ham.



A pizzezza is a small pizza with a medium-thick white-bread-style crust that’s served cold.



Pizza rustica is a quiche-like pie that’s similar to pizza alla campofranco; it’s also from Naples.



Renato Bosco trademarked a “double crunch” pizza, which has a focaccia-like pizza crust both on the top and bottom. It is essentially a sandwich.

PIZZA STYLES

We've spent a lot of space in this chapter talking about what a pizza style is—and pointed out many so-called styles that fall short of the mark. The following sections feature the styles we recognize, along with images compiled from our years of research during which we photographed (and ate) hundreds of pizzas all over the world, including

Europe, South America, Asia, and the United States. These images show both the range and the similarities of pizzas across a style. We also include notes about the key characteristics. We cover the key characteristics of each style in more detail in the Iconic Recipes chapter, starting on page 3:3.

For more on our travel-related research, see the Pizza Travels chapter starting on page 149.

We've grouped pizzas based on their shared characteristics below and in the pages that follow. Thin-crust pizzas encompass a number of different types of pizza, for example, while some styles remain their own distinct category, such as pizza gourmet. These categories also correspond to our master doughs (with the exception of focaccia) found in the Pizza Dough Recipes chapter, starting on page 2:81.

THIN-CRUST PIZZA

DEEP-DISH PIZZA

Bar/tavern-style



Brazilian thin-crust



Pie dough-style crust

Stuffed crust

Argentinean-style "al molde"

St. Louis-style

Chicago thin-crust

White-bread-style crust

São Paulo white-bread-style crust

NEAPOLITAN PIZZA

NEW YORK PIZZA



Tokyo marinara

AVPN

Canotto-style

Rest of Italy Neapolitan

Quad Cities pizza

Apizza (New Haven)

Chain pizza

NEW YORK SQUARE PIZZA



"Sicilian" pizza

Grandma-style pizza

ARTISAN PIZZA



AL TAGLIO PIZZA

Bonci-style

DETROIT-STYLE PIZZA



PIZZA GOURMET



Iezzi-style

THIN-CRUST PIZZAS

We encountered thin-crust pizzas of various stripes throughout our travels. They go by different names, but they share a set of common characteristics that make them similar enough to cover as a group: tavern-style pizzas, Trenton tomato pie, Chicago thin-crust, Brazilian thin-crust, and St. Louis-style pizzas. These pizzas share some fundamental traits: thin crusts shaped with a rolling pin or dough sheeter, typically sauced and topped right to the edge so there's minimal rim, little interior crumb to speak of, and a sturdy base that can hold a plank (see page 2:6). The texture can be variable; some are cracker-like and others chewy. Some of the

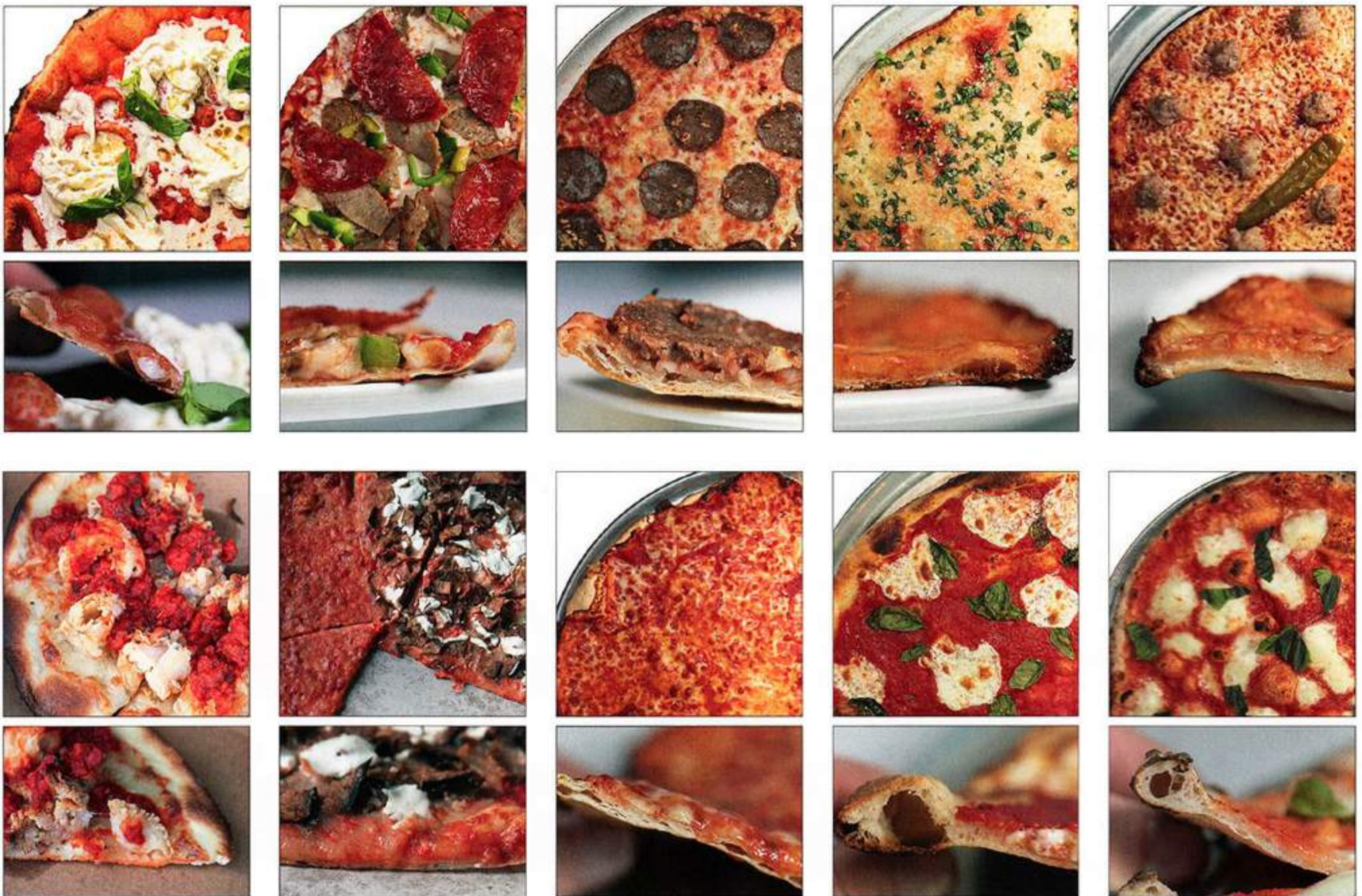
pizzas are also defined by their distinctive toppings or assembly method: the Provel cheese on St. Louis-style; the sauce-on-top on Trenton tomato pie; hearts of palm, hard-cooked eggs, and golf sauce on Brazilian thin-crust. All have a considerable layer of toppings.

How your thin-crust pizza is served will depend on where you are. In the Midwest, these pizzas are typically sliced into squares, which is known as a party cut. This strikes us as both messy and undemocratic, considering the measly edge pieces. Outside the Midwest, triangles are common, though if you are in São Paulo, custom would dictate that you eat your slice with a knife and fork (see page 190).

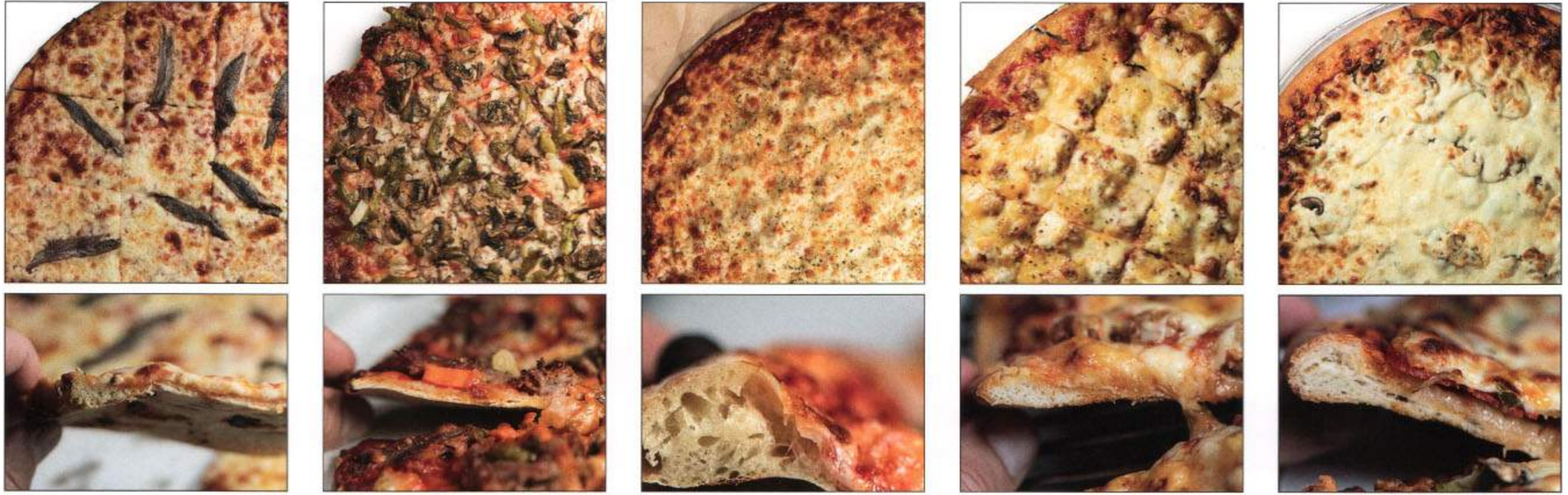
For more on our thin-crust recipes, see the Iconic Recipes chapter starting on page 3:3 and the Flavor Themes chapter starting on page 3:173.

There are many different variations on the thin-crust theme, and here we have collected examples of the thin-crust pizzas we sampled around the world.

Thin-crust pizza in the Northeast Atlantic seaboard



Thin-crust pizza in Chicago



Thin-crust pizza in St. Louis



Thin-crust pizza in Italy



Thin-crust pizza in South America



There are those who don't believe deep-dish to be pizza, taking the hard stance that it has more in common with a casserole. We don't agree. We consider the deep-dish a true style.

All deep-dish pizzas share some characteristics, but we encountered several types during our travels, and even found some similar pizzas all the way in South America. Here, we've collected them all together to more easily show the similarities and differences.

DEEP-DISH PIZZA

Chicago's cultural historian, Tim Samuelson, told *Vice* that deep-dish pizza was "one of the great symbols of the city." Invented around 1943, it made its debut at what is now called Pizzeria Uno (see page 62). While several men took credit for this new kind of pizza, it was female African American line cooks who came up with the dough recipes used at Uno's and other deep-dish pizzerias around town (see page 64).

Crusts can be divided into two styles: one is similar to white sandwich bread, and the other reminds us more of a savory pie crust, with dough that can be pressed into the pan. The similarity to pie crust might also explain the fact that many of these crusts were chronically undersalted. Thick

layers of mozzarella, (usually) sausage, and sauce go on top. A single pizza can weigh several pounds. One place claimed the dough, sauce, sausage, and cheese weighed enough to make an 3.6 kg / 8 lb pizza that yielded eight 450 g / 1 lb slices.

There's another variation on deep-dish: stuffed pizza, which features an extra layer of dough between the mozzarella and the sauce. While it's served at more than one pizzeria, it's not as common as the classic version. We found serious flaws with the execution. Covering the dough with cheese and sauce results in a gluey layer of uncooked dough (see page 370). Stuffed-crust pizza bears some resemblance to several Italian dishes, notably pizza alla campofranco (see page 124).

Deep-dish pizzas with pie-style crust



For more on our travels to Chicago, see page 234.

Deep-dish pizzas with white-bread-style crust



Deep-dish stuffed pizzas



Pizza al molde



NEAPOLITAN PIZZA

Neapolitan pizza is characterized by a crust with a large cornicione, or rim, marked by small charred spots called leoparding (see page 366). The crust is soft and the rim has an open crumb. It is baked at very high temperatures for a very short time, typically in a wood-fired or gas-fired oven (see pages 377 and 382).

We ate Neapolitan pizzas in nearly every city we visited while researching this book. Naples, where pizza was born in the 19th century, is also where a second wave of pizza originated in 1984 with the creation of the Associazione Verace Pizza Napoletana (or AVPN), which sought to bring “true” Neapolitan pizza to the world (see page 74).

The association claims that it documented the historical pizza of Naples, but in actuality their definition of “authentic” Neapolitan pizza was a big change from what was being offered in pizzerias in Naples at the time. This “true” Neapolitan pizza was more aspirational than actual. They made deliberately

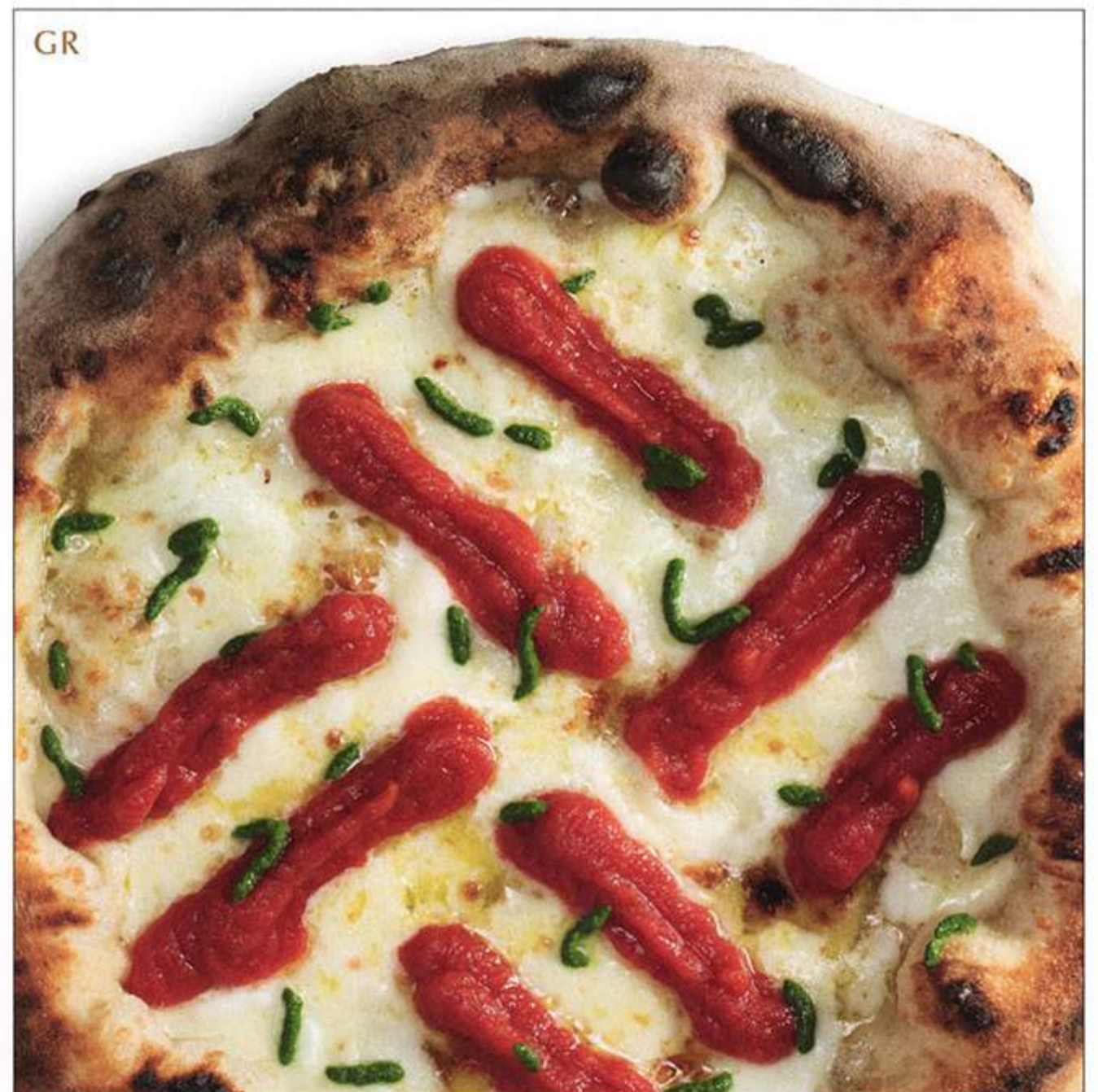
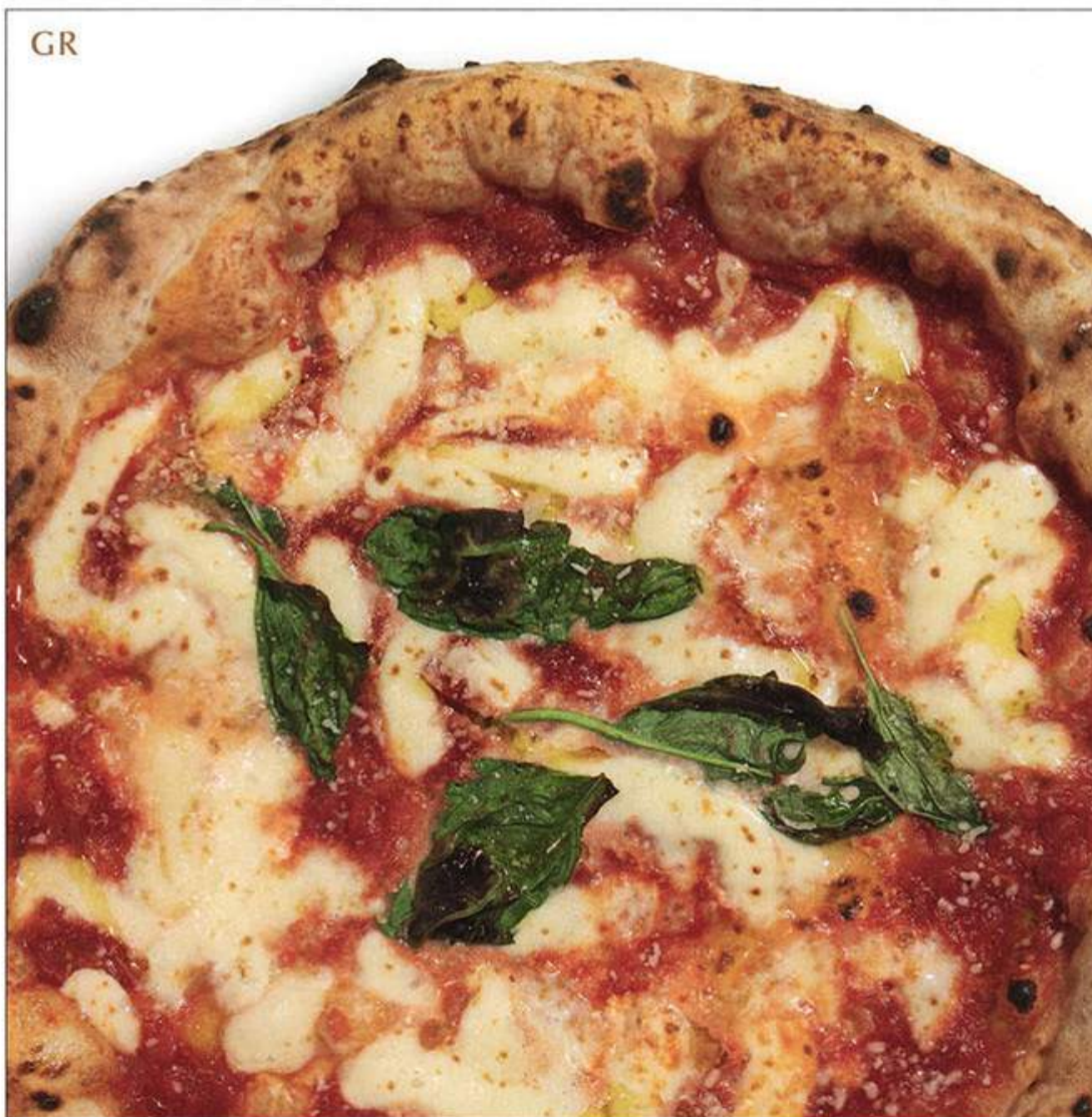
upmarket changes, like stating that an authentic Neapolitan margherita pizza must have fior di latte mozzarella or mozzarella di bufala and DOP San Marzano tomatoes (see page 2:213).

That “truth” was something the committee invented. This resulted in bringing a better product to the rest of the world, and it also helped improve the quality of pizza in Naples by shaming pizzaioli into upgrading their offerings. The committee went on to specify the process of creating an “authentic” Neapolitan pizza, down to the smallest detail (see page 3:43). However, so far as we can tell, this definition has been important only outside Naples, and really, outside Italy. For example, it is not clear that any major pizzeria in Naples strictly follows the full AVPN rules for how to make the pizza—we have seen violations of one rule after another, resulting in a much wider array of Neapolitan pizza than the strictures of the AVPN rule book would allow.

For more on our travels to Naples, see page 154.

All but one of the Neapolitan margheritas pictured here come from pizzerias featured in *Gambero Rosso*, an annual pizza guidebook that provides ratings for mostly Italian pizzerias (see page 152). We sampled these pizzas while traveling in Naples, Caserta, and Caiazzo, all located in Southern Italy.

Neapolitan pizza in Naples and Campania





Neapolitan pizza in Italy



Outside of the classic Neapolitan mar-
gherita pizza, there is a huge variation
among toppings added to the traditional
crust. Here we've gathered photos of
Neapolitan pizzas we ate all over the
world, including in Italy, the United
States, Japan, and South America.

Neapolitan pizza in Europe



Neapolitan pizza in the United States



Neapolitan pizza in South America



Neapolitan pizza in Tokyo



The pizzaioli of Tokyo are very serious about their Neapolitan pizzas. Their reverence for tradition and apprenticeship has fostered very special relationships with Italian mentors. On our trip there, we ate some of the best Neapolitan marinara pizzas we had anywhere.

THE ITALIAN OBSESSION WITH DIGESTION

On our tour of Italy, so many of the pizzaioli we met mentioned how “digestible” their pizza was, we lost count. In fact, many would brag to us about how little yeast they use in their dough, since they believe the yeast to cause gas. Nowhere else in our culinary travels did we encounter anywhere near the degree of obsession with digestion that we found in Italy. Bruno De Rosa mentioned it at Montegrigna Tric Trac; Ciro Salvo mentioned it at 50 Kalò; Angelo Iezzi mentioned it at Pizzeria a Taglio Angelo e Simonetta; Pierluigi Roscioli talked about it at Roscioli bakery; and the list goes on. Some advertise it on their menus: “Pizza Ad Alta Digeribilità.”

The Associazione Verace Pizza Napoletana says following its dough-making rules and its fermentation process “will result in less stress on our digestive system” because the starches will be broken down into simple sugars. “Our bodies are not able to assimilate these long chains,” the rules claim.

On occasion, the digestibility obsession has popped up elsewhere, though perhaps not to the same degree. The US-based industry magazine *PMQ* offered up an article titled “3 Ways Italians Make Their Dough More Digestible.” (Low-protein flour, strong flour plus long fermentation, and Pinsa mixes.) *Bon Appétit* published a feature claiming organic flour and wild yeast make for a more digestible pizza. Some pizzaioli say the secret is baking longer at a lower temperature; others say it’s room-temperature fermentation.

All over the internet, you’ll find articles claiming that long-fermented sourdough is easier on the guts of people with gluten sensitivity. It breaks down the phytic acid in the wheat’s bran, some say; others say it’s all about fructan, a compound in wheat.

We were unable to find scientific proof of any of this, and as far as we can tell, it’s all a crock. The amount of yeast in pizza dough is irrelevant because it dies while baking in the oven. Even if it did have a subtle effect, then we should see the same thing with Italian bread. We even asked some Italian pizzaioli about their bread, and they emphasized that its digestibility is not an issue. This is interesting because bread dough has roughly 0.5% more yeast in it than pizza dough. One study actually found some people with gluten sensitivity did better with sourdough and others did better with grocery store white bread. Go figure.

So why are Italians so focused on the digestibility of their pizza? The persistence of this idea is probably attributable to a marketing necessity. By claiming their pizza is easy to digest, these pizzaioli are trying to attract customers. The more we heard talk of digestibility, the more we had to chuckle. One Italian asked us, “But haven’t you eaten so much pizza you’ve had a hard time sleeping?” Well, yes, but we blame ourselves and not the pizza. Turns out there *is* such a thing as too much pizza.

Rest-of-Italy Neapolitan Pizza

When we visited pizzerias outside of Naples, we were surprised that virtually every Neapolitan-style pizzeria, including many run by people from Naples or Campania, makes pizza with significant modifications from what you would find in a standard pizzeria in Naples. The classic Neapolitan pizza has a white crust flecked with black spots, known as leoparding, and is supposed to be dead soft—“like a handkerchief,” as one Neapolitan pizzaiolo told us.

Yet outside of Campania the pizza was more browned, with a crisper crust. We found this quite funny because all styles of American pizza have a crispy crust to one degree or another. So when

Americans encounter Neapolitan pizza for the first time—either by traveling to Naples or dining at an AVPN-certified pizzeria outside of Naples—the softness is often off-putting. There is a whole line of argument about telling ignorant Americans that it is supposed to be soft, and they are supposed to like it that way. The AVPN even has an absurd campaign: “If you hear a crunch, it’s not authentic.” Yet it turns out that most Italians want a pizza that is Neapolitan-like, but crispier—just like the “ignorant” Americans. And, of course, it makes sense to cater to the customer. If people prefer a crispier crust, why not make it that way? Not following strict AVPN rules doesn’t have to be a bad thing. If anything, it’s a good thing because it means making pizza that people like.

Even outside of Naples, the margherita is an iconic pizza, and we sampled these while traveling through the rest of Italy. These pizzas may not have the softness associated with “authentic” Neapolitan pizza, but it turns out that many people prefer the crispiness of these crusts. We’ve arranged them lightest to darkest (boxed) by region.

MARGHERITA PIZZA IN THE REST OF ITALY

Tuscany



Campania



Rome



Lombardy





Neapolitan pizza from Naples



Neapolitan pizza from the rest of Italy



Canotto-style pizza

Canotto-Style Pizza

The rim, or *cornicione* in Italian, is the focus of exaggeration for a new variant of Neapolitan pizza called *canotto* (meaning “inflatable boat” in Italian). The term “canotto” is trademarked (within Italy) and owned by Carlo Sammarco, an ambitious young Neapolitan pizzaiolo. Carlo’s pizzas, and the somewhat similar pizzas from Pizzeria I Masanielli in Caserta and 10 Diego Vitagliano Pizzeria in a Naples suburb, all have a rim that is much more pronounced than the AVPN rule book would dictate. Sammarco’s inspiration arose after plates were being returned to the kitchen with uneaten pizza rims. He decided to improve this part of his pizza by making it soft and bread-like with a super high-hydration dough. Other pizzaioli, like Enzo Coccia, quite rightly point out that there has always been variation among pizzerias, with some preferring a thick *cornicione* and others a thinner one. What is different today is that these specific pizzerias are

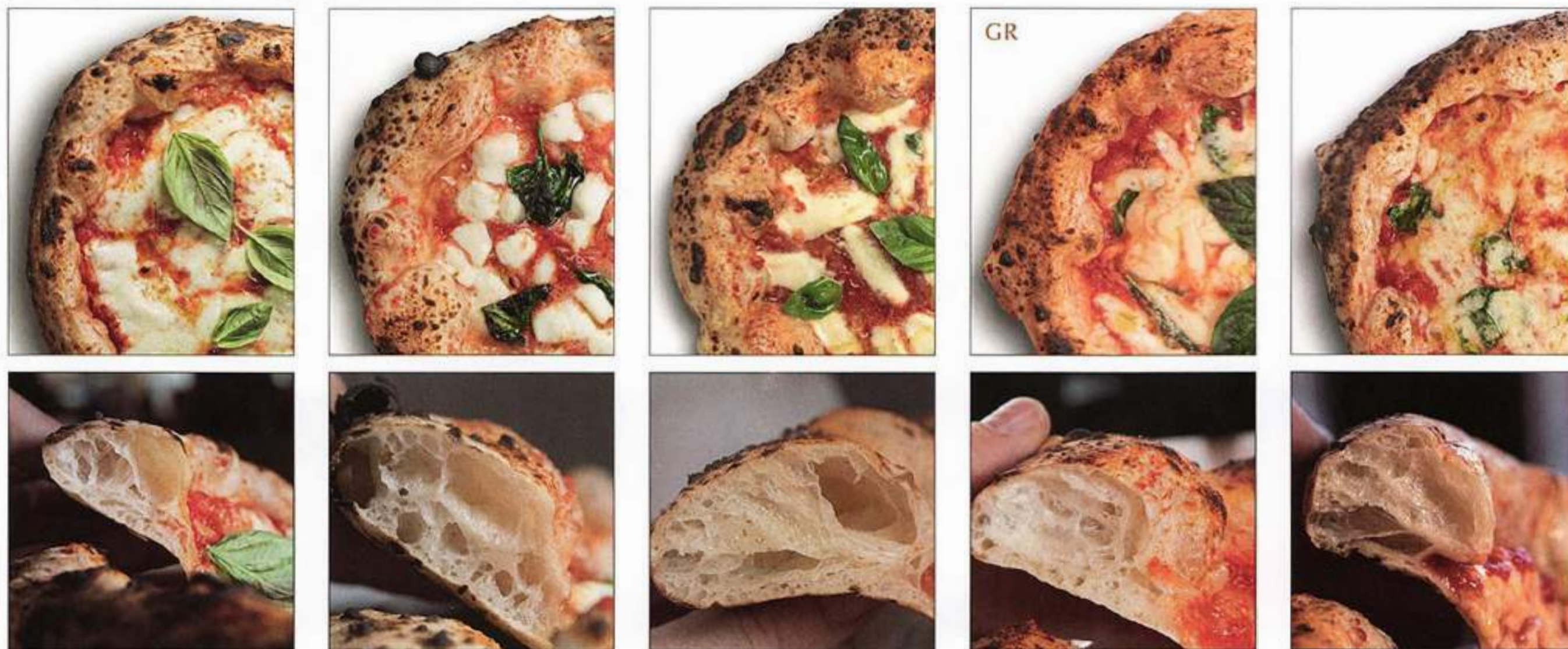
deliberately making the big rim a marketing point. We found these pizzaioli to be very secretive about exactly how they produce their puffed-up *cornicione*; I Masanielli even features a high-security combination lock on the door to its dough room (see page 160). But it wasn’t hard for us to figure out several ways to achieve the canotto-style rim, using high hydration and a long fermentation for the dough (see page 2:127). Caputo even introduced a new flour, *Nuvola* (or “cloud”), to help produce the desired effect.

The only pizzeria in the United States that we are aware of that produces this style is Una Pizza Napoletana, a long-standing pizzeria that through its history has moved from New Jersey to San Francisco and currently is in both New York City and New Jersey. Of course, they claim their puffy rim is entirely coincidental to the same rims gaining notoriety in Naples at just about the same time.

We think that creating a new pizza flour to support a novel type of pizza is admirable. A good example is the *Nuvola* flour from Caputo, which was intended to support making light, canotto-style pizza (see page 279). It’s an ingredient designed to give a dish a specific characteristic, but its presence does not make the style.

These margherita canotto-style pizzas are similar to traditional Neapolitan pizzas, except for the soft and bread-like crust. We sampled these while traveling through Italy and the United States.

CANOTTO-STYLE PIZZA IN ITALY AND THE UNITED STATES



For nearly 60 years, it was considered an iron law, “as inflexible as the law of gravity,” according to an Op-Ed contributor in the *New York Times*: a slice of plain cheese pizza cost just as much as a subway ride in NYC. As several observers noted, the subway service was just as lousy as the greasy slices. Finally, in 2019, a *Wall Street Journal* reporter declared the link was broken: the subway fare was \$2.75 and the cost of a slice had risen to \$3-\$3.50.

For more on our travels to New York, see page 214.

NEW YORK PIZZA

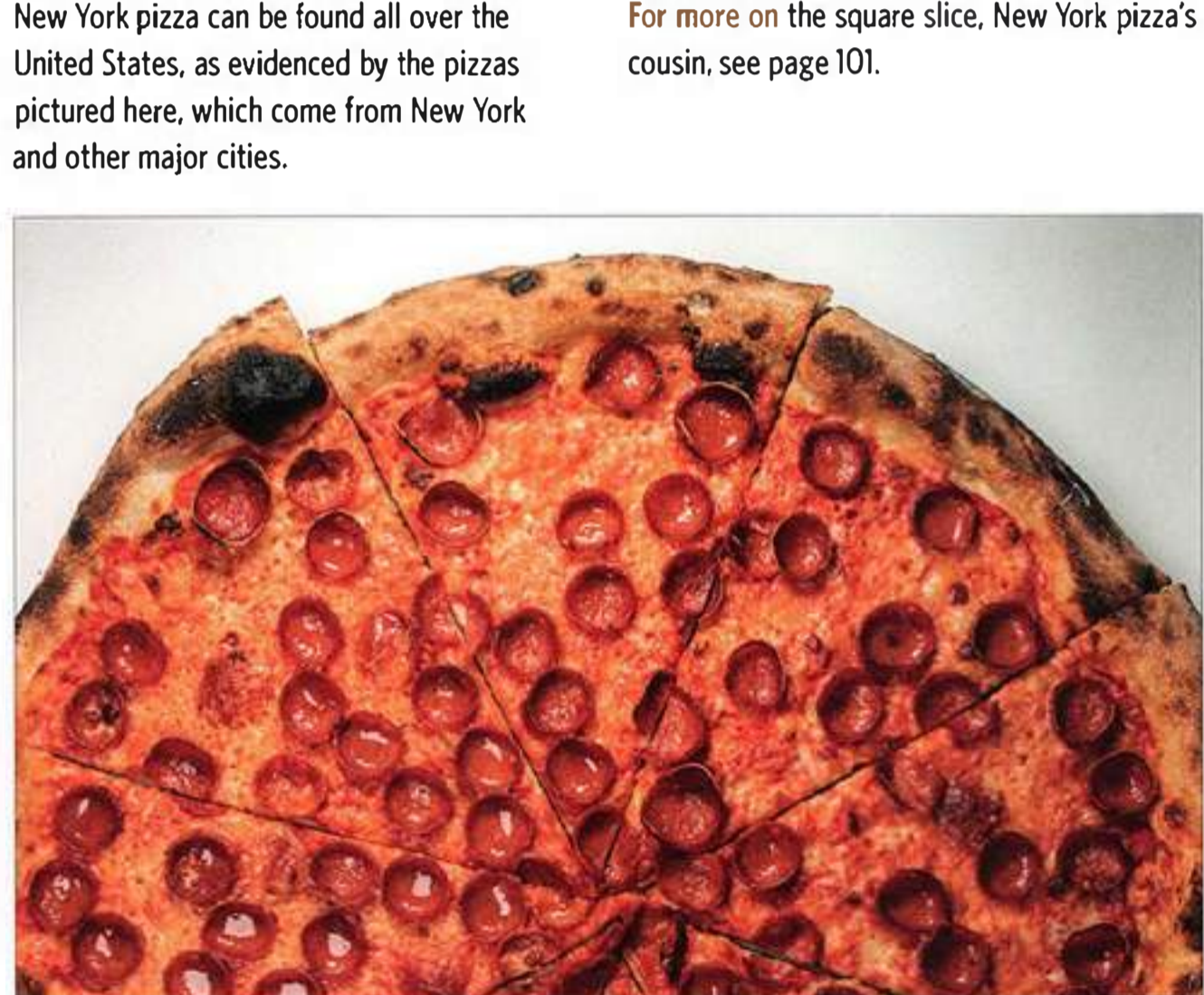
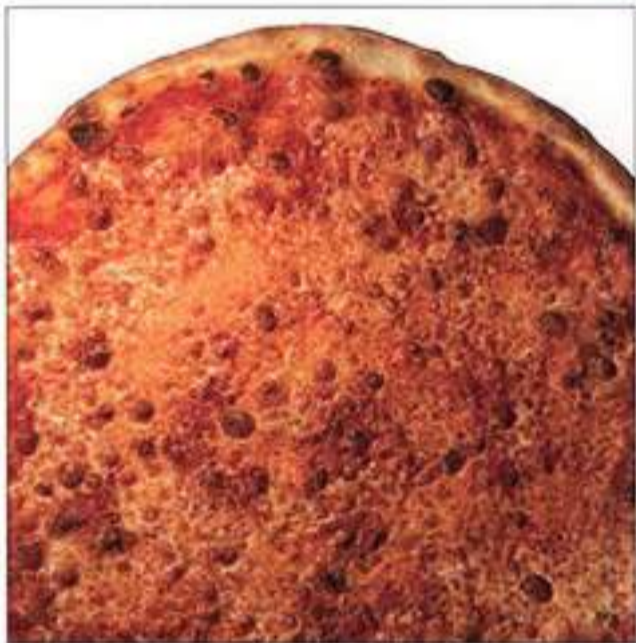
“Pizza is almost a character in the daily life of New York,” says pizza tour guide Scott Wiener (see page 153). Indeed, it’s everywhere you look. Its crust is considered thin, but not as thin as Neapolitan, and it certainly isn’t cracker-like. It’s got a snap to it, but it’s pliable enough that when you pick up a slice, the tip might droop a tiny bit. “A walk-and-talk slice,” Wiener calls it. A good New York crust comes out nicely brown, with minimal char marks. Sauce is typically layered below a blanket of pizza cheese. In the oven, sauce and cheese comingle, giving the pizza a uniform, brownish-red, mottled look. Though the

pizza of New York played a role in pizza’s expansion around the globe, you won’t find that mottled look in other pizza styles. Manhattan’s crowded sidewalks, bustling with pedestrians looking for cheap, quick fuel, are the inspiration for the iconic New York slice eaten folded in half from a cheap paper plate on the city’s streets. At slice houses, whole pizzas are displayed in a case at the counter. You pick out a slice or two and the pizzaiolo tosses them into the oven for a quick warm-up. The reheated slice is often preferred since it has the texture that most clearly defines the style.

NEW YORK PIZZA IN THE NEW YORK CITY AREA



NEW YORK PIZZA IN THE REST OF THE UNITED STATES



New York pizza can be found all over the United States, as evidenced by the pizzas pictured here, which come from New York and other major cities.

For more on the square slice, New York pizza's cousin, see page 101.

ARTISAN PIZZA

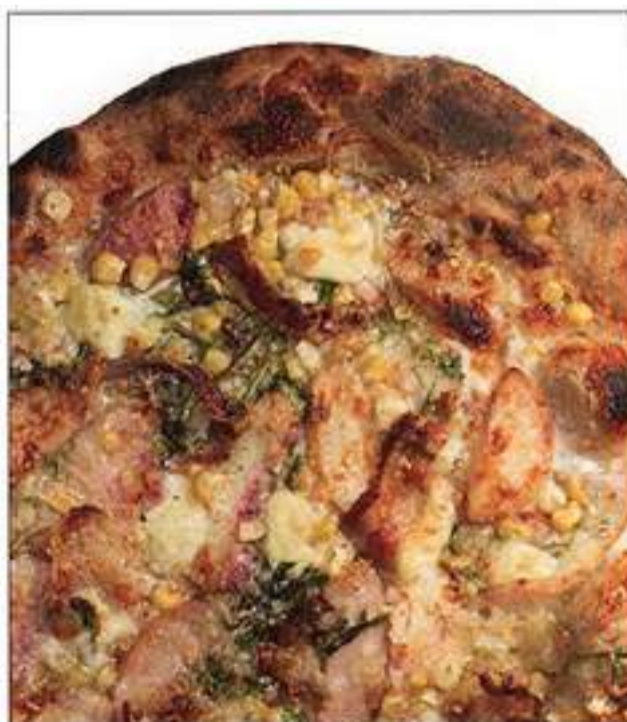
In 1980s Los Angeles, far removed from the unwritten but still powerful rules that governed pizza in its key locales (New York, New Haven, etc.), a new kind of pizza emerged (see page 82). Today, it's often called artisan style, but back then it was named for its home, California. It entails a chef's approach to pizza, where not only are toppings high quality and thoughtfully prepared, they can also be non-traditional. Salmon? Cilantro? Nasturtium petals? Sure. Attention is also given to the intricacies of a good dough that is shaped into a crust of medium thickness (see pages 3:67–68). It's typically sized somewhere between a Neapolitan and a New York

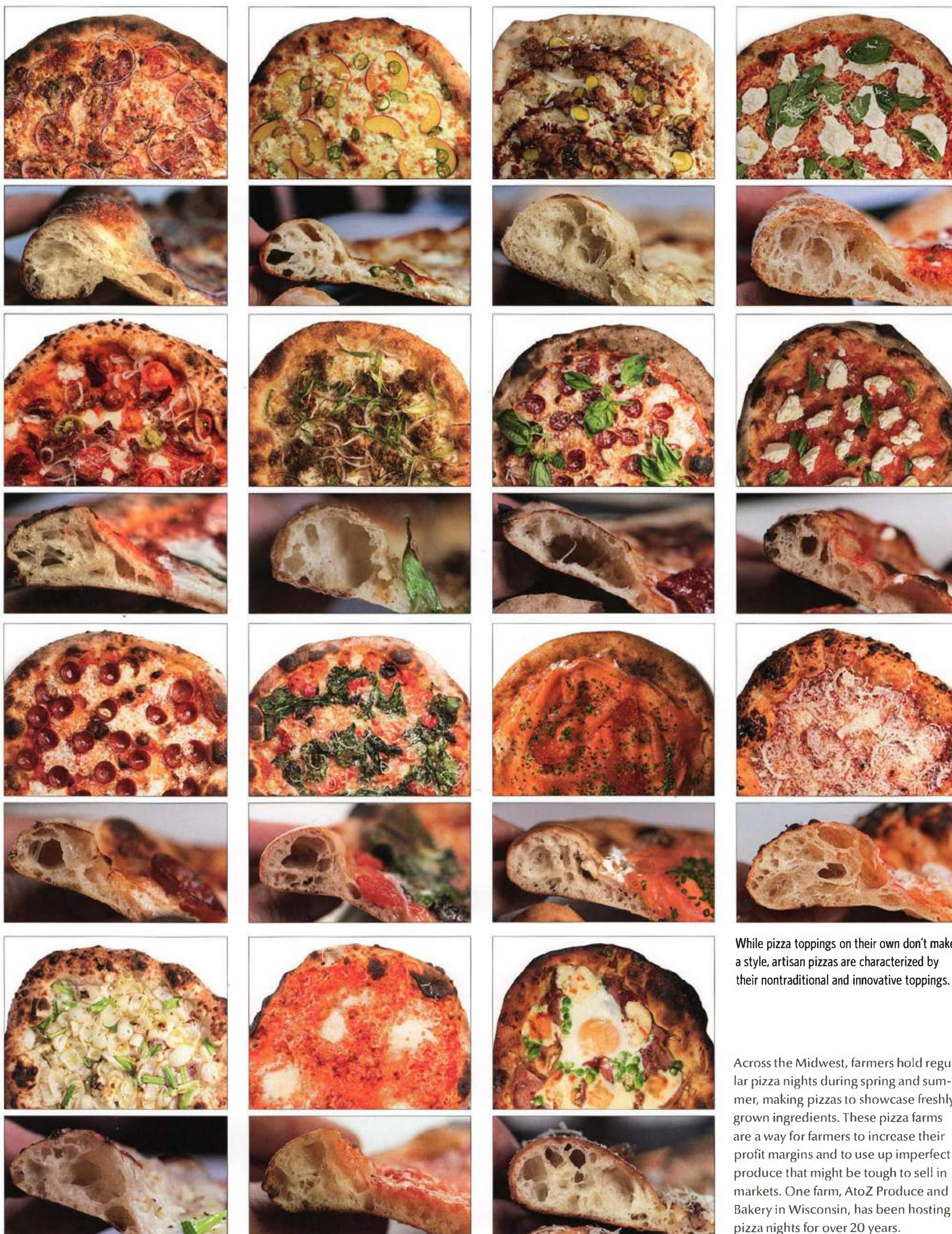
pizza. It has a pronounced rim similar to Neapolitan pizza but is crispier and can hold a plank.

We see it as the first wholly new style of American pizza since 1943, when Chicago-style deep-dish was invented. Back when the Los Angeles crowd began serving this new kind of pizza, it seemed crazy (not to mention expensive). Today, it's common. Even pizzerias in Italy serve what we'd call artisan-style pizzas. We would also argue the chef's approach to toppings opened the door for everything from the pizza gourmet movement to the wildly innovative topping combinations found in nontraditional pizza locales.

For more on the rise of artisan pizza, see page 83.

We have not classified these pizzas by region since regional attributes don't seem to influence this style of pizza. The majority of the artisan pizzas shown here are from the United States, but there are some from top Gambero Rosso pizzerias in Italy that are similar enough to artisan that we categorize them here rather than in the Neapolitan section on pages 130-135.





While pizza toppings on their own don't make a style, artisan pizzas are characterized by their nontraditional and innovative toppings.

Across the Midwest, farmers hold regular pizza nights during spring and summer, making pizzas to showcase freshly grown ingredients. These pizza farms are a way for farmers to increase their profit margins and to use up imperfect produce that might be tough to sell in markets. One farm, AtoZ Produce and Bakery in Wisconsin, has been hosting pizza nights for over 20 years.

For more on our al taglio recipes, see the Iconic Recipes chapter starting on page 3:3 and the Flavor Themes chapter starting on page 3:173.

There may not be a specific “Roman” pizza, but we really enjoyed the al taglio pizza we ate, both in Italy and the United States, while traveling. Here we’ve gathered a sampling of the pizzas we tried.

AL TAGLIO PIZZA

While we stand firm in our assertion that Roman pizza is not a style (see page 107), the most distinctive pizza we found in Rome was al taglio, notably those made by Gabriele Bonci (see page 110) and Angelo Iezzi (see page 109). Al taglio pizza is sold by the cut (al taglio translates to “by the cut” in Italian), so it is not typically sold as a whole pizza. It’s ordered either by weight or by the particular piece. Its most notable characteristic is that it’s designed to be baked ahead of time and then reheated just before serving.

While the two pizzaioli have different methods, this style is characterized by a high-hydration dough baked in a pan, resulting in an open crumb and a slightly crispy bottom. Iezzi bakes his pizza with toppings, as is typical for most styles of pizza. Bonci, on the other hand, bakes the crusts either untopped or with a thin layer of tomato sauce, cools the crust, then dresses the pizzas for display. When customers order, the toppings may be removed if they are heat sensitive (such as delicate seafood or tender greens); then the pizza is reheated, retopped, and served.

TOPPINGS BAKED ON



TOPPINGS ADDED AFTER BAKE



PIZZA GOURMET

In 1999, pizzaiolo Simone Padoan had what he calls a “personal crisis” focused on the nature of the pizzas he made. Padoan grew up in a Northern Italian family that ran what he describes as a rather ordinary pizzeria near Verona, and he too had taken up the profession. But he was dissatisfied with the conventional pizzas that he made. Instead he wanted to “elevate” pizza to be something that could be considered high cuisine. It was a complete rethinking of pizza—so much so that Neapolitan pizza purists say what he creates is not pizza at all, but rather a kind of Northern Italian open-faced sandwich—smørrebrød di Verona. Alternatively, one could call it a type of focaccia presented with toppings. Padoan opened his pizzeria, I Tigli (see page 188), to showcase this new approach. As with other styles, pizzaioli in the nearby area, notably Renato Bosco, Nerio Beghi, and Massimiliano Alajmo, started making their own versions. Because of its high-end aspirations, it is usually referred to by Italians as “pizza gourmet,” or (as with Gambero Rosso) pizza degustazione.

Pizza gourmet is based on a thick, round focaccia crust. Padoan is obsessed with achieving a particular set of characteristics that make it quite unlike other focaccia—in particular, it tends to have a much denser, tighter crumb, which he wants to have a short, not quite crumbly texture, but with a crispy crust. This is a typical crust, but Padoan has many variations, some made with whole wheat or non-wheat flours as primary or partial constituents. The crust is fully baked ahead of service and held as one would hold bread. Some pizzas feature a crust that is steamed rather than baked. At service time the crust

is warmed and sliced (usually into six pieces), then arranged on a plate with a gap between the slices. Toppings and sauce are put onto the pizza; in some cases the crust with toppings and sauce visits the oven for an overall warm-up, but for other combinations it does not.

The toppings that go on pizza gourmet can include tomato and cheese, but more often they are items from high-end Italian cuisine. So, a pizza might have rare-cooked duck breast with a berry sauce, or perfectly roasted langoustine with a delicate cream sauce.

Frankly, we are torn about pizza gourmet. On one hand, it clearly is a valid pizza style. We disagree with the knee-jerk rejection “that’s not pizza” because we believe that chefs and pizzaioli have the right to experiment and make their own styles. While pizza gourmet is clearly different from traditional Neapolitan pizza, its points of difference are no greater than some other things that even Neapolitan purists accept—like pizza frita or montanara. We very much agree with the idea that pizza can be haute cuisine, which is controversial for some. We also resonate with the sincerity that has driven Simone Padoan on his quest. Some of the pizzas we have had are excellent—mainly because of the creative sauces and toppings. However, we also find problems with pizza gourmet. The crust is always a thick, spongy focaccia, and that does not always work with the delicate sauces and toppings. Many of the doughs, including Padoan’s, are spectacularly (and we think needlessly) complicated. Indeed, it forces the diner to wonder, “Would I rather have the sauces and toppings by themselves on the plate, with bread on the side?”

Pizza gourmet is one of the newest pizza styles we encountered, created around 20 years ago. Its chef-driven toppings and presentation push the limits of the definition of pizza.



For more on our travels to Detroit, see page 250.

We sampled a lot of Detroit-style pizzas on our trip, and we found some of the best iterations outside the city of Detroit. No matter where you eat one, though, they are all pan-baked and bread-like.

DETROIT-STYLE PIZZA

Just as all superheroes have an origin story—being bit by a radioactive spider, getting exposed to gamma rays, or finding oneself orphaned on Earth from another world—so, too, do all pizza styles. In 1940s Detroit, a struggling bar owner asked his Italian mother-in-law for help developing a pizza recipe in the hopes it would bring in extra cash. He took her pan-baked pizza recipe and added his own touches, sprinkling cheese down along the sides so it would caramelize against the hot metal. The resulting frico edge is a distinguishing characteristic of this style, as is its square shape and thick, crispy crust. The dough is traditionally pressed into repurposed steel pans that were originally created for the local

auto industry. Sauce is spooned on after baking, which thwarts gumminess (see page 370).

It wasn't until relatively recently that this style spread outside the Motor City. There was a flurry of Detroit-style pizzeria buzz in the mid-2010s (fueled, in part, by a dazzling 2012 win at the International Pizza Expo), but it's still an underappreciated style that may be building up some steam. A chain that specializes in Detroit-style pizza, Jet's Pizza, is now in 19 states, and Pizza Hut rolled out Detroit-style pizza nationwide in 2020. On our world tour of pizza, we had the tastiest examples of this style in Chicago, New York, and Los Angeles (see pages 214, 234, and 263).





ARGENTINEAN PIZZA

Buenos Aires is home to a rich pizza tradition, owing to the large Italian population in the city. We found numerous types of pizza served there, including pan-baked pizzas, grilled pizzas, and traditional Neapolitan pizzas. Some of the pizzas we ate share characteristics with the thick-crust pan-baked pizzas we found in Chicago. We have grouped them together to highlight these similarities (see page 128).

Buenos Aires is also home to canchera (see page 200), a cheeseless pizza often served to soccer fans in the La Boca neighborhood. Canchera

hawkers would (and still do) bring stacks of pizzas to the stadium, set up a table, and sell it cold, by the slice. Buenos Aires is also home to fainá. Fainá is a dense flatbread made from chickpea flour (see page 200) that is sold and eaten with pizza. You might call it a thinner, drier polenta. It's often sliced and stacked right on top of a piece of pizza, known as pizza a caballo (see page 201). Fainá is also popular in neighboring Uruguay.



Canchera



A la piedra-style pizza



Grilled pizza



Fainá



Fugazza



Fugazzeta

For more on the history of pizza in Argentina and fainá, see page 40.

KEBAB PIZZA

The kebab pizza started appearing on Swedish pizzeria menus in the 1980s, and by the 2000s it was the country's most popular pizza. Toppings include some combination of kebab meat, tzatziki sauce, feta, cucumbers, lettuce, and pickled peppers. Sometimes, french fries are piled on. One publication, *The Local*, described it as "a Swedish invention which combines Italian and Turkish cuisine in a way that might horrify Italians and Turks." The mash-up is starting to make inroads outside of Sweden, too. You can get a version of kebab pizza in Tennessee, in Australia, in California, and even in Italy, where it's served right across the street from Le Calandre, a three-star Michelin restaurant from the Alajmo brothers (see page 185) in the village of Sarmedola di Rubano.



CHAIN PIZZA

The most common type of pizza consumed on earth, chain pizza, is not a real style by our definition. When we talk about chain pizza, we mean those made from the likes of Pizza Hut, Domino's, Papa John's, Little Caesars, and the numerous local chains in countries around the world. These pizzas are in some ways a derivative of New York pizza (see page 136), made typically with a medium crust that is softer and denser than a typical New York pizza, and seemingly endless combinations of toppings. These days many pizza chains are offering others styles of pizza as well.

While we won't waste space discussing the ways that chain pizzas fall short of the mark in quality (although they almost always do), the ways in which chain pizza has adapted to the local tastes wherever they are found is commendable. American chains are largely the mechanisms through which pizza spread to many parts of the world. As of this writing, Pizza Hut remains the biggest of these chains. In the 1980s and '90s, chains like Domino's and Pizza Hut grew their international business by leaps and bounds. Instead of pressing strictly American tastes on their international pizzerias, they tailored their menu selections to the tastes of the countries they were in. You'll find pizzas with American-style toppings alongside locally popular ingredients (everything from wasabi

For more on the history of chain pizzerias, see page 79.

to sweet mayonnaise to corn). A Pizza Hut menu in Japan is different than one in South Africa, for example. Domino's in France has crème fraîche on the menu and offers kebab pizza in Sweden (see previous page).

The chain market is not solely populated by American companies. There are, of course, chains all over the world, some of them multi-national, like Spain-based Telepizza. In South Korea, when American chains showed up in the mid-'80s, there wasn't a pizza scene. Today, there are hundreds of American outlets, but even bigger are the South Korean-based franchises. Chains like Mr. Pizza took an American specialty and turned it into something uniquely Korean. Step inside a Mr. Pizza or one of the other local chains, and you'll find dishes that are wildly inventive, with unexpected ingredients, combinations, and textures.

Where chains may often lack in quality, they seem to make up for it in innovation (even if we think at times the innovations might be wrong-headed), from everything to a rim crust oozing with a molten cavity of cheese to a pizza surrounded by mini sliders and hot dogs. And whether or not these offerings suit your taste, it's undeniable that chain pizza drives a huge portion of the pizza business.

This collection of pepperoni pizzas from national chain pizzerias look pretty similar and are pretty similar in quality. We may not love the chain pizza we tried, but there's a reason it's become so ubiquitous—it's cheap and fast.



CHAPTER 3 PIZZA TRAVELS



Gambero Rosso

... That this nation, under God, shall have a new birth
Abraham.

Visas



34





om.

Visas

AEROPORTO DI NAPOLI CAPODICAPPO USO MILITARE

08.05.2011

NAPOLI

CAMPANIA

LA REPUBBLICA ITALIANA

MINISTERO DI IMMIGRAZIONE

FLORENCE

20.07.97

2.50

ARRIVAL ★

FEB 2014

ROME

ITALY

35

IL SPECIALE
LA MIGLIORE
DEI VINI
PRE

DELL'ANNO
RICERCA
E INNOVAZIONE

CHOOSING THE PIZZERIAS	150
NAPLES AND CAMPANIA	154
ROME	168
NORTHERN ITALY	178
SÃO PAULO	190
BUENOS AIRES	200
TOKYO	208
NEW YORK	214
NEW HAVEN	228
CHICAGO	234
QUAD CITIES	248
OLD FORGE	249
DETROIT	250
PORTLAND, OREGON	254
REST OF THE UNITED STATES	262



PIZZA TRAVELS

Pizza is one of the most widely eaten foods on earth, and the vast majority of pizza eaters get it from pizzerias. The tradition of making pizza has been one of learning by doing, often through apprenticeships or family members. You could say similar things about bread, which is why we also traveled all over the world for our book *Modernist Bread*. But for bread, there are plenty of cooking schools that have professional training programs. This is vastly less common for pizza.

There are also plenty of articles and books about pizza and pizzerias. They'll promise to tell you everything you need to know about the pizza in New Haven or Naples or Buenos Aires or anyplace else. But how many of the authors actually travel the world to eat and experience all that pizza, in all its diversity? Given these factors, pizza required us to travel even more than our previous books did. We wanted to make sure we tried as many of the best pizzerias on earth as possible.

For this chapter, we flew from our home base in Seattle to key pizza locales in the United States. We went to six different regions in Italy. We visited Buenos Aires, São Paulo, and Tokyo. (We would have made additional trips, but our travel was halted due to the COVID-19 pandemic.) In each case,

we did a lot of research beforehand, reading books and articles, talking with people in the know. We also worked with locals. They told us the hot spots (along with pizzerias we might as well skip), introduced us to the proprietors, and shared information on the region's history.

This chapter serves as a travelogue of sorts, which is something we haven't included in previous books. Why did we do this? After much thought, we decided it was the only way to give the full picture. Pizza has been primarily a restaurant cuisine, and it's not a restaurant cuisine that has been particularly well documented. It's also a uniquely local cuisine, so the style of pizza you get in, say, Chicago, is different from what you'll get in Rome. We undertook this world tour to help us understand that diversity and learn from the local pros.

Our fact-finding expedition paid off in many ways. We were impressed with how generous so many of the pizzaioli were with their time and expertise. They not only shared some great pizza-making secrets, but also sparked new ideas that we tested out back home in our lab. We tasted all different kinds of styles and pseudo-styles and experienced some amazing topping combinations.

It's easy to learn how to cook something from a famous chef because so many of them have cookbooks. This isn't the same for pizzaioli. Even if you can find a cookbook from a famous pizzeria, it's often been compromised because they've adjusted the recipes for a home audience. This was one of many factors that necessitated our travels around the world, so we could learn firsthand instead of relying on books.

NEW DISCOVERIES AND TECHNIQUES

Some heavily mythologized styles do not even exist (see page 150)

Most historic pizzerias were not our favorite (see page 151)

Most AVPN-certified pizzerias in Naples don't follow all the guidelines (see page 154)

Pizza in São Paulo is an upscale dining affair (see page 190)

Portland, Oregon, is the best pizza city in the United States (see page 254)

The path leading to famed pizzeria Pepe in Grani located in Caiazzo, Italy.

CHOOSING THE PIZZERIAS

For most of its existence, pizza was the food of poverty. Boy, have things changed. Now well-to-do travelers are paying to take tours of some of the world's most well-known pizzerias. This includes both talented chefs and would-be pizzaioli going on pilgrimages to the birthplace of pizza to learn how it's really done.

We visited more than 200 pizzerias—visits that included extensive planning, suitcases of photographic equipment, and a lot of tasting and note-taking by members of our editorial and culinary staff. It was quite the undertaking. Still, we saw perhaps 0.001% of all the pizzerias out there. So how did we choose where to go?

Naples (see page 154) was a must-see. This is where pizza was invented. We also visited key first-generation pizza cities, such as New York (see page 214), New Haven (see page 228), and Buenos Aires (see page 200). In addition, we traveled to spots known for a particular style, such as Chicago (see page 234), and added a number of other areas, such as California (see page 263) and Rome (see page 168), to paint a picture of the pizza scenes there.

We selected pizzerias that were highly rated (referring often to guidebooks or best-of lists) or that had long histories. We used many of these books and lists to make our own itineraries, but these resources are created from the point of view of a prospective customer at a pizzeria. We were going not to judge the pizzerias but to understand their techniques. Some of these pizzerias were slice houses; some were more upscale. In all regions, we worked closely with local guides. For Italy, we relied heavily on the Gambero Rosso guidebook.

Obviously, we couldn't go to every pizzeria, everywhere, that's received a good review. What you're getting here is a curated selection of pizzerias we wanted to include.

OUR PROTOCOL

We contacted pizzerias in advance, letting them know we wanted to visit, ask questions, and take photographs. If they didn't want to participate, they were skipped, and some we just couldn't feature because we simply ran out of room in the book. This approach is quite different from traditional restaurant reviews, in which the reviewer would

never announce his or her presence. (Some well-known restaurant reviewers even resort to wearing disguises.) This wasn't going to work for us, though, since we were a) traveling the world, b) going to a whole lot of pizzerias at once rather than just popping into a local pizzeria for a review, and c) interested in photographing the pizzas as they were presented, top, bottom, and cross-section. We often arranged with the pizzerias to visit at off-hours, so we wouldn't be disruptive during service. If a pizza didn't arrive at the table looking exactly how the proprietor wanted it, they took it back to the kitchen and made another for us to shoot. We know we ate what the proprietor considered to be his or her best offerings, even if we didn't consider it good. Our take isn't meant to be an accurate reflection of what a random diner might experience—it's to understand the process.

How Did We Choose What to Order?

To have some standardization, we asked each pizzeria for two specific things: the simplest pizza and whatever the pizzaiolo recommended, which was either their favorite or the most popular. In Italy, that meant we ate a margherita and marinara in every pizzeria that served them. In New York, it was a plain cheese pizza. As for the pizzaiolo recommendations, they ran the gamut. In Chicago, we ate a lot of deep-dish sausage pizzas. In New York, it was pepperoni. We tried several clam pizzas in New Haven. Italy was more varied. And, of course, we tried more than just two pizzas at each place, so we really got a full picture (and full bellies).

THE GOOD, THE BAD, AND THE POWER OF A COMPELLING STORY

There were a number of big surprises. For example, we were surprised to learn that Sicilian pizza, as it's been described in the literature, doesn't seem to exist in the real world (see page 101). So-called Chicago thin crust really isn't very thin (and isn't a true pizza

For more on pizza styles, see page 125.

From our travels around the globe, our collection of guidebooks, maps, and postcards grew to be just as full as our stomachs.



style, see page 105). There isn't a particular pizza that can be called Roman style (see page 107).

Pizza, like many foods, can be surrounded by a certain cult of secrecy as pizzerias want to defend why you should go to their place and not others—maybe it's their secret sauce or secret technique. Many people we consulted with wondered out loud if the pizzerias we visited would even tell us the truth and share their methods. We made it clear that we wanted to honor people's techniques; we weren't trying to reveal their secrets to the world. And a fair number of pizzaioli did share their recipes and techniques! While we're not certain they revealed *everything* about their recipes—and some of the stories *did* strike us as dubious—their generosity has unequivocally made this a better book.

We discovered that the more talented the pizzaiolo and the better the pizza, the more open he or she was about everything. The warmest reception we had was in Italy. Italian pizzaioli regard their work as a profession—they're proud of their skills and contributions to the industry. This may have made them more open to sharing their work with us. In the end, though, we were incredibly happy with the cooperation we experienced all over the world.

We also learned that some pizzerias we'd heard raves about, sadly, weren't very good. Some of the most disappointing pizzerias were the ones with the longest histories. We often felt the product wasn't anywhere near as well executed as some of the newer pizzerias, even ones that try to copy the old-school style. In other cases, we felt there were significant flaws in an entire style of pizza (see page 114).

Here's the thing: when we talked with pizza aficionados about what seemed to us to be indisputable flaws—a dry crust or a gummy, white layer of unbaked dough—they wouldn't necessarily contradict us. Instead, they'd say, well, that's just the

style, or they'd trot out heartwarming stories: the pizzeria's history, the dedication of family owners working for generations, the hurdles that had been overcome. What really hit home after this experience was that people become attached to a particular pizza because they grew up with (or later fell in love with) the *idea* of the pizza (see page 115). In other words, the pizzeria's story helps to sell the pizza. While there's something to be said for history and loyalty, we have to say, good stories don't make good pizza. (Some of them, it turned out, weren't true anyway.)

Sitting down to write this chapter, we had to do some soul-searching. Praising a pizzeria that we didn't think deserved it would be both dishonest and useless for our readers. We also didn't think it would benefit anyone to trot out a whole bunch of criticisms about each flawed pizzeria. The end result was, if we really didn't like the pizza, we left it out unless there was some particular reason to include it (for example, if it was historic or if it was an exemplar of a particular style. In those cases, you'll notice we don't have much to say about the place).

In *World of Pizza* (starting on page 91), we share some of our thoughts on why some objectively bad pizza is still celebrated and how a powerful story can keep mediocre pizza on a "best of" list (see page 152). We call it the culinary Stockholm syndrome (see page 115).

Here, we offer you our answers to the question we've gotten countless times in the course of our research: "Where's the best pizza in _____?"

The historical provenance of pizza plays into the marketing. The number of pizzerias that claim to be original and authentic is very high but their origin stories are not always true. This meant we had to go to not only the best pizzerias on earth, but also the most legendary pizzerias on earth, even if they weren't all that they were cracked up to be (see page 118).



THE PATHOLOGIES OF “BEST” PIZZA LISTS

It seems wherever you look there is a list proclaiming that it covers the “best” pizza—whether in a particular city, state, country, or the world. Indeed the search term “best pizza list” gets over 200,000 results. There are several interesting phenomena behind these lists. The first is that lists are popular with readers who have shown they will buy magazines or click through links to read them, which drives the need to publish more lists. It is much cheaper and easier to simply draw up a list by looking at other lists than it is to go through the trouble and expense of gathering the data from scratch. Unfortunately, this means that most best pizza lists *are just made up*. A dead giveaway that the list is just made from other lists is when there is no discussion of the methodology behind the creation of the list. If somebody did send a team around the country to sample the pizzas, they will be proud of that fact and let you know. (We should know!) If the list just appears without explanation, you can bet it was created from existing content.

A different approach to making a “best pizza” list is to get food critics and/or culinary professionals to vote. That is the approach taken in “The World’s 50 Best Restaurants” list. There is something to be said for this, but the approach has its problems. There is generally no way to tell if the voters have actually been to the restaurant. Plus, the list tends to be heavily weighted toward whatever is trendiest at the moment. It’s a bit like asking for the best student in high school by taking a poll of just the cool kids.

Yelp, Tripadvisor, and other voting-based sites take the voting to a larger set of people. This has two problems. The first is that, as with professional voters, there is no way to tell whether the people have actually been there. Indeed, a very common phenomenon on Yelp is that deep within a really bad review will be an admission that the reviewer didn’t actually eat there, but that doesn’t stop them from voting. The second

issue is more severe: the body of voters is not regulated, so the pizzeria and/or its friends can vote.

Not all lists suffer these issues. Gambero Rosso, the Italian publishing company, has an annual pizza guidebook that is much more than a list—it offers reviews and ratings of 643 pizzerias within Italy. They use a set of their own anonymous inspectors to compile the guide in an approach that was originally invented by Michelin. The ratings include two systems—Spicchi, which is awarded for whole pizzas and rated as one through three pizza slices (three denoting the very best pizzerias), and Rotelle, which is awarded for pizza by the cut and is rated as one through three pizza wheels. In our experience the Gambero Rosso guide is a reliable indicator of good pizza. We don’t agree with every rating, but that is to be expected. Unfortunately, Gambero Rosso reliably covers only Italy—there is a section in the book for the rest of the world, but it is quite sparse.

The “50 Top Pizza” list is an Italian list that is also compiled with anonymous inspectors. We have visited about 90% of them and broadly agree that the pizzas they include are very good. Outside of Italy they do lists for North America and Europe, but their coverage is much more limited and the results much more suspect as a result.


Throughout this chapter, we’ve included the icons below to indicate which pizzerias we visited have won these prestigious awards. Since both the Spicchi and Rotelle awards are rated as one through three, you’ll see the corresponding number of icons for each award.



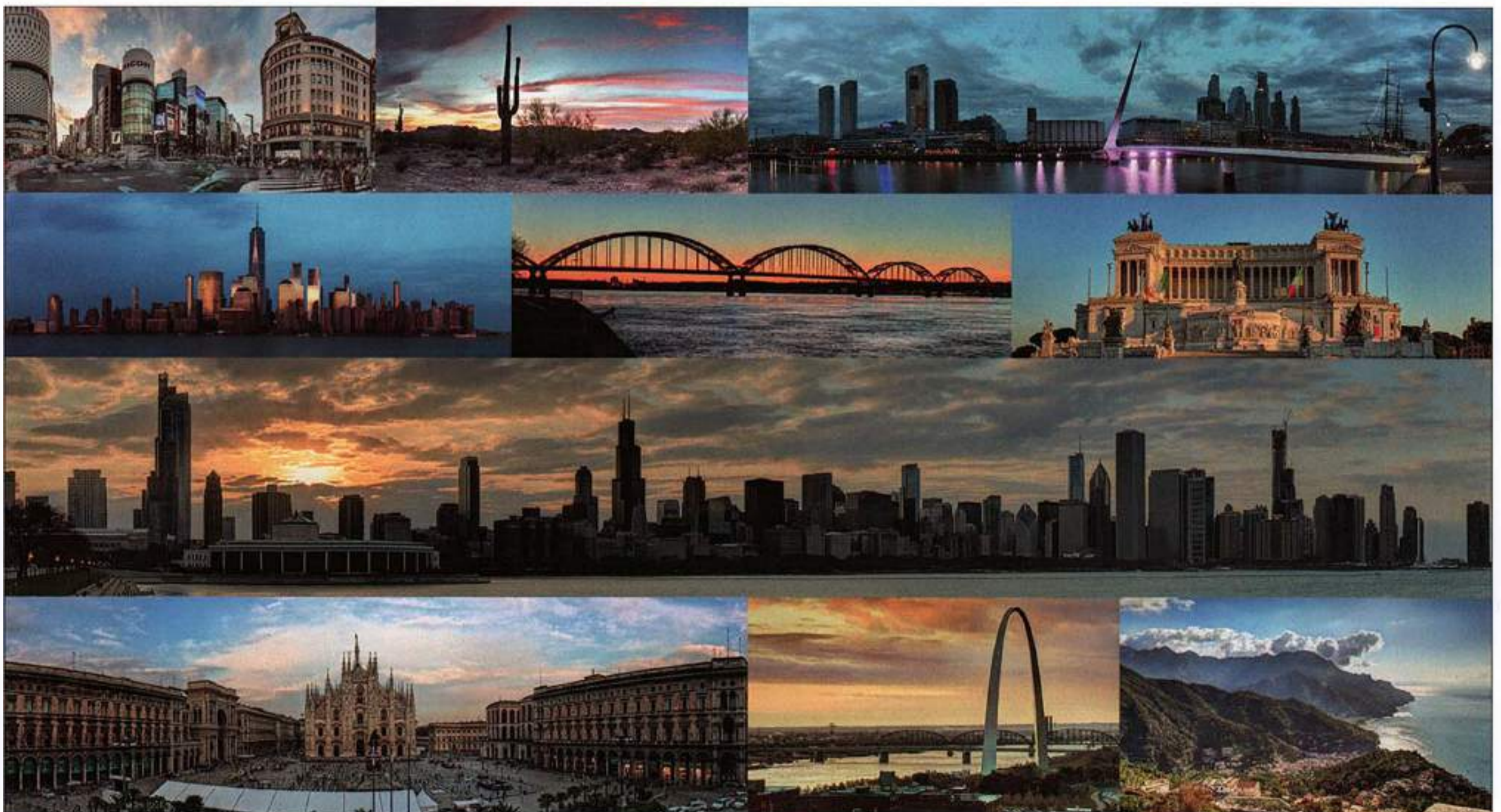
 50 Top Pizza award



 Gambero Rosso:
 Spicchi rating 1-3



 Gambero Rosso:
 Rotelle rating 1-3



Our pizza travels took us around the world including (top row) Tokyo, Japan; Phoenix, Arizona; Buenos Aires, Argentina; (second row) New York, New York; Davenport, Iowa; Rome, Italy; (third row), Chicago, Illinois; (bottom row) Milan, Italy; St. Louis, Missouri, and Amalfi Coast, Italy.

THE ROAD TO GREAT PIZZA

Here's a look at how the numbers shake out from our travels to pizzerias around the world.

Number of pizzerias by major city

Buenos Aires: 12
Chicago: 16
Detroit: 4
Florence: 6
Los Angeles: 8
Milan: 5
Naples: 16
New Haven: 6
New York City: 28
Old Forge: 4
Philadelphia: 4
Portland: 9
Rome: 10
São Paulo: 16
Seattle: 7
St. Louis: 2
Tokyo: 9

Number of pizzerias by style

Al taglio: 16
Argentinean: 9
Artisan: 21
Bar/tavern: 17
Brazilian thin-crust: 6
Deep-dish: 14
Detroit-style: 8
Grandma/New York square/
Sicilian: 24
Neapolitan: 76
New Haven: 6
New York: 33
Old Forge: 4
Pizza frita: 5
Pizza gourmet: 6

Most expensive pizzas

Brazil: Pizzeria Bruno (São Paulo), R\$155 / \$28.13 USD, "Camarão con catupiry"
Italy: Sirani (Bagnolo Mella, Lombardy), €90 / \$97.50 USD, "60 Gramm"
Japan: DevilCraft (Tokyo), ¥3,980 / \$36.20 USD, "Meatza"
United States: Marta (New York City), \$55 USD, "Tartufo Nero"

Least expensive pizzas

Brazil: Forneria Urbana (São Paulo), R\$19 / \$3.45 USD, "Ed. Martinelli"
Italy: Pizzeria Gino Sorbillo (Naples), €4 / \$4.33 USD, "Margherita"
Japan: Savoy (Tokyo), ¥1,500 / \$13.64 USD, "Margherita" and "Marinara"
United States: Aurelio's Pizza (Chicago), \$6 USD, 6-in plain cheese

Number of pizzerias ranked by Gambero Rosso guidebook awards

Tre Spicchi: 27
Due Spicchi: 9
Una Spicchi: 2
Tre Rotelle: 5
Due Rotelle: 3

- 255 pizzerias visited worldwide
- 33 pizzerias named after owners
- 20 AVPN-certified pizzerias
- 2-4 pizzas eaten at each pizzeria on average
- 12+ pizzas on most pizzeria menus
- Most popular pizza style: Neapolitan
- Most popular type of oven: wood-fired
- Most popular topping: meat (except in South America where vegetables are more popular)

PIZZA TOURS

Pizza-savvy entrepreneurs have been offering tours since at least 2005. Today, you can get guided pizza tours in Chicago, New Haven, Naples, Rome, and New York state, among other places. You can even tour a pizza factory in Milwaukee, Wisconsin. When possible, we hired pizza tour guides to arrange our own private visits. While we haven't had the typical tourist experience, these tours are a great way to get familiar with local pizzerias. They even allow you to try slices instead of having to buy whole pizzas.

Scott Wiener runs a popular tour in New York. For years, he was mostly just a pizza hobbyist (albeit an obsessive one, amassing, among other things, a collection of pizza boxes that would earn a Guinness World Record). But in 2008, he decided to try to make a living from his passion by sharing his knowledge on pizza tours. He got the idea after an epic birthday party in which he hired a bus and driver to take 26 friends on a whirlwind pizza blitz. Even on his own birthday, he took care of every detail, calling ahead so the pizzerias would have hot pies as soon as the throng arrived, offering historic details and other tidbits to his guests over a bullhorn, providing notebooks for them to take pizza notes. Six months later, he created his own dream job, starting Scott's Pizza Tours. Today, he's got a stable of fellow enthusiasts who help him lead both walking and bus tours of New York's pizza hot spots. His obsession has also become the subject of a documentary—*Scott's Pizza Tours*.

In New Haven, Colin M. Caplan offers tours of that city's best-known pizzerias, backing up the dining experience with his own research, which later became a book. Caplan, an architect and historian, even produced

a movie about his favorite city pizzerias and the history of Italian immigrants in New Haven. There's also Jonathan Porter of Chicago Pizza Tours, who designed bus tours that showcase both iconic and lesser-known pizzerias throughout Chicago.

Those are just some of the organized tours available around the world, but there's also a burgeoning pizza pilgrimage scene, in which people take it upon themselves to arrange their own epic pizza tours. And of course, some of the world's best pizzaioli honed their craft by spending months in Naples learning from the pros.



Scott's Pizza Tours outside Lombardi's original location (see page 31)



NAPLES AND CAMPANIA

The Mediterranean city of Naples, capital of Campania, sits alongside the Bay of Naples with Mount Vesuvius looming in the distance.

For more on pizza-like foods, see page 96.

The city of Naples holds a special place in the pizza pantheon. Over two centuries ago, pizza was born here, and today, people make pilgrimages just to eat at one of Naples's many temples to the creation of pizza. The purists, such as the folks from the Associazione Verace Pizza Napoletana (AVPN), say true Neapolitan pizza means only one thing—one *very specific* thing, involving rules that are mind-bogglingly precise (see page 3:43). Stray from the rules, they say, and you're not making real Neapolitan pizza. Given that, it's natural to assume that there's pretty much just one style in Naples. It's also natural to assume it's all high quality.

During our visit, we found those assumptions wrong on both counts. We were surprised to find

many kinds of pizza being made in and around Naples, not just traditional Neapolitan style, which is characterized, among other things, by a soft, pliable crust that is charred in spots. Some of the pizza we had in Naples was good and some was bad. Moreover, pizza doesn't mean just one thing in Naples. There's pizza frita (fried pizza), pizza bianca (no tomato), pizza rossa (no cheese), and pizza a portafoglio (folded and eaten to go). There are things that are called pizza, such as the casserole-like pizza rustica, but really *aren't* pizza.

The role of the AVPN within Naples is interesting. The organization spread the gospel of Neapolitan pizza around the world, but it appears *less* prominent in its home base than we would have



thought. While 100 pizzerias in Naples are AVPN certified, we didn't notice any of them taking pains to advertise it. (Elsewhere AVPN-certified pizzerias announce it proudly.) Moreover, not a single pizzeria we visited followed the AVPN rules to the letter. Does that mean they're not making Neapolitan pizza? We don't think so.

There were some other surprises. One was pizza frita, which appeared on many menus. In pizza's early days, women tended kettles of oil and made fried pizza on the street, earning a few pennies for their family and feeding folks who could afford nothing more. (Pizza frita plays a central role in Sophia Loren's 1954 movie *L'Oro di Napoli*; see page 38.) We enjoyed the examples we tried on our visit and aren't quite sure why this style hasn't caught on in the United States.

Naples isn't just a pizza city. It's a pizzaiolo city, where the pizza makers are almost as famous as the pizza itself. Enzo Coccia, Antonio Starita, Gino Sorbillo, and others are celebrities akin to the world's best-known chefs. Rather than saying, "I'm going to La Notizia," pizza aficionados might say, "I'm going to Enzo's place." We found them very welcoming and generous with their time and knowledge.

What makes the pizza culture of Naples so great is that the people themselves love pizza. There's a lot of competition and a tremendous number of opinions. Ask anyone about their favorite and you'll get an earful. We are including the surrounding region of Campania with Naples here. We found that some of the best pizza in the world is being made just *outside* of Naples in the small town of Caiazzo (see page 161).



NAPLES AND CAMPANIA BY THE NUMBERS

16 pizzerias visited in Naples

8 pizzerias visited in the rest of Campania

11 Tre Spicchi-winning pizzerias visited

11 AVPN-certified pizzerias visited

Largest pizzeria visited: Pizza a Metro (400 seats)

Oldest pizzeria visited: Antica Pizzeria Port'Alba (allegedly dates back to 1738)

Popular pizzas at pizzerias visited: margherita, marinara

Popular toppings at pizzerias visited: anchovies, garlic, tomatoes, mozzarella

Home of AVPN headquarters

800+ pizzerias in Naples, 100 of them AVPN certified

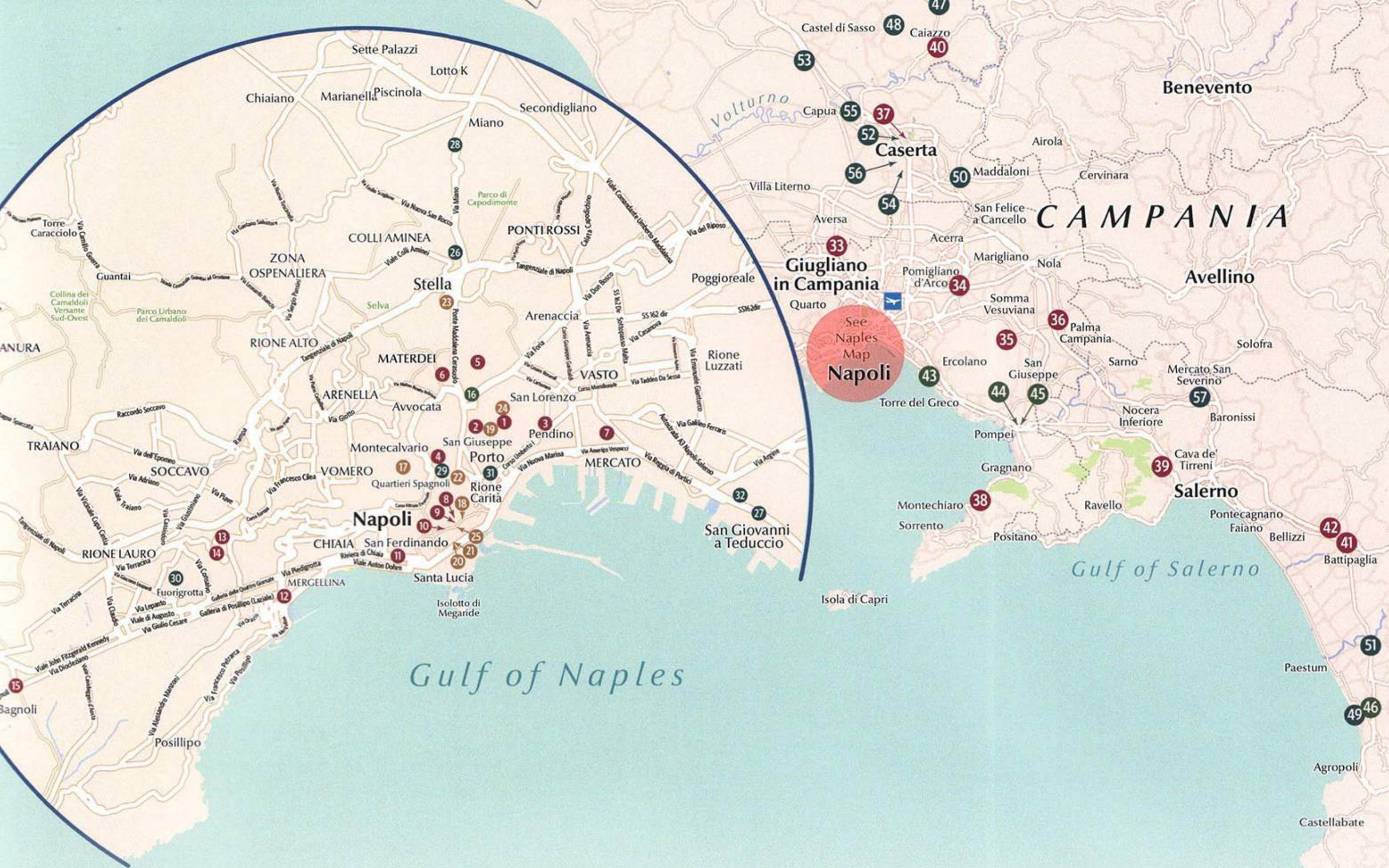
Guinness World Record holder for the longest pizza frita (7.15 m / 23.5 ft long)

KEY TAKEAWAYS

- We went to Naples to eat in the very best pizzerias and were quite surprised to find most pizzas were less than €10. Naples pizza is more than just a street food like it was in the past (see page 16), and it's often eaten in sit-down restaurants, with knife and fork, but it's not expensive. There's a cultural aversion to expensive pizza, so these legendary pizzaioli are offering their work at very reasonable prices.
- Dough is proofed at room temperature, a holdover from pizza's origination in the 18th century, before refrigeration. That's a big difference from elsewhere in the world, where pizzaioli work to control the temperature and often employ cold fermentation (see page 2:88).
- We were surprised to find several pizzerias basing their dough proportions around the amount of water in the recipe rather than the amount of flour, which is more typical in the US and among bread bakers.
- At the top pizzerias, the differences among the standard margherita and marinara pizzas are very small.
- Toppings generally are treated kind of like items on a shopping list, and menus often list dozens of pizzas. Elsewhere, we've seen more of a chef's approach to toppings in that the ingredients are paired and manipulated to achieve a specific culinary vision.
- "True" Neapolitan pizza—at least the vision of it laid down by the AVPN—isn't what's powering the pizza culture in Naples. All of the AVPN pizzerias we visited in Naples deviated from the rules in some way. The experience led us to conclude that the AVPN is really about elevating the stature of Neapolitan pizza and exporting a particular style to the world rather than reigning over the pizzaioli of its home city. For more on the AVPN, see page 74.
- Two pizza styles that were of great surprise to us were canotto style, which uses higher hydration and special flour to create a huge, puffy rim (see page 135), and pizza frita, a deep-fried style that we found particularly delightful at La Masardona (see page 160).
- Nowhere else in the world have we seen such a focus on "digestibility" as in Italy. Pizzaioli here make a point of saying their pizza is the most "digestible." For more on this Italian obsession, see page 133.
- Mulino Caputo, the Naples-based flour milling company, has played a role in a number of pizza developments globally. For more on the company, see page 75.
- Naples is home to some famous historic pizzerias dating back more than a century. We visited some of them for that reason, but it came as little surprise that many are run more as tourist destinations.



Via Toledo, an ancient street dating back to the 16th century, is one of the most important tourist destinations in Naples. It's known for both shopping and the cultural landmarks it connects people to. The road begins in Piazza Dante, named for the statue of Dante Alighieri that sits at its center, and ends near the famous Piazza del Plebiscito.



NAPLES

PIZZERIAS*

1. Pizzeria Gino Sorbillo (see page 165)
2. Antica Pizzeria Port'Alba (see page 167)
3. L'Antica Pizzeria da Michele (see page 167)
4. Pizzeria da Attilio (see page 163)
5. Pizzeria da Concettina ai Tre Santi
6. Pizzeria Starita a Materdei (see page 166)
7. La Masardona (see page 160)
8. Pizza a Portafooglio (see page 165)
9. Antica Pizza Fritta da Zia Esterina Sorbillo (see page 165)
10. Pizzeria Brandi (see page 167)
11. Pizzeria Salvo (see page 167)
12. 50 Kalò (see page 158)
13. Pizzeria La Notizia, 53 (see page 164)
14. Pizzeria La Notizia, 94 (see page 164)
15. 10 Diego Vitagliano Pizzeria (see page 158)

NOT TO BE MISSED

16. Museo Archeologico Nazionale di Napoli

WORTH SEEING

17. Castel Sant'Elmo
18. Galleria Umberto I
19. Cappella Sansevero

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

20. Palazzo Reale
21. Biblioteca Nazionale Vittorio Emanuele III
22. Via Toledo Metro Station
23. Catacombe di San Gennaro
24. Naples Underground
25. Gran Caffè Gambrinus

PIZZA RELATED**

26. AVPN Headquarters
27. Mulino Caputo
28. Museo e Real Bosco di Capodimonte
29. Mercatino della Pignasecca
30. Mercato Rionale di Fuorigrotta
31. Port of Naples
32. A Pizza

CAMPANIA

PIZZERIAS

33. Carlo Sammarco Pizzeria 2.0 (see page 159)
34. 450 Gradi Pizza e Fritti (see page 159)
35. Pizzeria Villa Giovanna (see page 167)
36. Era Ora (see page 159)
37. Pizzeria I Masanielli (see page 160)
38. Pizza A Metro da "Gigino" L'Università della Pizza (see page 162)

**We reached out to Antica Pizzeria e Friggitoria di Matteo but did not receive permission to photograph and interview staff, so they are not included here.*

39. Nonna Nannina (see page 162)
40. Pepe in Grani (see page 161)
41. 3 Voglie
42. PizzaArt (see page 165)

NOT TO BE MISSED

43. Herculaneum
44. Pompeii
45. Villa Regina at Boscoreale
46. Parco Archeologico di Paestum

PIZZA RELATED**

47. Caseificio Il Casolare
48. L'Agriturismo Le Campestre
49. Caseificio Barlotti
50. Caseificio La Delizia
51. Caseificio Rivabianca
52. Caseificio Leuci Franco
53. Caseificio Angelo Russo
54. Caseificio Artigianale Golino
55. Caseificio Auriemma S.R.L.
56. Caseificio de Nicola
57. Compagnia Mercantile D'Oltremare

***It's easy to go on your own to pizzerias and other spots we recommend. But if you want to experience the mozzarella makers, tomato canneries, and other food-related things, you'll need to book a tour. Some food companies, like Orlando Foods, offer their own tours for pizzerias that use their products.*



10 Diego Vitagliano Pizzeria (50)^{ITL #21} ▼▼

About 15 kilometers outside of Naples in the seaside town of Pozzuoli, Diego Vitagliano makes pizza with a high-hydration dough and a raised cornicione (pictured above) that has elsewhere been dubbed canotto style, a new twist in Neapolitan-style pizza (see page 135). Vitagliano, a first-generation pizzaiolo, began working as a dishwasher as a teen in Naples. He told us that by 18, he was making the pizza; he opened his

own Naples pizzeria in 2016. The ethic is focused on local ingredients, including provisions from the surrounding countryside and the restaurant's "0 Km garden." He offers his pizzas in three categories: storica, classica, and rivistate. See page 3:215 for our recipe for Marinara Sbagliata Pizza, inspired by Diego Vitagliano.

50 Kalò (50)^{ITL #3} ▼▼▼

This pizzeria was one of our favorites. Pizzaiolo Ciro Salvo shared some particulars about his dough, revealing just how different it is from many of the other pizzerias here. It has a hydration level of 70%, clocking in on the higher end for Naples. Salvo says the higher hydration makes for a more digestible pizza; we don't quite understand the obsession with digestibility (see page 133) and instead think about hydration in terms of a light and airy crust. The dough is also very high in salt, at upwards of 3%, and has very little yeast. The low yeast means he lets it ferment for 20–24 hours, longer than many of the other Naples pizzerias. The dough is such a point of focus that it's announced in the restaurant's name, which translates as "good dough" in the Neapolitan dialect. Actually, the dough is so important that Salvo has installed a camera in the mixing room so he can keep an eye on things when he's away. When in town, he prefers to mix it himself.

Beyond the dough, we found the toppings at 50 Kalò to be very good, too. Though the combinations can be unusual, Salvo also maintains ties to tradition, and the pizzeria has been certified by the AVPN (see page 74). In the restaurant you'll see an enormous number of olive oils, which are paired thoughtfully with different menu items.





450 Gradi Pizza e Fritti 🍷🍷

Pizzaiolo Gianfranco Iervolino has two passions. There's pizza, which is to be expected. And then there's his thing for 7th- to 10th-century Neapolitan music, which he performs professionally. He's even made several records. At 13 he began working at a catering school and later graduated from hotel school. He worked in kitchens in the UK before returning to Italy and rediscovering his interest in pizza. At 450 Gradi, which he opened in 2018, he approaches pizza like a chef, focusing on ingredient combinations. He lives three miles from Vesuvius and is a teacher at Gambero Rosso.

Carlo Sammarco Pizzeria 2.0 (50) ITL #27 🍷

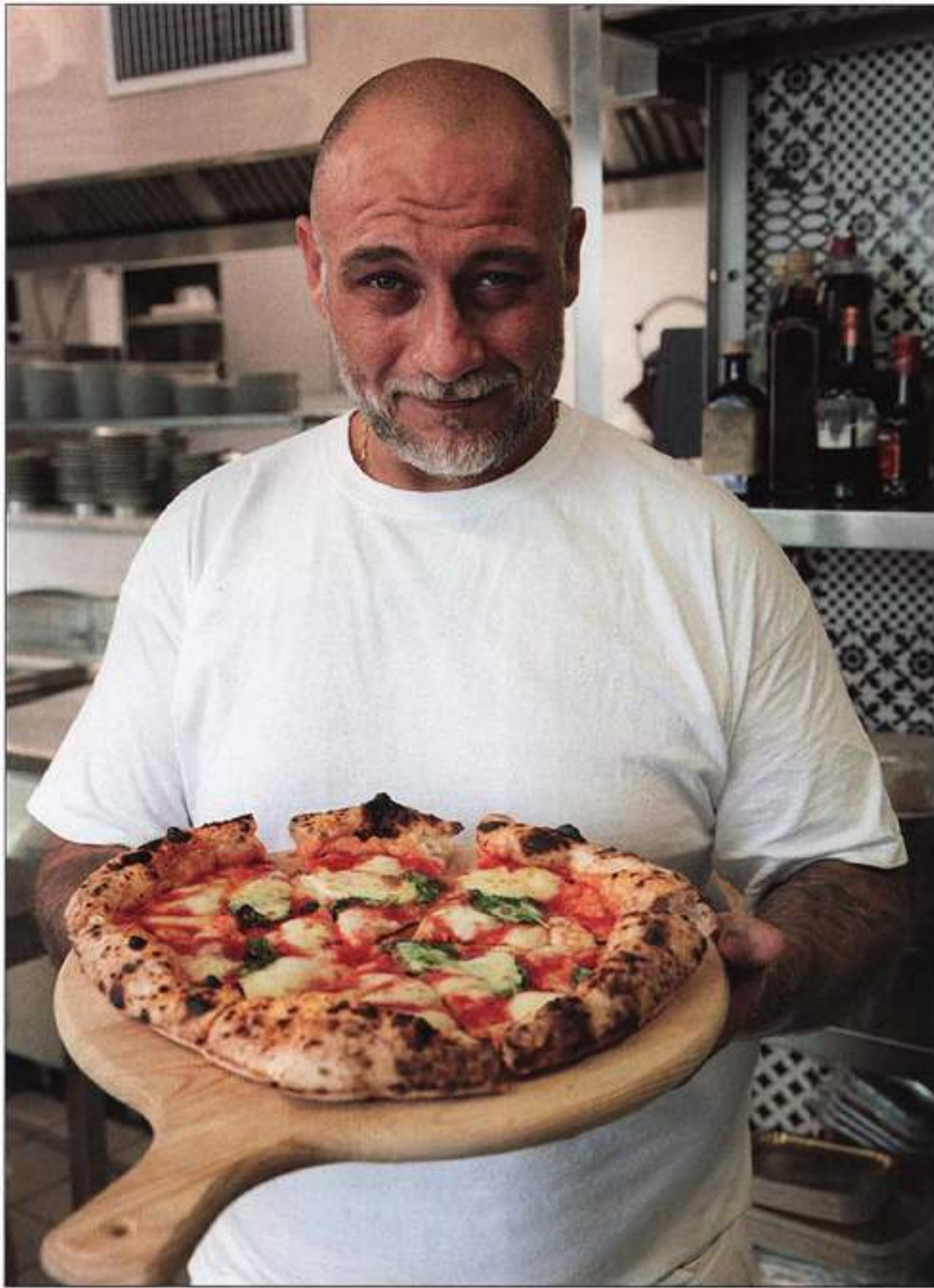
One of the few new styles of pizza invented in Naples in recent years is a puffy-rimmed creation dreamed up by Carlo Sammarco. He trademarked it canotto, which means dinghy or inflatable life raft, and upon seeing the two-inch cornicione, we understood why. The backstory, however, is puzzling. Realizing that customers often leave remnants of the cornicione uneaten, Sammarco made a study of the crust. The results led him to make the cornicione his trademark, making it even bigger using a mix of flours and high hydration to maximize air bubbles. Why he decided to emphasize what customers left behind is a mystery, but it put Sammarco on the map. Now you'll see puffy-rimmed pizzas elsewhere in Italy and beyond. Kudos to Sammarco for innovation (though a puffy rim doesn't automatically mean better pizza).



Era Ora 🍷🍷🍷

This pizzeria is outside of Naples and its pizzaiolo, Pietro Parisi, has been noted as one to watch. His background is interesting. He grew up near Vesuvius and began cooking at age five. Later, he studied with some of the world's top chefs, including Gualtiero Marchesi, a father of modern Italian cooking, and Alain Ducasse. He traveled through France, Switzerland, and the United Arab Emirates, staging at Michelin-starred restaurants. In 2005, family persuaded him to buy a failing pizzeria in Palma Campania. It's fitting, then, that Era Ora translates as "it's about time." Here, he's married high-level technique with simple ingredients from local farms, a connection that's earned him the moniker farmer-chef. Waste is frowned upon here, so Parisi uses every scrap he can, including the mozzarella water, which he uses in the dough. See page 3:220 for our recipe for Genovese Pizza, inspired by Pietro Parisi.





Pizzeria I Masanielli (50) ITL #1

Francesco Martucci (pictured left) sees himself not as a chef or even as a pizzaiolo. Instead, he told us he's a person who loves quality, consistency, and also pizza. At age 10, he became a food lover and started making pizza at home. From there, he learned from other chefs and through his travels. At I Masanielli, the crowd is young and hip and the place is busy, cranking out as many as 1,000 pizzas per day. The kitchen is well equipped. The pizza oven was handmade by a chimney maker and we counted 19 different refrigerators, each labeled at a different temperature. The dough recipe is kept in a passcode-locked room. The sauce is his grandmother's recipe, made daily starting at 8 a.m.



La Masardona (50) ITL #18

Pizza frita is a traditional preparation in Naples, dating back centuries. With most of the population crammed in tiny, kitchenless apartments, people mostly dined out, and for the very poor, that meant cheap food on the street. While regular pizza required an oven, pizza frita demanded only a kettle of oil and a flame. It could be set up anywhere and offered inexpensive sustenance.

We were pleasantly surprised that the pizza frita tradition carries on today, and saw it on many menus. The version at La Masardona was the best we had. If you're picturing a greasy, doughy gut bomb, think again. Though it looks like what an American might call a fried calzone,

the version at La Masardona was light and crisp. They've been making pizza frita at this institution since 1945, when it was started by Vincenzo Piccirillo's grandmother, nicknamed the Masardona. It's still family run, and the restaurant is outside of the touristy areas near the Port of Naples and the train station. But the place is bustling, even as early as 8 a.m., when a line starts forming outside the door for their breakfast pizza frita. The classic, pictured below, features salami and three cheeses (ricotta, scamorza, and mozzarella) and is fantastic. Though still inexpensive, it's an elevated version of street food.





Pepe in Grani 50^{ITL}#1 ▼▼▼

There's no shortage of pizzerias that someone has declared to be the "best in the world." This time, it's hard to disagree.

Franco Pepe (pictured above) comes from a baking family, and it shows. (He's one of the few pizzaioli we found who uses a biga starter.) He worked at his family's pizzeria, but he veered off to create his own vision. This vision turned out to involve an 18th-century stone building, extensive renovations, and lots of complications. Friends said he was crazy.

His ideas about pizza were also complex. No longer just a quick bite, his pizza would be slow. That meant a lot of things, including quality ingredients and thoughtful combinations, but it also meant mixing dough by hand in a wooden trough. Yes, every day Pepe and his staff are wrist-deep in enough dough for hundreds of pizzas.

Today, customers are willing to wait hours for a seat. We appreciated the attention to the craft of baking (though we don't understand hand mixing; a machine's just as good). But for us, the toppings are the stars. We were privileged to try the tasting menu, made right in front of us by Pepe himself. While tasting menus generally offer very different foods for each course, this all-pizza menu somehow made sense. The combinations were creative, impeccable, and even whimsical.

Even an ordinary margherita (pictured right) became extraordinary. Another pizza was topped with several different preparations of tomatoes, with an intense, concentrated fresh flavor; it made for the best-tasting tomatoes we'd ever experienced. When he explained he uses only locally sourced ingredients, we had a chuckle. He is, after all, in Campania, a produce paradise.

Pepe declined to share dough recipes. In fact, he said there aren't any, and it's all done by feel. While we don't quite buy that story, we thought upon reflection that if we were in charge of Michelin stars, we would award him one. See pages 3:216–217 for our recipe for Margherita Sbagliata Pizza, inspired by Franco Pepe.





Nonna Nannina

Located on the other side of Vesuvius, Nonna Nannina offers very good pizza made from a dough with a long fermentation and top-notch local ingredients. Pasquale Bisogno said he's a first-generation pizzaiolo and the restaurant is an ode to grandma Anna Mileto, his "nonna." The business is family run, and even at age 89, Nonna was making appearances. She's also the star of a video that loops on a display screen, in which she's tending her vegetable garden. We laughed out loud when the pizza came because it was one of the most technically perfect executions of pizza we'd seen. If this is what Grandma made, she was an accomplished pizzaiola!

The Bisogno family has strong feelings about the benefits of a locally sourced diet and adheres to the environmental ethic popularized by American poet and activist Wendell Berry. Though we noted little difference among the margherita pizzas made at other top Naples pizzerias, this (pictured left) was one of our favorites, likely due to the tomato and mozzarella Bisogno choose.



Pizza a Metro da "Gigino" L'università della Pizza

Seven ovens. Four hundred seats. Two tons of dough a day. This is Pizza a Metro, an institution for eight decades in Vico Equense, on the Bay of Naples. The most amazing thing about it? The pizza is actually good, a surprise considering the volume. Gigino Dell'Amura came up with the idea to sell his pizza "by the meter"—that is, the dough is spread into long rectangles and different toppings are placed in sections along the length (pictured above). Most parties order 50 cm / 20 in of this, 50 cm / 20 in of

that. The pizza is more like a thicker version of New York-style pizza than Neapolitan style. It played into the story of Caputo flour (see page 75).

We met several people with fond childhood memories of this place from family trips to the Amalfi coast. It's still family run, and in its longevity we see it as an important institution. It's also made us question what counts as "traditional" pizza in Campania. Also, given the booming success, we wonder why they didn't open another branch.



Pizzeria da Attilio 50 ITL #25

Attilio Bachetti (pictured left) is a third-generation pizzaiolo running a family business that opened first as a wine shop in 1938, then began serving pizza a few years later. One of Bachetti's most well-known pizzas is the Carnevale (pictured below), which appeared on the menu all the way back in the 1940s. Today, it's a striking presentation. He spoons ricotta in six spots along the rim, then pinches the dough shut, bringing each ricotta-filled bit of crust to a point, so the end result looks like a six-pointed star. We appreciate this kind of spirit, given he's in a city where changes to classic Neapolitan pizza can be frowned upon. We also appreciate the fact that this historic pizzeria has upped its game over the years rather than falling into complacency. The pizzeria is tiny, and so is the oven. When we asked him about it, he said, "Why would I need a larger oven?" True, the pizza was fantastic.

When we were searching around for the best exemplar for our Neapolitan pizza dough (see page 2:124), Bachetti's recipe provided our starting ground. He specified 62.5% hydration, 3.13% salt, and 0.06–0.2% yeast, which is a huge range. In pizzerias lacking refrigeration, we understand that yeast amounts often need to be adjusted (though da Attilio's dough room is deep inside the building and slightly below ground, which keeps it cool in the summer). In our recipe, we used instant yeast and decreased the salt to a more typical 2%. All of the experiments we did for Neapolitan pizza were based on that recipe, inspired by Bachetti. The pizzeria has been certified by the AVPN.





Pizzeria La Notizia, 53 (50)^{ITL #11}; Pizzeria La Notizia, 94 (50)^{ITL #7} ▼▼▼

We knew right away that we'd have a lot to talk about with pizzaiolo Enzo Coccia (pictured top left). He's coauthor of *La Pizza Napoletana*, one of very few scientific books focused on pizza, and we looked forward to meeting the man in person. To say he's passionate about pizza is an understatement. He takes a scholarly, cerebral approach to the subject and was incredibly generous in sharing his expertise. He also had some very strong opinions. It made for a lively debate on our visit, which we very much enjoyed.

Coccia is the son of a pizzaiolo but left the family business in 1994 to open La Notizia, 53. (The number refers to the street address on Via Caravaggio.) While today he will expound at length about pizza's origins

as a simple street food, he brought a level of care and technique to making pizza at a time when these ideas weren't so widespread; some have called him revolutionary. In 2010, he opened La Notizia, 94, just down the street, which is fashioned like a wine bar. Here, he offers more creative pizzas.

Coccia is a sort of ambassador for Naples pizzaioli, pushing for high standards, and has a reputation for honest feedback. While he earned his stripes in a traditional pizza-making context, he's a great example of a pizzaiolo who is pushing pizza forward in an upscale manner. He's offered consulting services for pizzerias far and wide, and he's well-known in the pizza world globally. See page 3:219 for our recipe for Marinara Pizza with Fresh Mozzarella, inspired by Enzo Coccia.



Pizza a Portafoglio 🍷🍷

Gennaro Salvo is a fifth-generation pizzaiolo who worked at his family's pizzeria before setting off on his own. He's taught pizza-making classes, worked for others (including Gino Sorbillo, for whom he helped open a Milan pizzeria), and now has his own pizzeria. The specialty is pizza a portafoglio. These pizzas (pictured above) are often served only on a slip of paper and are typically folded in half once, then again, giving them their name, which translates as "wallet." It's a true Neapolitan street food, and it's akin to grabbing a slice in cities like New York. Salvo's pizzeria serves as many as 1,000 per day, most of them simple margheritas. A big part of the customer base is families walking by in the daytime, picking up pizzas for the kids, and late-night crowds.



PizzaArt 🍷🍷

A family-friendly pizzeria complete with game room and playground located in Battipaglia (famed for its mozzarella di bufala), PizzaArt takes a unique approach to the dough with a focus on the grain itself. Here, you'll find doughs made with ancient grains, crusts flecked with bran (pictured above) or festooned with crunchy oats, pizzas topped with farro. The menu is long, with some typical offerings, some more creative pizzas named for famed painters, actors, and singers, and some pizzas made with ingredients grown under the auspices of Slow Food Presidia, which promotes biodiversity. Proprietors Vito De Vita and Helga Liberto say their inspiration comes from Vito's grandparents and their simple farmhouse cooking in Cilento.



Pizzeria Gino Sorbillo ⑤0^{ITL} #4 🍷🍷🍷; Antica Pizza Fritta da Zia Esterina Sorbillo

The historic Via dei Tribunali is perhaps the most iconic street in Naples, which is of course the birthplace of pizza. The narrow street was the working-class heartbeat of the ancient city, and strolling its cobblestones today still gives a sense of Naples's past. We were struck, then, by the fact that there is really only one top-ranked pizzaiolo on this street: Gino Sorbillo (pictured above). He is indeed a character. On our visit, he arrived wearing head-to-toe designer clothing; he posed for photos with exuberance; he's all over TV and social media. Despite what seems like a marketing-driven approach to pizza, the "white art" is in his blood. Today, Sorbillo and his family run numerous pizzerias and pizza fritta locations in Italy, Tokyo, Miami, and New York. If the line is long at the pizzeria, stop by the pizza fritta location next door.



Pizzeria Starita a Materdei 50^{ITL} #13

Antonio Starita (pictured above) is an elder statesman of Neapolitan pizza, often referred to with the honorific “Don,” and with good reason. His pizzeria is highly regarded, and the family business dates back to 1901, when it opened as a winery. In the 1940s, it began offering pizza. By the 1950s, it was chosen as the location for a pizza-focused film starring Sophia Loren (see page 38). Starita is also a teacher with the Associazione Pizzaiuoli Napoletani (APN) and a member of Le Centenarie (pizzerias that have been in Naples for over 100 years). There are dozens of pizzas on the menu, but a signature dish here is the crackly-crust montanara pizza (pictured right), a fried disc of dough that’s then topped and baked (see page 3:157).





Pizzeria Villa Giovanna 🍷🍷🍷

There are some female Michelin-starred chefs in Italy, but there's only one woman among the top-ranked pizzaioli in Campania, according to Gambero Rosso—and she's Polish. Her name is Renata Sitko (pictured left), and she describes her journey to acceptance in this male-dominated world as difficult; still, being an outsider may have allowed her to break some unwritten rules. She says that, unable to afford college after high school, she left Poland for Italy and first learned to cook from the aunt of a woman for whom she did housecleaning.

Villa Giovanna, just outside of Naples, is high on the slopes of Vesuvius, and as we drove up the narrow, winding road to get there, we noticed the landscape becoming greener, the temperature cooler. We arrived at a lovely resort-style restaurant that serves excellent pizza.



Pizzeria Salvo 50^{ITL}#6 🍷🍷🍷

Francesco and Salvatore Salvo are third-generation pizzaioli (and the brothers of Ciro Salvo, owner of 50 Kalò) who took over the small family business in 2005 when their father died. They expanded over the years and broadened the cuisine to become more restaurant than pizzeria, with an elegant, modern feel. After success off the beaten path in San Giorgio a Cremano, they also opened a large new Naples location.

With servers trained at Michelin-starred restaurants, Pizzeria Salvo consistently gets high marks for service. The pizza is carefully crafted, including the Cosacca pizza (pictured above), made with two kinds of cheese grated over the pizza. They offer a pizza tasting menu and have a menu of dozens of olive oils that reads like a wine list. This was the only pizzeria for which we saw numerous billboards while driving around Naples.

Historic Pizzerias

ANTICA PIZZERIA PORT'ALBA

This pizzeria claims to be the world's oldest, and while it's historic, we're skeptical it dates to 1738 (see page 36). There is documentation, however, that in the early 19th century it was a favorite of students, who stood to eat pizza folded a libretto, much like the pizza a portafoglio still served at this location from a cart outside.

L'ANTICA PIZZERIA DA MICHELE 🍷

This pizzeria will forever be associated with Elizabeth Gilbert's bestselling memoir, *Eat, Pray, Love*, which became a Hollywood movie. Founded in 1925 by Michele Condurro, it has stayed in the family. We found better pizza elsewhere but appreciate its century of history.

PIZZERIA BRANDI

Pizzeria Brandi's roots run back at least to the 1820s. One former proprietor, Raffaele Esposito, claimed to have invented the pizza margherita, though that's recently been debunked (see page 23). Today, tourists appreciate it mostly for the history.





ROME

The Pantheon, once a Roman temple and now a Catholic church, sits on the city square known as the Piazza della Rotonda. The square was historically a fish and vegetable market, but today is a tourist hot spot.

Rome has been an important city for thousands of years. What it has not been is an important pizza city. In the 19th century, pizza was a failure in Rome, according to Neapolitan novelist Matilde Serao, even though the city of Naples, pizza's birthplace, was just 225 km / 140 m away. For much of the 20th century, pizza in Rome had something of a bad rap and was seen as little more than low-quality Americanized food for tourists. We'd studied the cuisine of the 21st century and eaten at plenty of restaurants in the Eternal City long before working on this book, but pizza wasn't even on the culinary landscape. In the last few years, however, a flurry of pizzerias billing themselves as "Roman style" have opened in the United States and elsewhere, so we figured

we needed to get on a plane to learn what, exactly, Roman-style pizza was all about.

What we discovered is that there's really no such thing as a Roman style of pizza (see page 107). Sure, there's plenty of pizza. That includes everything from cheap commodity-style pizza like you'd find in New York's 99-cent joints to some of the most memorable pizzas we ate during our expedition. But to say we found a particular Roman style? Not so much. Depending on who you ask, Roman-style pizza involves a super-thin cracker-like crust. Someone else would say it's thicker, and it's sold by weight. Indeed, we found some pizzas called Roman style that were thick, and others that were thin. We found examples of things that are often



labeled “Roman-style” pizza—pizza al taglio, pizza alla pala, pizza tonda—but those aren’t pizza styles. They’re mostly signifiers of how pizza is shaped or cut. (For more definitions, see page 140.) We found pizza that was generally crispier than traditional Neapolitan style, but that in itself isn’t a style. We found (surprisingly) a slice culture based around good ingredients, but that isn’t a style.

So why is the food world suddenly hearing so much talk about Roman-style pizza? You could say it’s marketing. Or you could say it’s Bonci. Gabriele Bonci developed his own unique pizzas—an approach pioneered by another pizzaiolo, Angelo Iezzi, who developed high-hydration techniques here in the late 1980s. Bonci, with a combination of baking skills, the mind of a chef, and an irrepressible personality, popularized that approach. His pizzeria, called Pizzarium (see page 176), just outside the

Vatican City, has captured the attention of both locals and culinary tourists, and it’s also captured the imagination of imitators, who have modeled new restaurants on it. Sure, Pizzarium is *in* Rome, but that doesn’t make the pizza Roman style. It’s just, well, Bonci. To our mind, it also stretches the definition of what pizza is. Actually, purists might say that it’s not even pizza; it’s more like an open-faced focaccia sandwich or an Italian version of Danish smørrebrød. But whatever you want to call it, it’s delicious. It’s also a great model for pizzeria entrepreneurs (see page 111).

Not everyone in Rome copies Bonci or Iezzi, of course. We enjoyed the work of several bread-bakers-turned-pizzaioli. We visited a pizzeria run by a Michelin-starred chef. We also learned a trick with crushed ice (see page 177)—quite an unusual topping.



ROME BY THE NUMBERS

10 pizzerias visited

3 Tre Spicchi-winning pizzerias visited

1 Tre Rotelle-winning pizzeria visited

5 Neapolitan-style pizzerias visited

Most popular styles of pizza: Neapolitan and al taglio

Most popular type of oven: wood-fired

Average cost of pizza: €8–10

Unique set of toppings: prosciutto, olives, hard-boiled eggs, mushrooms, tomato

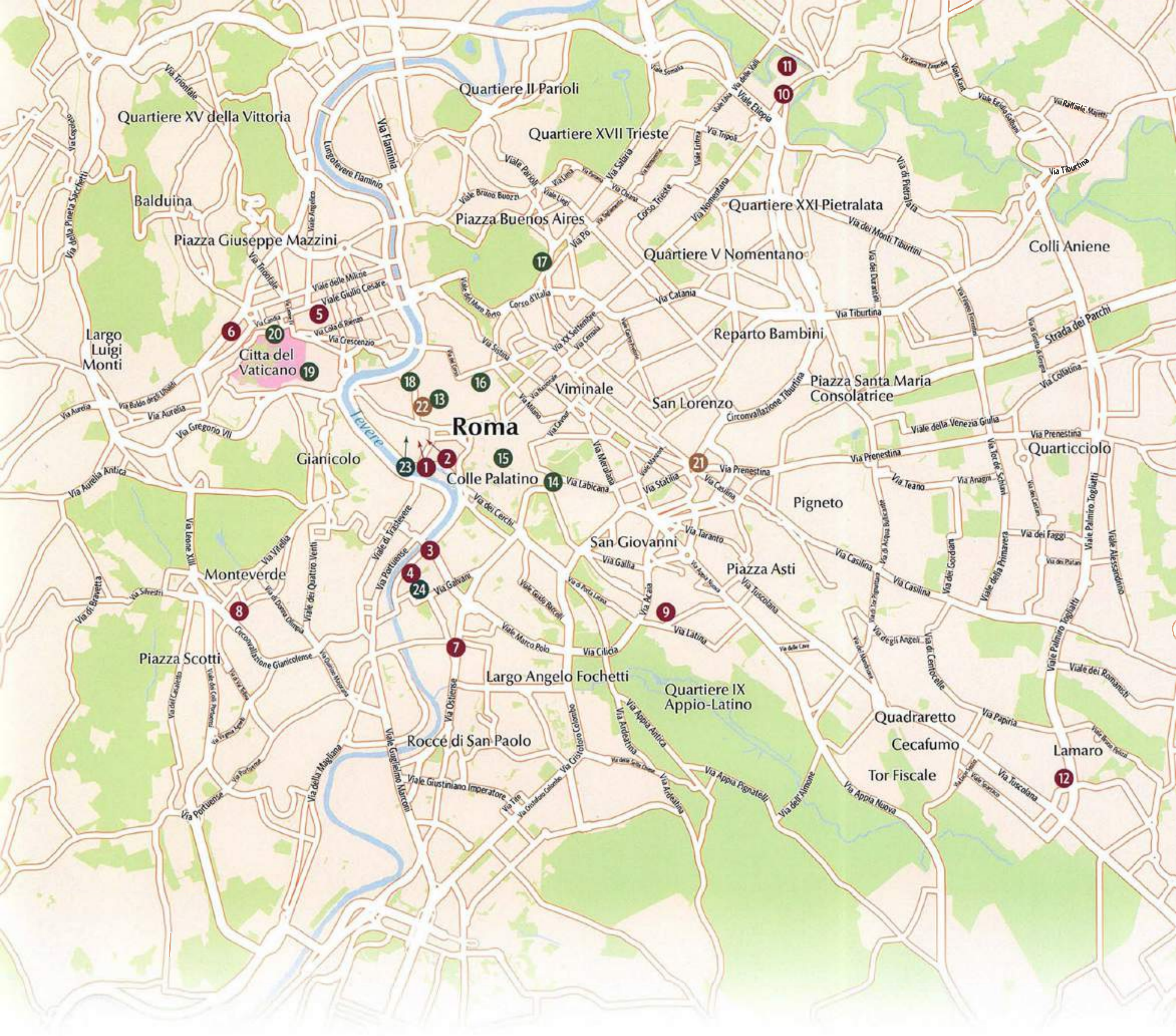
Guinness World Record holder for largest pizza party (1,046 attendees)

KEY TAKEAWAYS

- There's a lot of talk about "Roman-style" pizza, but we don't see the city's pizza defined in that way. The thing that's often called "Roman style" is simply pizza al taglio, meaning it's sold "by the cut." That's a slice—albeit rectangular—not a style.
- Credit for the recent fascination with so-called Roman-style pizza goes to Gabriele Bonci, a pizzaiolo who popularized the pizza al taglio concept by using high-hydration dough, impeccable technique, and high-quality ingredients to make what is essentially elevated fast food. Before him, Angelo Iezzi developed some of these ideas in the 1980s. Now those ideas are being copied around the world. We see that as good marketing rather than as a style of its own.
- While we feel Bonci's product is indeed pizza, it does stretch the definition. It's fundamentally a pan-baked focaccia that's rubbed with oil or a tiny amount of tomato sauce, allowed to cool, and then dressed with toppings. It's displayed in a case, cut into strips of whatever size the customer chooses, and then reheated.
- We were surprised to find what is essentially a slice culture here, although it's different than New York's slice culture. Here, slices are cut in strips and sold by weight. Toppings are often more creative than what you'd see in a New York slice house display case.
- The pizza here is generally crispier than what we found in Naples—or at least it's crispier than the "official" version of AVPN Neapolitan-style pizza.
- Some of the best pizzerias we visited were started by people who studied baking. These folks know their dough. Since our visit, we see bread and pizza in Rome as being closely connected.
- To the degree there's anything uniform across the Roman pizza landscape, it might be the customers. Every pizzaiolo we spoke with here had stories about how exacting Roman customers can be. It reminded us a little bit about how New Yorkers are famously assertive as opposed to being shy and putting up with things.



The Colosseum, which first opened in 80 AD and was the largest amphitheater in the Roman empire, originally hosted gladiatorial combat and animal fights. Today, even though two-thirds of the structure has been lost, it remains an iconic tourist attraction.



ROME

PIZZERIAS*

1. Antico Forno Roscioli (see page 172)
2. Emma (see page 172)
3. Giulietta (see page 173)
4. Trapizzino (see page 177)
5. L'Osteria di Birra del Borgo (see page 174)
6. Pizzarium (see page 176)
7. Pizzeria Ostiense
8. La Gatta Mangiona (see page 175)
9. Sbanco (see page 177)

10. Pizzeria a Taglio Angelo e Simonetta (see page 177)
11. Tonda (see page 177)
12. Sforno (see page 177)

NOT TO BE MISSED

13. Pantheon
14. Il Colosseo
15. Foro Romano
16. Fontana di Trevi
17. Galleria Borghese

18. Museo Nazionale Romano
19. Città del Vaticano
20. Musei Vaticani

WORTH SEEING

21. Tomb of Eurysaces
22. Sant'Eustachio Il Caffè

PIZZA RELATED

23. Mercato Campo de' Fiori
24. Mercato di Testaccio

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

**We reached out to In Fucina and Seu Pizza Illuminati but did not receive permission to photograph and interview staff, so they are not included here.*

Antico Forno Roscioli

Technically, Antico Forno Roscioli is a bakery. It opened in Rome's city center in 1972, but on our visit, we learned that the family is in its fourth generation of bakers, and they've been making pizza-like things for a long time. In the 1950s, they started making pizza bianca, which is essentially a light and simple focaccia, dressed with olive oil and salt after baking. Their pizza rossa is brushed with a tomato sauce. They've also long sold pizza al taglio (pictured right). Before the recent craze over "Roman-style pizza," these items were viewed as focaccia here—that is to say, as flat-breads. Now, they're pizza. Nancy Silverton, of Pizzeria Mozza in Los Angeles, was inspired by Roscioli's pizza and opened Triple Beam Pizza in Los Angeles as an homage.



Emma 🍷🍷

This is a joint effort between the Roscioli family (above) and Francesco and Ilaria Roscino, who named this modern-looking pizzeria for their grandmother. Not surprisingly, the dough was created by the baker in the group, Pierluigi Roscioli. Francesco told us the recipe includes less than a gram of yeast per kilo of dough and that the dough is rolled, not stretched, to make this light, thin-crust pizza. It's modeled on the

cracker-thin crusts at another popular pizzeria, Da Remo (which also inspired Marta in New York City), considered an institution in the genre. The toppings are organic and seasonally based, and some items are sourced from the Salumeria Roscioli's deli, like Ghirardi Prosciutti Parma ham (pictured below). The pizza is served whole and eaten with knife and fork.



Giulietta 🍷🍷

Chef Cristina Bowerman (pictured right) is an unforgettable character, easily recognized by her signature hot-pink hair. She is the chef at Glass Hostaria and in 2010 became one of only a handful of female chefs in Italy to earn a Michelin star. She has incredible energy and enthusiasm. And she has an unusual résumé filled with exploration and reinvention. Born in Cerignola, she studied law, then moved to San Francisco in 1992, where she worked in graphic design and also at a coffeehouse. This was where she became passionate about cooking. She later moved to Austin and went to culinary school.

In 2005, she moved back to Italy and since then has been involved in a series of food ventures, including Giulietta, a large pizzeria that's somewhat of an anomaly here, with a menu offering both Roman and Neapolitan pizza. The two types of dough are baked in separate ovens to achieve the desired end results: a crisp-crust Roman and a softer Neapolitan.

Given her culinary résumé, it's no surprise that the pizzas are well executed and thoughtfully, and sometimes very interestingly, topped. The menu features the expected pizzas—a marinara, a margherita—and also some unusual combinations, such as Neapolitan pizzas with swordfish, or zucchini cream and fried eggplant (pictured below), and a thin Roman pizza with chickpea cream and octopus. You can watch the work in the kitchen on video monitors in the dining room. Giulietta is next door to Bowerman's other business, Romeo Chef & Baker, a trattoria and cocktail bar.





L'Osteria di Birra del Borgo 50 ITL #43

To say that L'Osteria di Birra del Borgo is a beer-and-pizza joint is true, but not fully accurate. To say it's a temple of fermentation—beer *and* bread!—is also true, but it misses some of this brewpub's charms. Here, Luca Pezzetta (pictured below) has done his homework, experimenting with dough and toppings to make great artisan-style pizza, some of which borrows from Gabriele Bonci's approach. There's good reason for that. Pezzetta worked for Bonci and says Bonci was a consultant on this endeavor when it opened in 2017. Pezzetta started out working in his father's restaurant, which Bonci frequented, then left for culinary school, later landing at Bonci's restaurants. There, he says he was encouraged to experiment.

At Birra del Borgo, he's continued in that vein, making doughs that feature, for example, forbidden rice, rye, or coconut flour. Each type of pizza on the menu uses a different leavening technique, including both preferments and natural leavening. He likes to add a bit of extra-virgin olive oil to his doughs, which are cold-proofed over time. Some toppings are fresh while others are cooked, and Pezzetta uses a chef-driven approach, meaning each topping is thoughtfully prepared, like a dish in and of itself.

The menu features pizza in teglia, baked in a pan, and pizza tonda, meaning round. Birra del Borgo also offers a tasting menu. Though some might say he's a disciple of Bonci, Pezzetta has also created an identity of his own and has taught pizza-making at cooking schools in Italy and Brazil.





La Gatta Mangiona 50 ITL #10 ▼▼▼

On our visit, Giancarlo Casa described his pizza as “95 percent Neapolitan and 5 percent Roman.” To us, it’s Neapolitan in inspiration, but a little crispier than the traditional take on that genre—a style we’re calling “Rest-of-Italy Neapolitan” in this book. This restaurant has deep roots. Owners Casa, Cecilia Capitani, and Sergio Natali met in high school back in 1973. Casa and Capitani got married in the 1980s; then in 1999 the trio opened La Gatta Mangiona, which has a large collection of art devoted to cats (la gatta is the Italian word for “cat”). At that time, pizza in Rome had a bad reputation, but they envisioned something different. They worked on dough recipes and fermentation to make a light and crispy crust, and have clearly put a lot of thought into their product. Some of the staff

has been there since the beginning. The restaurant looks modest on the outside but serves very good pizza.

On our trip through Italy, we tried dozens of marinara pizzas, but this one (in Rome, not Naples, where it was invented!) was the best cheeseless pizza we had. The sauce was fantastic, the pizza was extremely flavorful, and it was properly baked, too—a tricky proposition when you’re making a marinara (see page 2:222). A funny thing we noticed was that marinara pizzas come with anchovies in Rome but not in Naples (in Naples, a marinara with anchovies is called pizza Romana), despite the fact that Rome is not a seaside community. Here, the anchovies were applied before baking. It’s always nice to see a restaurant that’s managed to thrive for two decades.

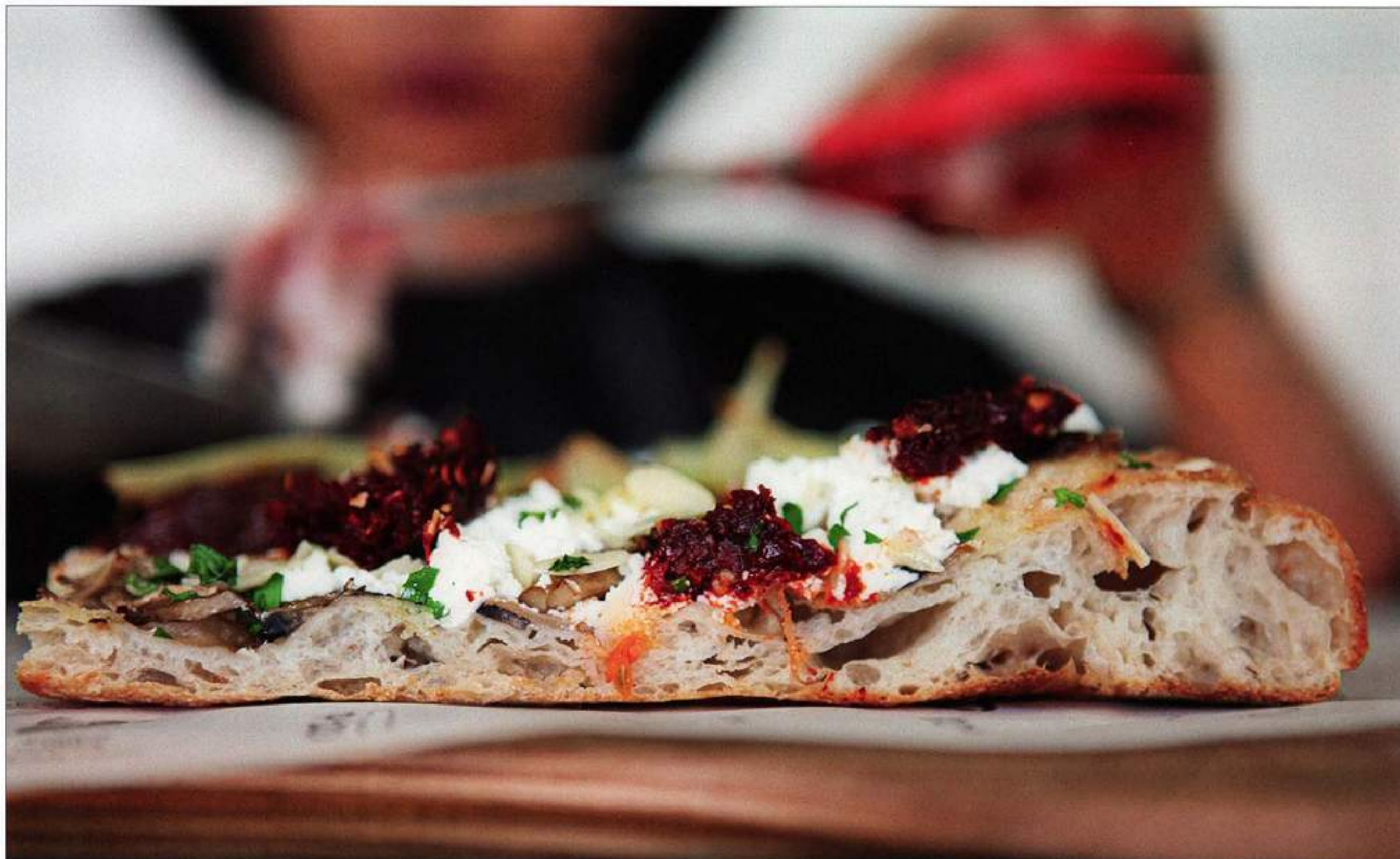


Pizzarium 🍷🍷🍷

What Gabriele Bonci (pictured right) is making in his Pizzarium is essentially fast food, ordered at the counter, quickly reheated, and then taken to go, since there are only a few tables outside but no seats. Despite all this, it manages to be very good food indeed. This is pretty impressive in itself. Yet Bonci has also been a transformative figure on the Roman pizza scene, upping the quality, popularizing a particular approach, and influencing countless other pizzerias to do the same.

He went to culinary school but was drawn mainly to the magic of baking. When he opened Pizzarium in 2003, it was clear he thought about pizza crust like an uncompromising baker. Bonci's doughs are both complicated and sophisticated. The dough is baked in an unoiled pan and flipped partway through to finish on the oven floor. All this is done ahead of time, then toppings are added and the pizza is displayed in a case. Customers order however much they want, and it's cut into rectangular strips that are sold by weight. It's called *pizza al taglio*—meaning “by the cut”—and it used to be pretty lousy in Rome. But Bonci has taken Roman pizza to a new level. Even though it's made ahead and reheated, both the base and the toppings really hold up. The pizza is crisp on the bottom, with an ethereal crumb that forms an airy bed for broadly creative toppings.

We tried one pizza with scalloped potatoes on top, another with braised oxtail, and a third with burrata and prosciutto. All day long, the offerings change. Bonci doesn't say he was the originator of the airy-crust-and-toppings-after-baking approach; Angelo Lezzi (see next page) was really the pioneer, though Bonci's version is quite different from Lezzi's. But Bonci's style has been an inspiration to other pizzaioli, including Luca Pezzetta (see page 174). Now, in addition to Rome, Bonci has an outlet in Chicago. See page 3:146 for our recipe for *Al Taglio Pizza with Ricotta, Pistachios, and Mortadella*, inspired by Gabriele Bonci.





Pizzeria a Taglio Angelo e Simonetta 🍷🍷

Angelo lezzi is considered the father of a Roman al taglio pizza revival. In 1987, he took over a failing pizzeria, renaming it Angelo e Simonetta for himself and his wife. He began experimenting with flours, higher-hydration dough, and long, cold fermentation. The result was a lighter, airier version of pizza al taglio, which for years had been little more than cheap commodity food. lezzi's pizzas are crunchy on the bottom and melt-in-the-mouth soft in middle, with plenty of air bubbles and high-quality toppings.

In the 1990s, lezzi began teaching his methods and by the 2000s, you could find this style of pizza elsewhere in Rome, including at Bonci's Pizzarium. Unlike Bonci's pizzas, many of lezzi's are baked with toppings. He's taught in Dublin and Dubai and partnered with a New York pizzeria owner to open PQR in Manhattan. See page 3:143 for our recipe for Al Taglio Pizza with Sausage, Escarole, and Fior di Latte Mozzarella, inspired by Angelo lezzi.

Sforno 🍷🍷🍷; Sbanco; Trapizzino; Tonda

You might say Stefano Callegari is a master of invention, or, perhaps, reinvention. Years ago, he worked as a delivery driver for a bakery. He says he learned to make bread while hanging around with the baker. He went to pizza-making school in the 1990s but scrubbed that to become a flight attendant. It wasn't until 2005 that he got back to pizza and opened Sforno. Here, he serves round pizzas with blistered crusts baked in an oven fueled with pressed wood.

The pizzas are very good, but one particular pizza gained him some notoriety, called Pizza Cacio e Pepe (pictured below). If you're familiar with cacio e pepe, you know it's a pasta dish made with grated cheese and black pepper. Callegari reimagined it as pizza. It comes to the table with a thick shower of pecorino Romano, as though it's covered in snow. We'd seen videos of how he made this pizza, involving the extraordinary

step of throwing chunks of ice on the unbaked dough. In the oven, the ice melts, which sounded to us like a recipe for a soupy, disgusting mess. But when we tried the pizza at Sforno, it was very good, albeit salty from all the cheese. The ice creates a sort of naked, empty vessel on the pizza base, and Callegari said that's what makes the cheese stick. It also creates a gel layer, which isn't always appealing, but in this case it actually works, creating a sense of creaminess like in traditional cacio e pepe.

We give him props for innovation but there are other ways to accomplish this goal (see page 3:241). We also like his other invention, the Trapizzino, a sort of pizza sandwich filled with home-style Roman specialties. You can find these at his Trapizzino outlets in New York and elsewhere in Italy.





NORTHERN ITALY

Naples was the birthplace of pizza. And though pizza had been around for hundreds of years, crossing oceans for South America, the United States, and elsewhere, it didn't establish an Italian foothold outside of that southern city until the latter part of the 20th century. Even then, pizza in Northern Italy had a reputation for being plain lousy. It was served, if at all, because tourists demanded it.

Certainly, you didn't visit Tuscany for the pizza. You would go to see Renaissance art and architecture. Similarly, you'd visit Emilia-Romagna to taste Parma ham, Parmesan cheese, and balsamic vinegar, or even because it's home to the car makers Ferrari and Maserati. In the Lombardy region, you might visit Milan for its fashion, its art, its high-tech energy, or its gleaming steel and glass architecture. You wouldn't go for the pizza.

If you're unfamiliar with the nature of Italian cuisine, the dearth of good pizza in even the biggest cities in these regions may sound strange. But remember, Italian cuisine had been highly regionalized for centuries (see page 19). In fact, there wasn't "Italian" food, *per se*. Instead, there was Florentine food or Milanese food or Roman food, and so on. Actually, there wasn't even a united Italy before the mid-19th century (see page 21).

When we began planning our pizza expedition and thumbing through the *Gambero Rosso* pizzeria guide (see page 152), we were both surprised and pleased to find whole sections devoted to regions of Northern Italy. We were even more pleased to find some very good pizza.

You can find several different pizza styles here, including Neapolitan style—though the pizzas are different from those served in Naples. Instead of being soft and pliable, they are crispier; instead of having black spots of char, they are more evenly browned. To us, it felt like a common-sense version of the very rigid notion of what constitutes Neapolitan-style pizza according to the AVPN (see page 3:43). Actually, it has a lot in common with some of the best pizzerias in the United States, too—the kind we call artisan style. (Though most Italian pizzaioli would bristle at the comparison to Americans!)

Another significant style you'll find here is pizza *degustazione*, sometimes called "pizza gourmet" (see page 141). It was particularly interesting in that it was truly a new development in pizza. Aside from being a flat round of dough with toppings, almost everything about pizza *degustazione* is different than standard pizza. The dough might be steamed. The toppings, which are often highly technical

executions, are applied after baking—sometimes with tweezers, making for an elaborate and often beautiful presentation.

We think part of the willingness to experiment comes from the fact that these pizzaioli are working far from Naples, where the rules are much more firmly set. We can't say we loved all of it, but it definitely gave us a lot to think about it.

KEY TAKEAWAYS

- Outside of Naples, you'll find a different version of Neapolitan-style pizza. Here in Northern Italy, it's typically crispier than the traditional version thanks to lower baking temperatures. We call this style Rest-of-Italy Neapolitan (see page 134).
- Many of the pizzerias employ cold fermentation. That's different from Southern Italy, which uses ambient temperatures.
- We met some pizzaioli doing unusual things with pizza dough here. Water might be infused with other flavors before mixing with flour. Whole wheat flour was also surprisingly popular. Dough might be steamed, like bao.
- We saw a lot of creativity in toppings in Northern Italy.
- Overall, we concluded that being far outside of Naples allows pizzaioli more room for experimentation. That's what pizzaiolo Simone Padoan of I Tigli in Veneto said about his experimentation that led to pizza *degustazione*.
- In Naples, pizza was mostly quite inexpensive. In Northern Italy, it could be a little pricier and sometimes was served in fancier restaurants.



NORTHERN ITALY BY THE NUMBERS

Tuscany

8 pizzerias visited

6 Tre Spicchi-winning pizzerias visited

Most popular style of pizza:
Neapolitan

Most popular type of oven:
wood-fired

Unique set of toppings:
codfish, black chickpea
cream, onion

Emilia-Romana, Lombardy, and Piedmont

5 Tre Spicchi-winning pizzerias visited

Most popular styles of pizza:
Neapolitan and pizza
gourmet

Most popular type of oven:
wood-fired

Most doughs on a menu: 50
types at Pizzeria Montegrigna
Tric Trac

Home of World Pizza
Championships (every April
in Parma)

Home of European Pizza
Championship (every
October in Milan)

Veneto

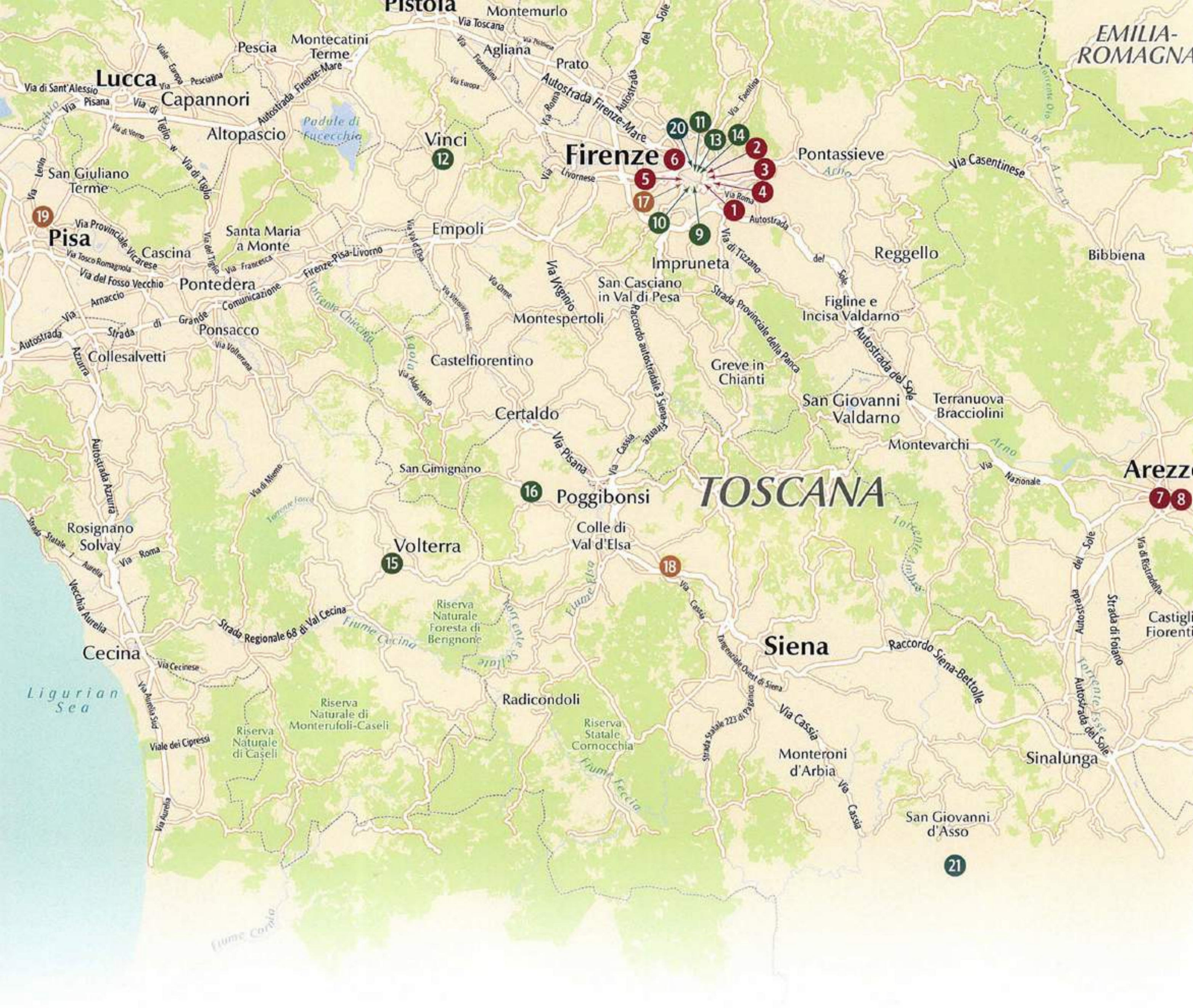
3 pizzerias visited

1 Tre Spicchi-winning pizzeria
visited

Most popular style of pizza:
pizza gourmet

Unique set of toppings:
cuttlefish ink, mantis shrimp,
bottarga, spider crab

Verona, a city in the region of Veneto, is most popularly known as the setting of Shakespeare's classic love story *Romeo and Juliet*. The Adige River flows through the city center, which is punctuated with the bell tower of the Sant'Anastasia church and the Torre dei Lamberti.



TUSCANY

PIZZERIAS

1. Le Follie di Romualdo (see next page)
2. La Divina Pizza
3. Santarpia (see page 182)
4. Il Vecchio e il Mare (see next page)
5. Al Solito Posto
6. Giotto Pizzeria-Bistrot (see next page)
7. Pizzeria O'Scugnizzo (see page 183)
8. Panificio Menchetti (see page 182)

NOT TO BE MISSED

9. Piazzale Michelangelo
10. Ponte Vecchio
11. Piazza della Signoria
12. Museo Leonardo da Vinci
13. Museo Galileo
14. Casa di Dante Alighieri
15. Volterra
16. San Gimignano

WORTH SEEING

17. Boboli Gardens
18. Chianti
19. Pisa

PIZZA RELATED

20. Mercato Centrale
21. Museo del Tartufo

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.



Le Follie di Romualdo 🍷🍷🍷

Romualdo Rizzuti (pictured above) began his pizza career at a young age, working in his family's Salerno pizzeria. At 16 he went to Florence to study the craft at one of the city's best pizzerias and has found a welcoming home there. He opened Le Follie in 2017 in a nightlife district, and it quickly amassed positive reviews. The pizza is Neapolitan style, but with some differences. All of the doughs include a bit of wheat germ, fresh brewer's yeast, and long fermentation. Le Follie also serves pizza frita, said to be one of Rizzuti's favorites.



Giotto Pizzeria-Bistrot 🍷🍷🍷

The young pizzaiolo Marco Manzi has a small but appealing pizzeria just off the beaten path in Florence, where he makes Neapolitan-style pizza. He was born in Ischia, an island in the Bay of Naples, and began cooking at a very young age. He studied pastry, interned at a five-star hotel, and began working as a pastry chef in Rome. Later, an opportunity arose back home and he decided to give pizza a go, applying his pastry knowledge to the "white art."

He opened Giotto in 2016, with a mission to "make a popular dish like pizza a high-level sensory experience." The toppings can be creative, including one with rabbit sausage and another with black cabbage. The pizzeria has been certified by the AVPN but doesn't follow all the rules to the letter, using levain, high hydration, and whole-grain flour.



Il Vecchio e il Mare 🍷🍷🍷

This restaurant, named for the Ernest Hemingway novel *The Old Man and the Sea*, was around for a decade, focusing on seafood dishes, until Mario Cipriano was brought in to reinvigorate the menu in 2017 by adding pizza. A native of Campania who grew up in Trieste, he came with experience, including a father and grandfather who were pizzaioli. Cipriano focuses on Neapolitan-style pizza using local Tuscan ingredients. Several days a week, however, he offers something uncommon in this region: pizza alla pala, the long and narrow pizzas often found in Rome and baked in an electric oven. The dough, fermented for up to 48 hours, is made with stone-ground flour and includes multigrain options. He also offers gluten-free pizzas baked in a dedicated oven.



Panificio Menchetti 🍷🍷🍷

The Menchetti family has run a number of successful bakeries in Tuscany since 1948, including a large, beautiful, and modern facility out in the countryside that would be at home in a high-end suburb in the United States, complete with a well-equipped playground. In the morning, its primary job is retail bakery, where you can buy all manner of pastries and bread products. Later in the day, pastries are replaced by pizza that's similar to Gabriele Bonci's (see page 176) in some ways, but different in that the pizza is not baked in pans. It's essentially long, thick focaccia that's shaped in a pan but flipped onto a peel to bake (pictured above). The family also grows olives and wheat, owns a vineyard, and has a variety of products for sale from their farms, including flour.



Santarpia 🍷🍷🍷

We visited this pizzeria in 2018 when Giovanni Santarpia was at the helm. Santarpia, a longtime pizzaiolo with a penchant for crazily colorful chef's "whites," has traveled throughout Italy—Campania, Calabria, Emilia-Romagna, Abruzzo—making Neapolitan-style pizza. Here, we noticed a crunchier texture and less leoparding than the traditional. Santarpia has since left this pizzeria, which has changed its name to Duje.



Pizzeria O'Scugnizzo 50^{ITL} #23 ▼▼▼

Pizzeria O'Scugnizzo is a fantastic little pizzeria in the beautiful and very old town of Arezzo, serving pizza since 2000 that's comparable to the best in Naples. The name is a slang term for a boy from the streets, one who's using his wits to simply scrape by. The pizzaiolo is Pierluigi Police, and he has help in the pizzeria from family. Here, you'll find Neapolitan-style pizza with the traditional soft crust (unlike many of the other Neapolitan-style pizzas we ate in Northern Italy, which were often browner and crispier). The pizzeria is certified by the AVPN, which normally requires a wood oven, but since this wasn't acceptable in Arezzo, the organization made an exception and allowed gas (see page 3:43).

One dish we tried here reminded us of carbonara. The pizza was baked until almost done, then a beaten egg was poured on top before returning it to the oven to quickly finish, making a sort of scrambled egg-topped pizza (pictured above). It was as delicious as it was inventive.

Police didn't set out to become a pizzaiolo and instead spent his early career in the fashion and textile industry. He switched to the restaurant field and came to pizza that way, essentially self-taught. Then in 2005 he enrolled in a course at the Scuola Italiana Pizzaioli, and his vision deepened. Another interesting feature of his pizzeria is its very long beer list, including a selection of Trappist beers.



EMILIA-ROMAGNA

PIZZERIAS

1. Piccola Piedigrotta (see page 189)

WORTH SEEING

2. Museo Casa Enzo Ferrari
3. Grotta Gigante

PIZZA RELATED

4. Prosciutto Crudo di Parma
5. Museo del Balsamico Tradizionale
6. Museo del Parmigiano-Reggiano
7. Museo del Pomodoro
8. Museo del Prosciutto di Parma
9. Museo del Salame di Felino
10. Tamburini
11. Acetaia San Giacomo

LOMBARDY

PIZZERIAS*

12. Dry Milano (see page 187)
13. AMOR (see next page)
14. Cracco Café
15. Manuelina
16. MARGHE
17. Berberè (see page 186)
18. Panificio Davide Longoni
19. Pizzeria Montegrigna Tric (see page 188)
20. Lipen

NOT TO BE MISSED

21. Galleria Vittorio Emanuele II
22. The Last Supper at Santa Maria delle Grazie
23. Museo Nazionale della Scienza e della Tecnologia Leonardo da Vinci
24. Museo del Violino

WORTH SEEING

25. Lago di Garda

PIZZA RELATED

26. Mercato di Via San Marco

PIEDMONT/ VALLE D'AOSTA

PIZZERIA

27. Gusto Madre (see page 186)

PIZZA RELATED

28. Mercato di Porta Palazzo

VENETO

PIZZERIAS*

29. ABC Montecchia
30. Grancaffè Quadri (see next page)
31. Amo (see next page)
32. I Tigli (see page 188)
33. Renato Bosco Pizzeria (see page 188)

NOT TO BE MISSED

34. Canal Grande
35. Piazza e Piazzetta San Marco
36. Ponte Pietra
37. Piazza Bra
38. Museo di Castelvecchio
39. Piazza dei Signori
40. Palazzo Barbieri
41. Dolomites
42. Basilica di San Marco
43. Castello Scaligero di Sirmione

WORTH SEEING

44. Casa di Julietta
 45. Casa di Romeo
 46. Basilica di Sant'Antonio
 47. Arena di Verona
- PIZZA RELATED
48. Piazza delle Erbe

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

**We reached out to Ottocento Bio and Sirani (and ate there) but did not receive permission to photograph and interview staff, so they're not featured in the following pages.*

Grancaffè Quadri; AMOR; Amo

It may seem odd that the Alajmo brothers, Raffaele and Massimiliano, who run 11 different restaurants and cafés in Northern Italy (plus restaurants in Paris and Marrakech), including the Michelin three-star Le Calandre, would spend a lot of time making pizza. And yet several years back, the irrepressibly creative Massimiliano began an intense study of the genre. Why do pizzaioli punch down the dough, deflating it? Why are toppings and dough baked together? Why is it baked at such high temperatures? For that matter, why be limited to baking?

The results of Massimiliano's inquiries have some similarities to pizza degustazione, but some differences, too. They call it pzza (for the "j" in their name), and you can sample it at their more casual restaurants Grancaffè Quadri, Quadrino, AMOR, and Amo. On our visit, the team was extremely generous, including Massimiliano, who shared details about his methods. (We used this information to create our own version of pizza degustazione dough, which is similar to Chinese bao; see page 2:165.) They begin with a very soft dough, shape it flat, and then proof it. Then it's steamed—in essence, precooked, to gelatinize the starch—and only later are toppings added. It's then either re-steamed or heated in an oven. The steam-only pizzas come out white, looking as if they weren't cooked at all. The Alajmos hold patents for some of their methods.

The pzza arrived at our table with the level of creativity and impeccable execution you'd expect when a Michelin three-star chef is at the helm. One of the more memorable pizzas they made for us included one (pictured below) with a smoked oyster cream that acted as the sauce, beef tartare, bone marrow, and caviar. But they also serve versions of the classic margherita and the like, putting their own pzza stamp on them. They also have begun serving fried and grilled versions of their pzza. See page 3:153 for our recipe for Margherita Pizza Gourmet, inspired by Massimiliano Alajmo.





Berberè 50 ITL #14 ▼▼▼

Calabrian brothers Matteo and Salvatore Aloe have accomplished something here that's hard to pull off: they came up with a formula for good artisan-style pizza served in a stylish Bologna pizzeria, and they managed to replicate it over and over. After opening in 2010, they now have 12 outlets in Italy and London while still maintaining a reputation for high standards. It's clearly a place made for young, trendy Italians, filled with hipster décor and large murals by contemporary local artists that are both beautiful and unusual.

The pizza is an interesting mix of the traditional and the high-tech, and shares some common features with artisan style. The pizzas are cut into eight slices and topped individually, for sharing. The brothers got into the business after studying economics, with Matteo going on to work at Michelin-starred restaurants. Their dough featured lievito madre (levain) in bondage.



Gusto Madre ▼▼▼

Gambero Rosso calls it pizza degustazione, but Massimiliano Prete simply calls it "contemporary pizza." He began his career as a pastry chef and baker, then, once he began to focus on pizza, drew inspiration from Gabriele Bonci (see page 176) and Renato Bosco (see page 188), making long-leavened sourdough pizzas. There are actually six doughs and styles to choose from, including a high-hydration focaccia-style dough made with some whole wheat that comes out crunchy; a softer pizza made with spelt, buckwheat, rye, and wheat that's cut into wedges and individually topped; and a third with 100% spelt flour. Prete is no longer there and the pizzeria's former pastry chef, Fabio Ciriaci, is now the chef.



Dry Milano (50) ^{ITL #32} ▼▼▼

You'll see beer and wine on the menu of every pizzeria. Cocktails are much rarer—and good ones particularly scarce. Dry manages to be a trendy cocktail bar that also makes really great pizzas. (The name “Dry” is an ironic reference to the alcohol-free Prohibition era.) We'd call this pizza Neapolitan in style, and it's cooked at Neapolitan temperatures, but it has much more unusual toppings than the traditional. Gambero Rosso calls it pizza degustazione. Either way, it was excellent pizza.

The pizza dough is made with a biga starter, cold-fermented, and baked in a wood-fired oven. All of the ingredients were high quality, and the pizzas themselves were beautifully served. We particularly enjoyed one pizza with squash blossoms (pictured above). Pizzaiolo Simone Lombardi started in 2013 after working in several other restaurants and

clearly is passionate about pizza. Even the classics, the margherita and the marinara, come with the option of additional condimenti, such as prosciutto, tuna, stewed onions, or salt-packed capers. The chef's special pizzas include one topped with roasted plum tomatoes, anchovy cream, caper powder, candied lemons, and fior di latte; another features zucchini, anchovies, and mint.

The restaurant itself is aesthetically driven, and that approach carries over to the cocktails, too. Created by mixologist Guglielmo Miriello, some are vintage, others newfangled, and all are appealingly presented. See page 3:228 for our recipe for Triple Zucchini Pizza, inspired by Simone Lombardi.



I Tigli (50) ^{ITL #5} ▼▼▼

In his immaculate pizzeria in the tiny, picturesque village of San Bonifacio, Simone Padoan (pictured above) set out on a mission of reinvention. After making pizza the usual way for years, he began experimenting in the early 2000s, eventually coming up with recipes involving complicated doughs, steaming then baking, delicate toppings sometimes applied with tweezers, and presliced individual portions. Later, it was dubbed pizza degustazione (see page 141), and pizzaioli elsewhere began emulating the style. It's pizza, but it's far from traditional, with unusual toppings (such as shrimp, or ginger and lime) and without the typical oven spring you see in most pizzas. The crust is intentionally short, and the doughs all feature 20% whole wheat flour, which we felt didn't pair well with some of the more delicate toppings. But it arrives with a lovely presentation, cut into slices for sharing. See pages 3:154–155 for our recipe for Pizza Gourmet with Squab and Foie Gras, inspired by Simone Padoan.



Pizzeria Montegrigna Tric Trac ▼▼▼

Most pizzerias put variety on the menu by having different topping and sauce combinations. Bruno De Rosa does that, but he also has many, many dough flavors. Never have we been in a pizzeria with more doughs. De Rosa told us he had 50, and the menu goes on for a dozen pages. The pizzeria is in a suburb quite a distance from downtown Milan, and it's been here since 1971. In 1999, he said, he began experimenting with aromatic inclusions in the dough, adding fennel, mint, saffron, basil, and even coffee. The dough is long-fermented and wood-fired. We would call the pizza Rest-of-Italy Neapolitan style; Gambero Rosso calls it Neapolitan style. De Rosa would say it's in the style of his native Tramonti (see page 69).



Renato Bosco Pizzeria (50) ^{ITL #12} 🍷🍷🍷

Renato Bosco makes some of the more complicated doughs we've seen. He clearly loves to experiment—and always seems to have a smile on his face—even after being in the pizza business since he was a teenager. His pizzas are in the degustazione style, made with nontraditional methods and often with unusual toppings. Bosco is famous for his doughs, and you'll find seven different styles of pizza on the menu, including varieties



called Pizzacrunch, Aria de Pane, and Mozzarella de Pane, which are all trademarked. He's serious about protecting his ideas. His five venues, one of them focused on takeout, are mobbed. We liked the sense of experimentation, but felt some of the pizzas fell short, including the Bagel Pizza, which is steamed in flavored water (curry, BBQ) and then baked. See page 3:147 for our recipe for Bosco's Pizza Sandwich, inspired by Renato Bosco.



Piccola Piedigrotta 50^{ITL #31} ▼▼▼

In our travels, we noticed that pizzaioli can sometimes be real characters. Giovanni Mandara (pictured top right) at Piccola Piedigrotta is no exception. He is a dedicated biker who has driven his Harley-Davidson motorcycle all over the world. His pizzeria is decorated with pictures of himself; one is a rendition of him as Hamlet, shirtless and with goat horns. His pizza is quite unusual, too. Gambero Rosso calls it “pizza all’Italiana” because it doesn’t fit any other mold. It’s on the thick side and probably closest in style to an artisan pizza you might find in the United States.

The doughs can be unusual, featuring things like squid ink or seawater. He’s been experimenting for more than 30 years now at this cozy little pizzeria, and he built it into a place where exciting combinations and

unusual ingredients are found, such as wild poppy stems, dandelions, and even coffee. The menu offers detailed descriptions on the ingredient sourcing, including Corbarino tomatoes from Salerno, eggs from Paolo Parisi, and so on. To many customers, the specially sourced items from small producers are part of the appeal. About 10 years ago, Mandara came up with a new twist: a mobile pizza oven he uses for events. The mobile pizza oven has been all over the place, from the Vatican to the United Arab Emirates, but we wonder how it navigates the tight spaces of his own city, Reggio Emilia. He tows it with an extremely large American ¾-ton pickup truck.



SÃO PAULO

São Paulo is a multifaceted city and has both funky old-school charm as well as high-tech modernity. From the Beco do Batman neighborhood, in which graffiti artists gather to put up their artwork along the alleyway walls, to the Octávio Frias de Oliveira Bridge, an architectural feat, the city is a thriving cultural hub.



While São Paulo is home to some wonderful, nationally recognized restaurants (a few of which we got to try on our trip), Paulistanos will tell you that this is a pizza city, and they're absolutely correct. There are at least 6,000 pizzerias in a metropolitan area of some 21 million people, and residents have been celebrating Pizza Day on July 10 since 1985. We were immediately struck by the prevalence of upscale pizzerias. These were large, sit-down restaurants with tablecloths, a sense of atmosphere, and careful service. It was quite a contrast to our other South American destination, Buenos Aires, where the pizza culture is focused on casual slice houses, and to the casual pizzeria culture across the United States, too. In São Paulo, most of the pizzaioli were happy to answer our questions. There's longevity among some of the staff, including one pizzaiolo who's been at it for more than 55 years. It wasn't unheard of to see \$40 pizzas on menus, made with high-end toppings. That's a *lot* more than you'll pay for the best pizzas in Italy, and even in the United States, where

the cost of living is generally much higher. (It prompted us to wonder, are pizzaioli underpricing their work?)

Brazil, like the United States and Argentina, welcomed significant numbers of Italian immigrants in the 20th century, and the Italian influence is strong there (see page 43). While you'll find pizzas with the typical toppings you'd see in Italy or New York, you're also likely to find some inventive toppings, including hearts of palm, hard-boiled eggs, and tuna. In general, the toppings tend to go on heavy, while the tomato sauce is light. You'll also find dessert pizzas. Several of the pizzaioli told us they've been making the same dough for decades, but we wondered about that because flour has changed significantly almost everywhere, especially after World War II. We found several predominant styles, including a true cracker-thin crust that we liked enough to make one of our master pizza styles (see page 3:10). We also found thicker crusts more in line with Neapolitan- or New York-style pizza, and even Brazilian takes on Chicago deep-dish pizza.



KEY TAKEAWAYS

- Brazilians care about their pizza, and they'll tell you that São Paulo is the pizza capital of the world. While we're not sure about that claim, we will agree that overall, quality is high.
- Pizzerias are often sit-down restaurants, many family run, and several have multiple locations. The pizza can be more expensive than in most other cities we visited. It arrives at the table sliced, and the staff will often serve the slices to you.
- Even though the pizzerias are somewhat upscale, some also do a thriving takeout business.
- Pizza is strictly a dinner item (often on Sundays) and eaten with knife and fork. One well-known pizzeria (Bráz Elétrica) recently broke the unwritten rules by offering lunch service. Signs on the wall even told people to use their hands to eat pizza to try to create a more relaxed atmosphere.
- We had heard that Brazilians sometimes put ketchup and mayo on their pizza, and found it to be true. It comes in a combination they call "golf sauce."
- Almost every place we visited had round or octagonal boxes for pizza to go, instead of the square boxes we saw elsewhere.

- Catupiry. We'd never heard of this ingredient and initially thought, mayonnaise? But no, it's made from milk. It's a mild-flavored processed cheese that's piped onto pizzas, holding its form while baking. Sometimes it's piped into the cornicione. If you're American, picture something the consistency of Cheez Whiz, but whiter in color. It's loved by Paulistanos but not by everyone.
- The wood-fired ovens burn compressed eucalyptus, a tree that thrives in Brazil and whose strongly scented oil is often used to relieve body aches and nasal congestion. Interestingly, and fortunately, we couldn't detect the distinctive piney aroma in our food. The love of wood-fired pizza may have a side effect, though. In 2016, researchers noted that air quality here is poor, despite the extensive use of biofuels, and they theorized that Paulistanos' pizza habit may be a big contributor. They estimated the pizzerias burn 307,000 tons of wood each year.
- Several pizzerias offer a pizza created in homage to Cantina Castelões, which is said to be the first pizzeria in Brazil.

SÃO PAULO BY THE NUMBERS

16 pizzerias visited

1 AVPN-certified pizzeria visited

Most popular styles of pizza: Brazilian and Neapolitan

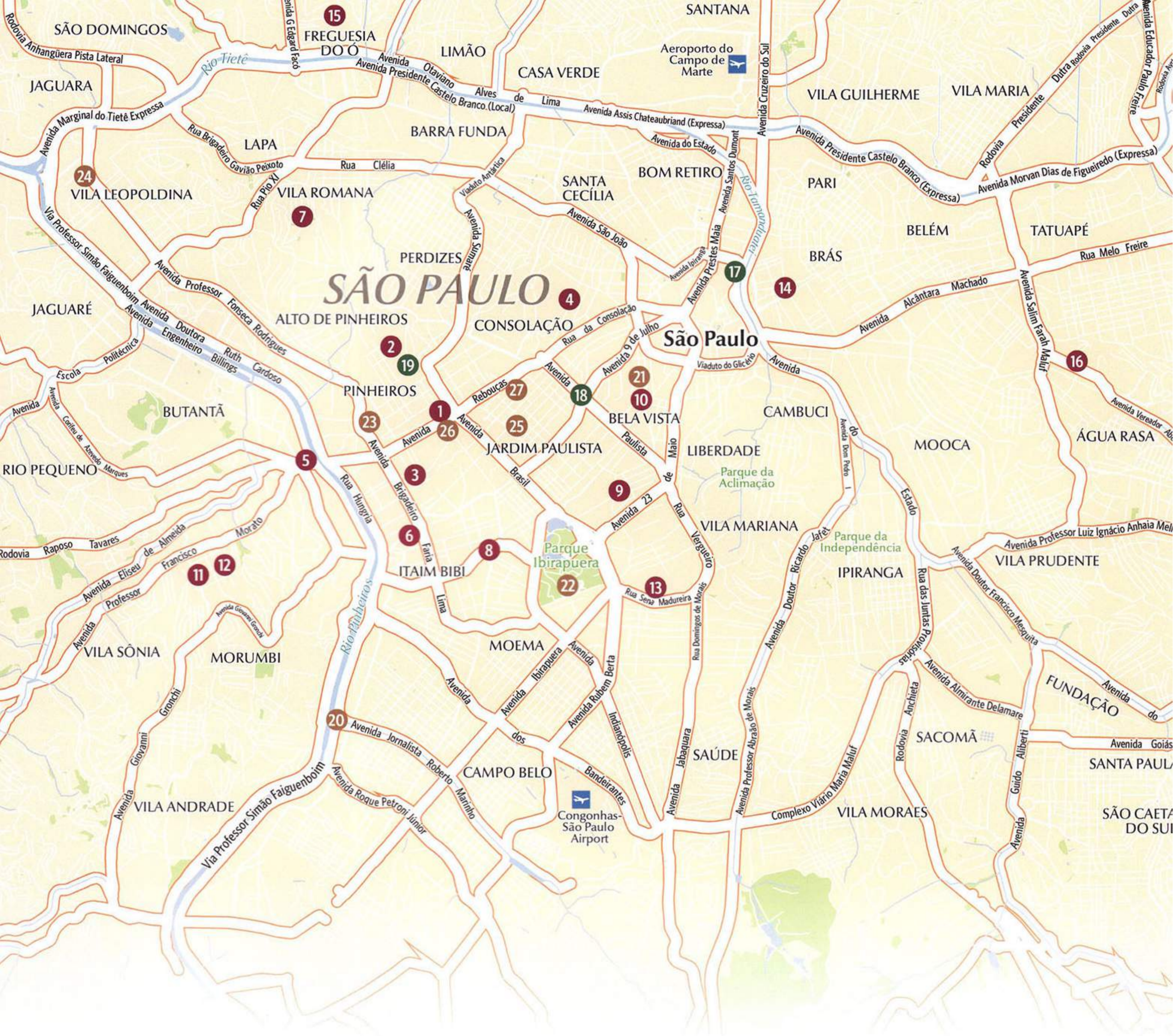
Most popular toppings: tuna, hearts of palm, Catupiry, hard-boiled eggs

Unique set of toppings: cottage cheese and veggies

Oldest pizzeria visited: Cantina Castelões (allegedly dates back to 1924)

Pizzerias visited did not offer build-your-own pizzas

8,000+ pizzerias citywide



SÃO PAULO

PIZZERIAS

1. Bráz Elétrica (see next page)
2. Carlos Pizza (see page 195)
3. Primo Basílico (see page 198)
4. Vica Pota Pizzaria e Forneria
5. Forneria Urbana (see page 196)
6. A Tal da Pizza
7. Vituccio
8. Pizzaria Camelo (see page 197)
9. Babbili
10. Pizzaria Speranza (see page 199)

11. Scalinata Pizzeria e Ristorante (see page 199)
12. A Casa da Pizza Estufada
13. Bráz Quintal (see page 194)
14. Cantina Castelões (see page 199)
15. Pizzaria Bruno (see page 196)
16. Sala VIP (see page 198)

NOT TO BE MISSED

17. Mercado Municipal de São Paulo
18. Avenida Paulista and Museu de Arte de São Paulo (MASP)

19. Beco do Batman

WORTH SEEING

20. Octávio Frias de Oliveira Bridge
21. Basilicata
22. Parque Ibirapuera
23. Mercado Municipal de Pinheiros
24. Companhia de Entrepósitos e Armazéns Gerais de São Paulo (CEAGESP)
25. D.O.M. Gastronomia Brasileira
26. Maní
27. Tordesilhas

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

Bráz Elettrica

Bráz Elettrica is trying to turn pizza a little bit on its head here. It's a much more casual spin-off restaurant of Bráz Quintal (see page 194) and is open for lunch—something so unusual that a São Paulo food journalist we bumped into said it was her first time eating pizza at midday. The space itself is very rock 'n' roll, with neon and graffiti and lots of pop art. It was quite memorable.

Bráz Elettrica is so named because it features an electric oven. We'd characterize the pizza here as somewhere between New York and Neapolitan style, and indeed the owners went on a research tour of both

cities before opening. Eating with the hands is encouraged. It's part of Bráz Elettrica's overall mission, in this land of white-tablecloth pizzerias, to make pizza a more casual and fun night out, where experimentation, not tradition, rules. You can watch your pizza being made in an open kitchen. We thoroughly enjoyed our pizzas, including a Calabrese piccante with tomato paste, pepperoni, mozzarella, basil, and a drizzle of honey; and a Frisco (pictured bottom right), which had spring cream (like whipped cream, but savory), mozzarella di bufala, escarole, Grana Padano, raw mushrooms, and lemon zest.



Bráz Quintal 50 ^{BRAZIL}

There are about 10 Bráz outlets, including Bráz Elettrica (see page 193), Bráz Pizzeria, and Bráz Quintal, a more upscale sister restaurant with wood-fired ovens. The space is both enormous and beautiful, and we'd classify it as rather fancy, but not stuffy. The oven is in the center and is the focal point. Walk past the oven and out to the courtyard, which is landscaped to feel like you're in a rainforest. The restaurant group has been around for two decades, which they told us has given them license to expand in new directions. At Bráz Quintal, the crust is thicker and airier than most, and the topping choices more varied than at Elettrica. Pizzaiolo Raffaele Mostaccioli told us he's a fourth-generation baker who hails from the Amalfi coast. Initially, he tried to replicate what his family had done for generations, but began really warming up to Brazilian-style ingredients.

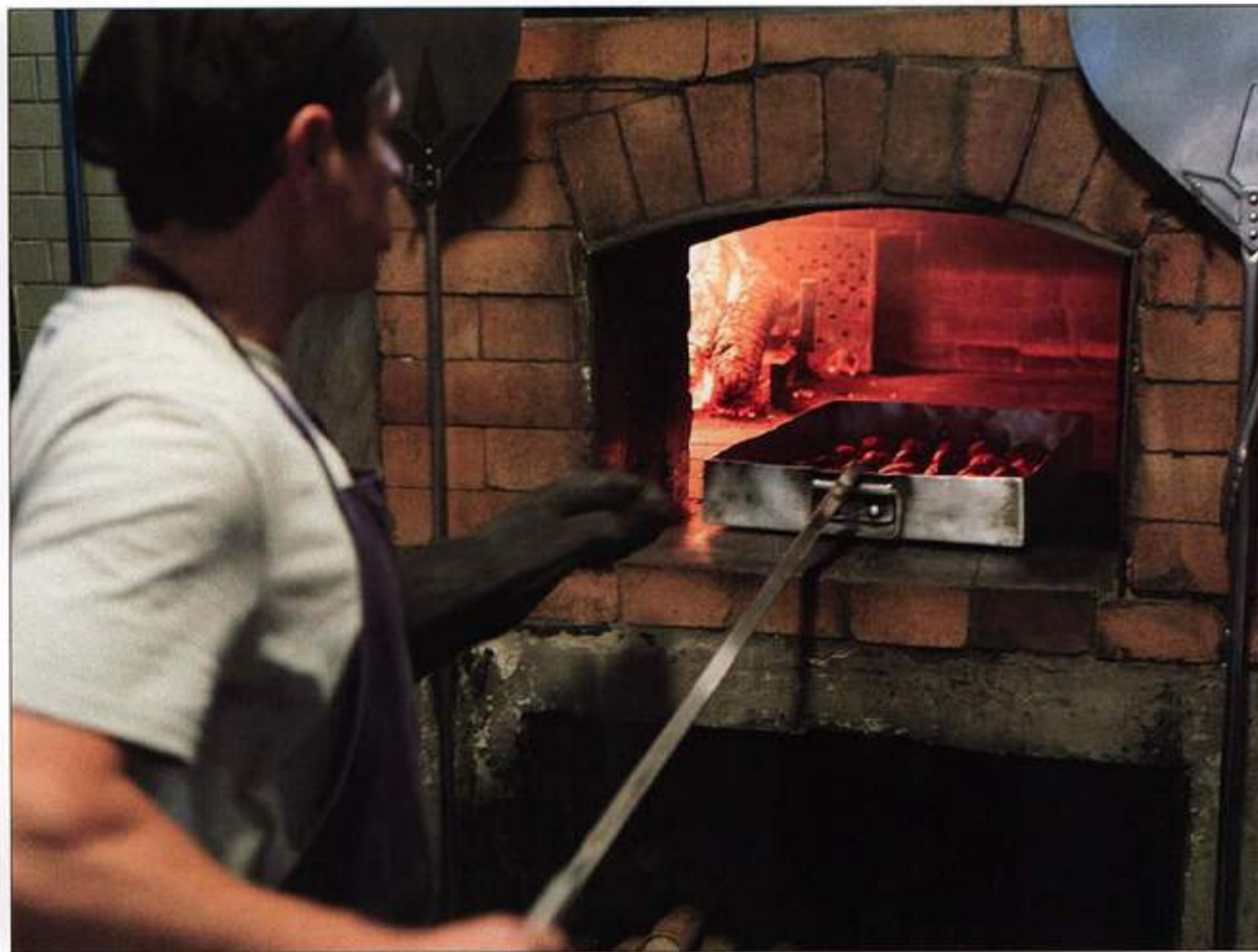
There are three different dough varieties (unusual in itself); one uses whole wheat, rye, Anaconda, and Caputo flours; another is whole wheat; and the third uses Caputo flour. Often, pizzerias store all their balls of dough together in a large pan, which means the last ones used can dry out a bit or overproof. Not here. Instead, individual balls are stored in color-coded and dated plastic containers, ensuring everything stays fresh and that fermentation is easily controlled (see page 2:70). The attention to detail was impressive. Mostaccioli told us he really tries to feature the flavors of the region. On our visit, we tried three different pizzas, all of which we enjoyed, including the Bráz (pictured below), with slices of roasted zucchini, mozzarella, garlic, and Parmesan.



Carlos Pizza

We thoroughly enjoyed our visit at this pizzeria, which is trying to sway Paulistanos toward Neapolitan-style pizza. The dough lacks the heavy leoparding typically found on Neapolitan pizzas, and the toppings are different from those you might find in Naples, but the pizza is definitely crafted in the Neapolitan spirit. Luciano Nardelli (pictured below, at left), the pizzaiolo, comes from a traditional culinary background and approaches toppings like a chef. He chooses top-notch ingredients, sources local cheeses, and works with local farmers to change his menu offerings regularly. The pizzas emerge from an old-school oven of which he is understandably proud. For all this, you'll pay a steeper price than most places: \$20 for an individual and \$40 for a large pizza, which is a lot compared to the cost of living in São Paulo.

We enjoyed a delicious pizza (pictured below) with thinly sliced zucchini, tomato sauce, mozzarella, mascarpone, and sea salt, and another pizza with a locally sourced spicy Calabrese sausage, tomato sauce, and mozzarella. They make a wood-fire-roasted tomato sauce (unlike the typical sauce, which is mostly crushed or canned tomatoes) that was perfectly charred and delicious. The sausage was different from what you'd find in both Italy and the United States, and we found it excellent. The space itself is small but has an openness about it, with a lot of natural light and long tables with benches for a communal feeling.

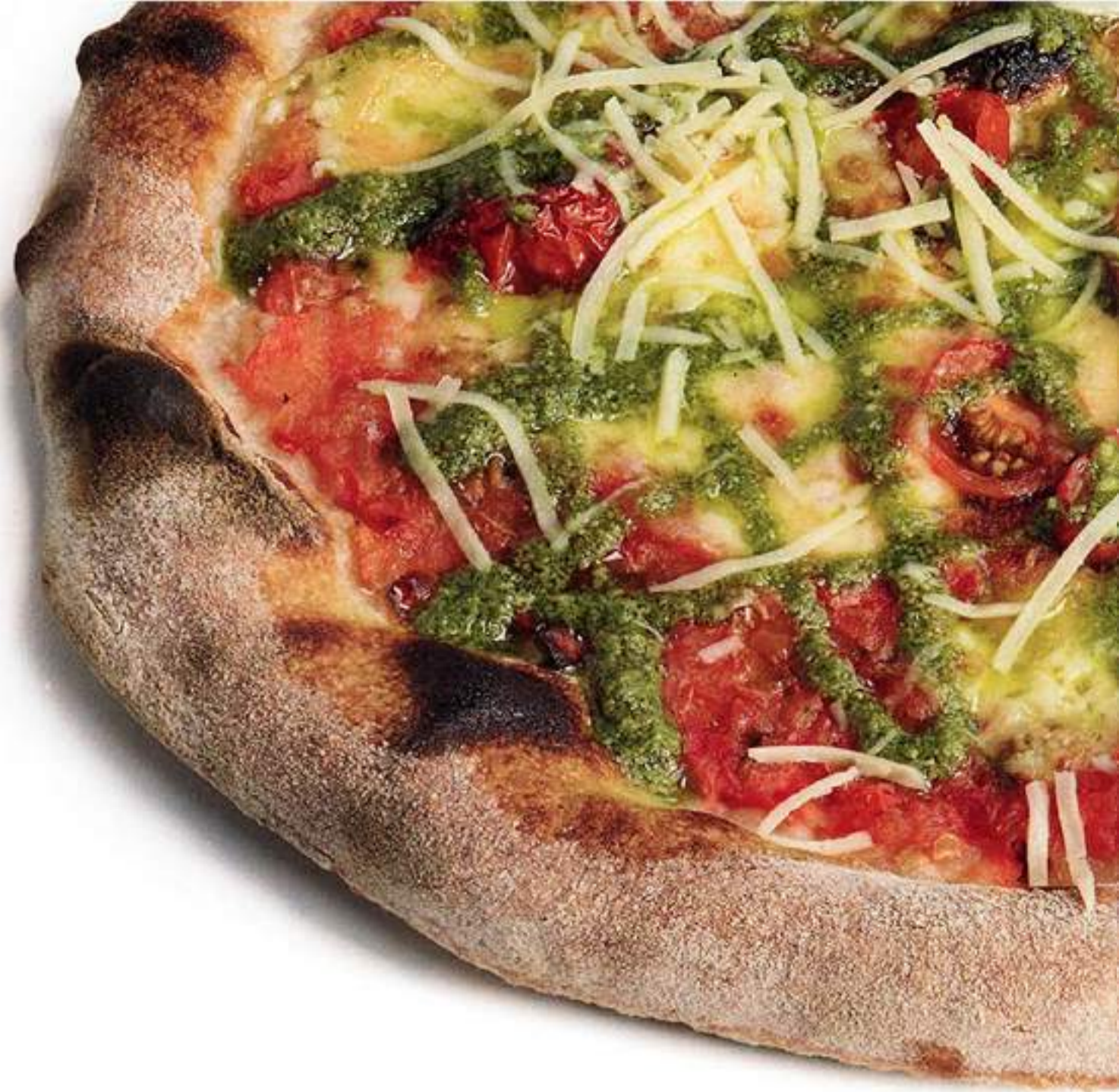


Forneria Urbana

Established in 2016, this pizzeria is in an outdoor retail space that's populated with shipping containers. Forneria Urbana put their mark on it, giving it a hip look. The individual-sized pizzas at this restaurant are baked in an electric oven, making them similar to those served at Bráz Elettrica. Turns out wood-fired ovens were prohibited here, and the owner seemed fine with that, noting that many say they're bad for the environment anyway. (We don't think they're so great for pizza, either; see page 377.)

The pizzas are named for iconic places in São Paulo. We tried the Elevado (pictured right), made with tomato sauce, cherry tomatoes, pesto, Parmesan, and queijo Canastra, a super-regional artisanal raw milk cheese. We're told that sometimes this cheese is really melty and other times it isn't, depending on the milk that's used and the aging.

Forneria Urbana has an older sister restaurant, Vituccio, established nearly 40 years ago. It's a more traditional Brazilian pizzeria serving Neapolitan-style pizza.



Pizzeria Bruno

The view from the dining room at Pizzeria Bruno is lovely, but compared to the other pizzerias we visited in São Paulo, the space itself wasn't all that impressive, especially considering the menu includes \$40 pizzas. The history here is long, dating back to 1939, and the staff has longevity, too. Flavio, the pizzaiolo, started as a dishwasher at age 15 and has stayed for 30-plus years; waiters have been here 30 or even 40 years. The pizzeria was founded by Bruno and Giuseppina Bertucci, who brought recipes from their native Italy and found a business partner in João Machado de Siqueira. At first they made chicken and polenta, but it didn't catch on. They switched to thin-crust pizza but, lacking an oven at that time, they fried the pizzas.

Today, the pizzeria is still family run and the pizzas are still pan-fried, complete with toppings, either on the stovetop or in the wood-fired oven. We tried the Reinaldo (pictured left), a longtime signature pizza, with tomato sauce, mozzarella, tuna, hearts of palm, mushrooms, and hard-boiled eggs. Turns out hearts of palm actually work on pizza, sort of like artichoke hearts. See page 3:190 for our recipe for Reinaldo Pizza, inspired by Pizzeria Bruno.



Pizzaria Camelo

What's a picture of a camel doing on the front of a pizzeria? When this restaurant opened in 1957, it served Arab food. Six years later, the Nóbrega family bought the place and had other ideas, so they switched to pizza. It's been a huge success, and now there are five Pizzaria Camelos in Brazil. It's one of the fancier places we visited, with waiters in suits and white tablecloths in the dining room. Nonetheless, Camelo does a thriving takeout business as well, managing the volume with a dedicated oven.

Pizzaiolo Antônio Macedo (pictured below) has been here 55 years, even though other pizzerias have tried to poach him. While customers in Brazil don't typically know their pizzaioli by name, Macedo is an exception, and at 83 years of age, he's still going strong. Way back when, he created the original dough recipe. We asked about the recipe but he told us he eyeballs everything. Given his experience, it was actually

believable. It's a tight dough, and it's aggressively flattened with a rolling pin. The rolled-out dough is kept in stacks, ready for topping. The kitchen runs like a machine.

The crust is super thin, with sparse amounts of sauce and cheese—a quintessentially Brazilian pizza. While the topping selections are relatively standard (Catupiry cheese is dispensed with a special gun), they're very well executed. We tried the Portuguese pizza, one of the most popular offerings, with ground ham, egg, onion, olives, and cheese, and a burrata pizza with arugula pesto, tomato sauce, and Parmesan, and loved the results. Most pizzerias in São Paulo are hesitant to let you put different topping combos on two halves of a pizza; Camelo is one of the only places that will let you divide the pizza into thirds and top it with what you want. They are also famous for dessert pizzas.



Primo Basílico

This pizzeria, which began with a focus on delivery, hit the 26-year mark in 2018. Now a full-service sit-down restaurant, Primo Basílico serves medium-crust pizza that they call Italian style. We think it's similar to New York or artisan style, with a rather thick rim. The name is a play on a well-known 19th-century novel, *O Primo Basílio*, which explored

bourgeois life and ennui. In their rendition, Basílio was changed to Basílico, which means basil. There are lots of options on the menu here, including a pizza in honor of Cantina Castelões (see page 44), with tomato sauce, cheese, and sausage slices.



Sala VIP

That's VIP—as in, Very Important Pizza. Sisters Renata and Natalia Delbosque own this multi-location pizzeria, which specializes in Brazilian thin-crust pizza. The menu has been the same since day one. The pizza here is a little less expensive than other places. The crust is light and the toppings are placed right up to the edge. We tried some interesting combinations here, including the beef carpaccio pizza (pictured right) with mustard and caper sauce, tomato sauce, Parmesan, and black olives.



Scalinata Pizzeria e Ristorante

This newish restaurant serves Brazilian-style pizza, including both the thin- and the medium-crust styles, but with Italian flavors. The interior was inspired by the Piazza di Spagna in Rome and the atmosphere around its famous steps, or scalinata. You will instantly know this because there's a huge mural when you walk in the door. They use instant yeast, which we found to be a rarity in São Paulo. In a nod to tradition, they



offer casatiello, a meat-and-cheese-stuffed bread baked in a ring shape and ordered by the slice. But they also are trying new topping combinations, with varying degrees of success. We tried a Burger Pizza (pictured below), in which the meat was wrapped in dough. The problem is, the steam from the burger patty makes the dough gooey.



Pizzeria Speranza

After the Tarallo family immigrated to Brazil from Naples, they founded this pizzeria in 1958, relying on recipes they brought with them. In 1979 they opened a second location, also in São Paulo. The business is still run by the Tarallo family (headed by pizzaiolo Francesco Tarallo), now in the third generation. Pizzeria Speranza serves Neapolitan-style pizza,



but with Brazilian flavors. They claim to be the first AVPN-certified pizzeria in Brazil, but no longer have the badge because they wanted to highlight local ingredients, such as cheeses. It's also tough getting AVPN-sanctioned ingredients. They're known for their Calabrian bread as well.



Historic Pizzeria

CANTINA CASTELÕES

Even though we didn't get to eat the pizza here (the owner said the nearly 100-year-old oven, pictured right, hadn't heated up enough yet), we're including this pizzeria for historical interest. Established in 1924, it claims to be the first pizzeria in São Paulo (though we read about a now-defunct pizzeria that opened in 1910). We're told the dough is low hydration and very dense. Pizzerias all over São Paulo have special pizzas named Castelões in honor of this historical pizzeria.

In Brazil, there is an expression about the prevalence of political corruption and the fact that the power brokers always seem to get away with it. Instead of, say, jail time or impeachment, scandals tend to "end in pizza," meaning the issues are brushed aside, as if over a casual meal.





BUENOS AIRES

The Obelisco de Buenos Aires (pictured top left), adorning Avenida 9 de Julio, is one of the most iconic monuments in the city. It was inaugurated in 1936 in celebration of the 400th anniversary of the first (albeit failed) founding of the city. The Obelisco is a popular site for celebrations, especially when a soccer game is won.



Pizza truly is part of the cultural identity in Buenos Aires, to the point where it's almost mythologized. Like New York and New Haven, this Argentinean city is part of pizza's original diaspora from Naples, thanks to the shiploads of Italian immigrants arriving in the late 19th and early 20th centuries (see page 40). It's no wonder Porteños, as the city's residents are called, take their pizza very seriously. Like in New York, Buenos Aires is a slice culture, and people tend to eat their slices standing at counters. We saw a lot of similarities between the proprietors of pizzerias in New York and Buenos Aires, too—a little standoffish, a little skeptical of our fact-finding mission, but thoroughly confident in their product.

While Italian immigrants were arriving here around the same time as in New York, the pizza evolved differently. We found several pizza styles here, ranging from ultra-thin *a la parrilla* (cooked on a grill), to heavy, gooey slices of *pizza al molde*, a thick pizza baked in a pan. There is also *media masa*, a thinner version of *al molde*. We tried cheeseless *canchera* slices that originally were sold out of metal tubs at soccer stadiums and reminded us of the

sfinzione in Italy. There are also pizza-like items that historically predated pizza in Buenos Aires: *fugazza*, a food with Genoese roots consisting of a focaccia-like dough topped with onions; and *fugazzeta*, which uses a similar dough and is topped with onions and cheese. Another staple is *fainá*, made with a chickpea dough that has roots in the Ligurian dish *farinata di ceci*.

We definitely ate more cheese here than at our other stops. Buenos Aires pizza is really loaded with it. Because of that, the crusts need to be somewhat substantial, so you won't see the latticework alveoli in crusts here. Instead, they're more of a thick white-sandwich-bread style.

We toured Buenos Aires immediately after our trip to São Paulo and the contrast was striking. In Brazil, pizza is often a sit-down affair in an upscale restaurant; in Argentina, it's more about a quick slice in a hole-in-the-wall. But there were some similarities, too. For one thing, there was a great longevity among the staff at many of the pizzerias we visited in both cities, sometimes going back more than four decades.



KEY TAKEAWAYS

- The slice is king here and is often eaten while standing at a counter. This struck us as very strange indeed, considering most Buenos Aires pizza isn't particularly well suited for quick stand-up meals. It's smothered in cheese, and there's no way to eat these thick, heavy slices except with a knife and fork. It's as if Chicago deep-dish was mostly served as to-go slices.
- This brings up another observation. Pizza lovers sometimes ask the rhetorical question, "Can there ever be too much cheese on pizza?" The answer is yes. The dough is smothered so thick with cheese it oozes down the sides. We definitely love cheese, and we enjoyed some of these weighty slices, but we would prefer to have the volume dialed back.
- There's one big exception to the over-cheesification of pizza here: canchera. This is a style of pizza with sauce but no cheese. Long before pizzerias started opening here, sometime around the 1930s, canchera hawkers stacked piles of these pizzas in metal tubs and sold them by the slice. It's a lot like the original Neapolitan pizza hawkers, who carried their wares in a metal stufa.

- Buenos Aires pizzerias almost always serve fainá, a thin, polenta-like pancake made with chickpea flour. Porteños will often order a slice of each, stacking their fainá on top of their pizza to create pizza a caballo (pizza on horseback; see page 3:128). This combination wasn't always appealing to us, but clearly it's a thing here.
- Another thing we didn't understand is the seeming obsession with olives. Many pizzas here are served with whole olives on top, like a garnish—one that rolls off as soon as you pick up the slice. Invariably they are also unpitted, making them even more of a challenge to eat.
- Popular toppings include ham, pineapple, red peppers, cooked onions of varying degrees of doneness, and Argentinean mozzarella, which is often ground to a consistency not unlike mashed potatoes. Sometimes it's ground with other cheese to make a blend.

BUENOS AIRES BY THE NUMBERS

12 pizzerias visited

Most popular styles of pizza:
Argentinean al molde, fugazza, fugazzeta

Most popular toppings:
anchovies, ham, lots of cheese

Unique set of toppings:
Argentinean mozzarella, ham, banana, whole olives with pits

Self-proclaimed pizza capital of the world

More pizzerias than steak shops

For more on canchera and fainá, see pages 42 and 40.



BUENOS AIRES

PIZZERIAS

1. Pizzería Angelín (see page 206)
2. Siamo nel Forno (see page 207)
3. 1893 (see next page)
4. El Imperio de la Pizza (see next page)
5. Pizzeria La Mezzetta (see page 205)
6. El Cuartito (see next page)
7. Los Inmortales
8. La Guitarrita (see page 204)
9. Pizzería Güerrín (see page 207)

10. Banchero Pizzeria (see page 207)
11. Pizzería Las Cuartetas (see page 207)
12. El Mazacote (see page 204)

NOT TO BE MISSED

13. Museo Argentino de Ciencias Naturales Bernardino Rivadavia
14. Mercado de San Telmo
15. La Boca

WORTH SEEING

16. El Ateneo Grand Splendid
17. El Caminito
18. Puente de la Mujer
19. Obelisco
20. Parrilla Don Julio
21. El Baqueano
22. Tegui

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

1893

Argentines love their parrillas, or grills, and owner Danilo Ferraz has taken the concept to pizza. The pizzas are ultra thin with high-end toppings, some of which are prepared sous vide. He is really trying to do something different here, and he took time out of a hectic day to explain his unusual process. To Ferraz, it's not about the dough, per se; it's about the technique. He rolls it out very thin, then bakes it on one side, flips it and adds toppings, and finishes it on the grill for a nice brown bottom. The results were quite successful. His ingredients were top-notch, too.

We tried a pizza (pictured right) with arugula, sun-dried tomatoes, and mozzarella, and another with morcilla (a kind of blood sausage), radicchio, apple, pickled pepper, and Patagonia blue cheese. A pizza with mortadella was among our favorites. Even the fainá was fancy, served with salad on top. The space, too, was lovely, with lots of natural light and dark wood tables. 1893 also makes fantastic empanadas, adding achiote paste to the dough that gives it a pinkish hue. Ferraz has recently opened another shop called Hell's Pizza, with pizzas named for US figures including Abraham Lincoln, Martin Luther King Jr., Hillary Clinton, and Herbert Hoover.



El Cuartito

Another historical pizzeria, founded in 1934 and serving pizza al molde, El Cuartito is both attractive and enormous, with beautiful tile work on the signage and lots of historical photos. When we visited, the pizzaiolo said he'd been there since 1986, when he was 17 years old. We arrived early, and within moments of the doors opening, the place was full. The kitchen produces 1,000 pizzas a day, a volume that requires tremendous efficiency. The crusts are parbaked and stacked. The most popular pizzas are pre-assembled and kept at the ready all night long. They also sell a lot of baked goods, including empanadas and bread.



El Imperio de la Pizza

This neighborhood pizzeria opened in 1947, and its current pizzaiolo has been there for 41 years, more than half the pizzeria's life. The pan pizzas al molde are baked in an old brick dome-shaped oven that they're really proud of. You'll get the standard selection of Argentine pizzas here, in a space whose walls are plastered with historical figures and colloquial stories. There's a large pastry case selling baked goods.



El Mazacote

El Mazacote's a la piedra-style pizza is a bit unusual in that it's thick-rimmed and baked on a stone. Mario Rodriguez, the pizzaiolo there for 25 years, said they have a flamethrower built into the oven to heat the floor. The pizzeria has been around since 1981, and it's had pretty much the same menu ever since. You can try the mozzarella pizza, along with the fainá, fugazza, and fugazzeta by the slice; everything else is available only as a whole pizza, baked to order. For the fainezetta, the chickpea-flour fainá pancake is used like a pizza crust and topped with mozzarella and onions; it comes out from the oven crispy and tasty.



La Guitarrita

Founded in 1963 by two 1940s-era soccer stars (René Pontoni and Mario Boyé), La Guitarrita is festooned with memorabilia. Pontoni's grandchildren now run the business, which includes six locations, all served by a central commissary kitchen. On our visit, they baked as many as two dozen pizzas a la piedra at once to keep up with demand. With 62 pizzas on the menu, it's one of those places that prompted us to ask, who reads these menus (see page 107)?



Pizzeria La Mezzetta

This place isn't much to look at, just a storefront with long, narrow counters—a real hole-in-the-wall. Its roots go back to 1939. Sometimes food lovers fetishize these kinds of restaurants, seeing “authenticity” in the tight quarters, age, and even griminess. This is one case where the cliché holds true—we thought this pizza was some of the best we had in Buenos Aires. The line stretched down the block. The space is tiny, and customers quickly eat *de parado*, that is, standing at a narrow bar. The format is like a New York slice house, in which pizzas are displayed in a case and then heated up to order. It's seen as an iconic Argentinean pizzeria and it offers only a handful of options, including the types of pizza

you can find all over Buenos Aires. But here they were very well executed, with golden-brown crusts and a good crumb that was airier than most. Sure, there was a lot of cheese, but the pizza didn't suffer from the gel layer we found other places. The pizzaiolo, Francisco Ibañez, was here for decades until recently retiring.

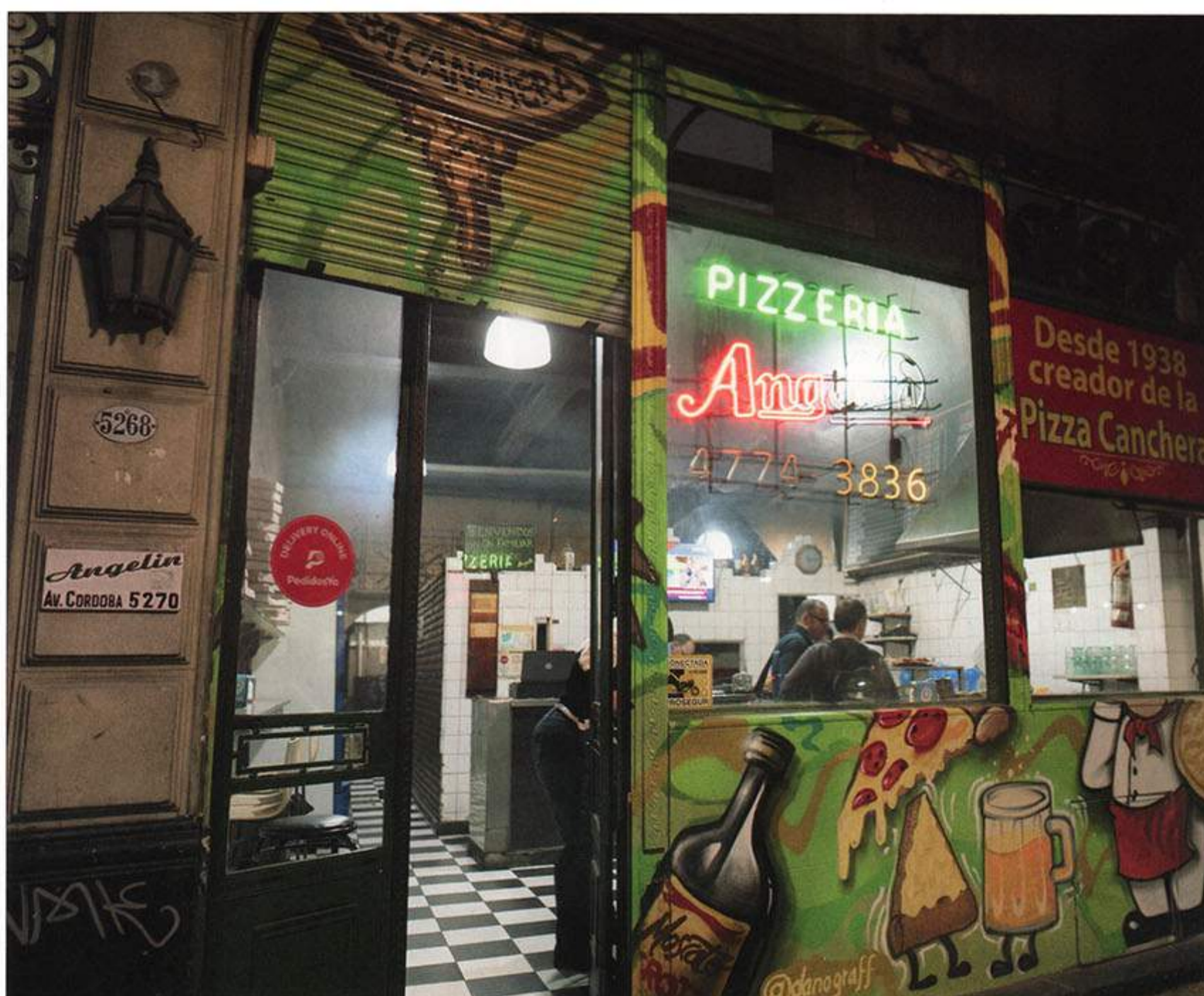
We tried a mozzarella with tomato sauce and *fainá* on top and liked the *fainá* better than elsewhere. The *fugazzeta* (pictured bottom left), stuffed with onions and mozzarella, is La Mezzetta's workhorse, and they make at least 100 each day. We crammed ourselves into a tight corner, tried the offerings, and were glad we came in.



Pizzeria Angelín

The Buenos Aires tourism bureau says this family-run pizzeria, established in 1938, specializes in traditional pizza al molde from a wood-fired oven, and that's definitely their most popular style. But they're also famous for canchera (pictured below). It's a simple dish, but that's why it's so challenging to execute. There aren't any fancy toppings to hide behind; it's just tomato sauce, oregano, olive oil, and dough. Here, it was made just right, with a flavorful tomato sauce on an ultra-thin crust with a sprinkling of green oregano on top. They've been making it this way for more than 80 years now, ever since the pizzeria's founder baked up stacks of them, set them out on a table outside the soccer fields, and sold them cold.

You can get canchera all over the city, but this claims to be the original. It's a place that prides itself on keeping things the same. The pizzaiolo, Raul Sapes, has been there for decades. Gustavo Pintos (pictured below) is the third generation to run the place and says that he can think of only two big changes since they opened. First, they began offering knives and forks once more women started coming in for a slice and didn't want to get their hands greasy. Then, in the 1990s, Angelín moved down the street from its original address and added a dining room, which today is decorated with the wicker-wrapped Chianti bottles intended to signify "Italy." This is one of those rare times when it appears staying the same has worked out just fine.



Siamo nel Forno

LISTED IN GAMBERO ROSSO'S BEST ITALIAN PIZZAS IN THE WORLD

This is the only pizzeria in Argentina certified by the AVPN (see page 74), and pizzaiolo Nestor Gattorna (pictured below) told us it was a long journey to get there. He's really trying to forge a path for traditional Neapolitan-style pizza in Argentina, and his passion shows. He concedes it took a little while for this style to catch on, but it's finally getting a foothold.

The pizza, like typical Neapolitan style, is wood-fired. He says it's too hard to get the kind of flour used in Naples, and the heat means he has to

refrigerate the dough in the summer, but he's sticking to the AVPN rules as best as he can. His ingredients are all high quality, giving this pizzeria a distinctive niche in this pizza-dense city. The Tre Saponi (pictured below), with basil pesto, mozzarella di bufala, and cherry tomatoes, was among our favorites of the trip. The pizza here was also relatively inexpensive compared to some of the others we tried.



Pizzeria Las Cuartetas

This large, classic pizzeria, founded in the 1930s, churns out 1,200 pizzas a day, and despite the volume, we felt they did a better job than some of the others. They use 000 flour (not 0000 like many other pizzerias here)

and a combination of three mozzarellas. The main style here is the thick-crust, pan-baked pizza al molde (pictured below), but diners can ask for thinner media masa or a la piedra preparations.



Historic Pizzerias

BANCHERO PIZZERIA

This family-run business was established in 1932 by an immigrant from Genoa, and it really plays up that long history. It calls itself "the inventor of fugazza with cheese," which is commonly referred to as fugazzeta and is wildly popular all over this city.

PIZZERÍA GÜERRÍN

Güerrín is probably one of the best-known pizzerias in this city, and it's old-school, dating to 1932, when it was opened by Genoese immigrants. There are over 100 pizzas on the menu, but we were tipped off that people don't bother reading it; they just tell the waiter what toppings they want. The white-bread-style crusts reminded us a bit of some we had in Chicago, with a gel layer.



TOKYO

Tokyo, the sprawling capital city of Japan on the main island of Honshu, is situated on Tokyo Bay and has a population of over 13 million people. At night, Tokyo Tower, a communications and observation tower, lights up as one of the city's most iconic landmarks.



Japan is a rather unlikely place for good pizza. Rice, not wheat, has long been the staple. Until recently, cheese was seen as rotten milk, with the unappealing texture of wax. Many Japanese are lactose intolerant. So when chef David Chang suggested on an episode of *Ugly Delicious* that Tokyo has some of the best pizza in the world, it sounded almost like a challenge. We had to visit.

We found a vibrant pizza scene with a history that involved several waves of pizza. There's plenty of chain pizza with American-style toppings, as well as topping selections that are more Japanese, such as wasabi, daikon, or sweet mayonnaise. There's also an obsession with something called "pizza toast," which is pretty much what it sounds like: a comfort food made with canned toppings and processed cheese on thick slabs of white bread. Even more surprising was the existence of Chicago-style deep-dish pizzerias.

But we didn't come here for any of that. We focused on pizzerias specializing in Neapolitan and artisan pizzas. The trend began here in the 1990s, when an economic boom led to a craze for all things Italian. Aspiring chefs began making pilgrimages to Naples to learn the craft. In 2003, one of them became the first foreigner to earn top honors for his traditional Neapolitan pizza at an annual contest

sponsored by the AVPN. More Japanese pizzaioli won Italian pizza prizes after that. By 2006, the AVPN had opened a branch in Japan, and so far it has certified more than 80 pizzerias.

But the man who's considered the godfather of Japan's Neapolitan pizza scene neither studied in Naples nor won any Italian pizza contests. Seirinkan's Susumu Kakinuma (see page 212) learned pizza making first by eating, then by nonstop practice, day in and day out. He's been making pizza in Tokyo for more than a quarter century, and other pizzaioli look to him as a mentor. Savoy, a pizzeria where he worked before opening Seirinkan, became a training ground.

Initially, the Neapolitan-style pizzerias relied on ingredients imported from Italy. Today, we found many use a mix, often substituting Japanese flour or tomatoes for the more traditional Italian ingredients demanded by the AVPN. There are other touches that seem quintessentially Japanese as well, including the dedication of people like Kakinuma. Japanese culture places great value on tradition—never mind that the tradition was created in Naples, not Japan. Writers who have explored the subject use words like *shokunin*, meaning a devotion to craft, or *seishin*, the drive for continuous self-improvement.



But Kakinuma sees the Japanese interest in pizza slightly differently. “Look, Japanese people are really free,” he told *Eater*. “What I mean by that is, Japanese pray on New Year’s Day at a Shinto shrine, get married in a Christian church, and hold their funerals at a Buddhist temple. They’re beholden to no single point of view.”

In other words, they can adapt and grow, pushing boundaries at times, following tradition at others, to create the culture, and the foods, to call their own.

KEY TAKEAWAYS

- Tokyo doesn’t have its own unique pizza style. We’d categorize most of the pizza we ate as either Neapolitan or Rest-of-Italy Neapolitan.
- Tokyo does have a unique marinara pizza. It’s very light on sauce, topped with fresh-sliced garlic, and liberally doused with olive oil. We had one of the best marinaras of our travels in Tokyo.
- Speaking of oil, we saw it laid on so heavily that it would splash onto the oven floor when the peel was jerked away, causing flare-ups. The oil was part of the reason that the top marinara, at Savoy, was so good.
- Garlic cloves are sliced directly onto each pizza with a paring knife. This struck us as odd, when the cloves could easily be prepped in advance and stored in oil. Then we remembered that some Naples pizzaioli apply fresh garlic to each pizza with a bench knife.
- Unlike the pizzaioli in Naples, those we met here don’t pop the big air bubbles that sometimes arise as the crust bakes. In fact, some pizzaioli stretch the dough in a way that *creates* bulbous protrusions, and then let the bubbles get heavily charred in the oven.
- We noticed a number of pizzaioli tossing a little salt in the oven before each pizza. We remembered the Japanese sumo wrestling custom of tossing salt in the ring as a sort of cleansing ritual. With the pizzas, the salt provided some entertainment value since it made the fire spit.
- Some pizzerias featured tiled, Italian-style wood-burning ovens, but other ovens were made of black sheet metal that looked more like the work of a local welder and were steampunk in style.
- Several pizzaioli we met were proud to tell us they worked 365 days a year, making every pizza. That monk-like devotion inspired Philadelphia’s Joe Beddia (see page 266).

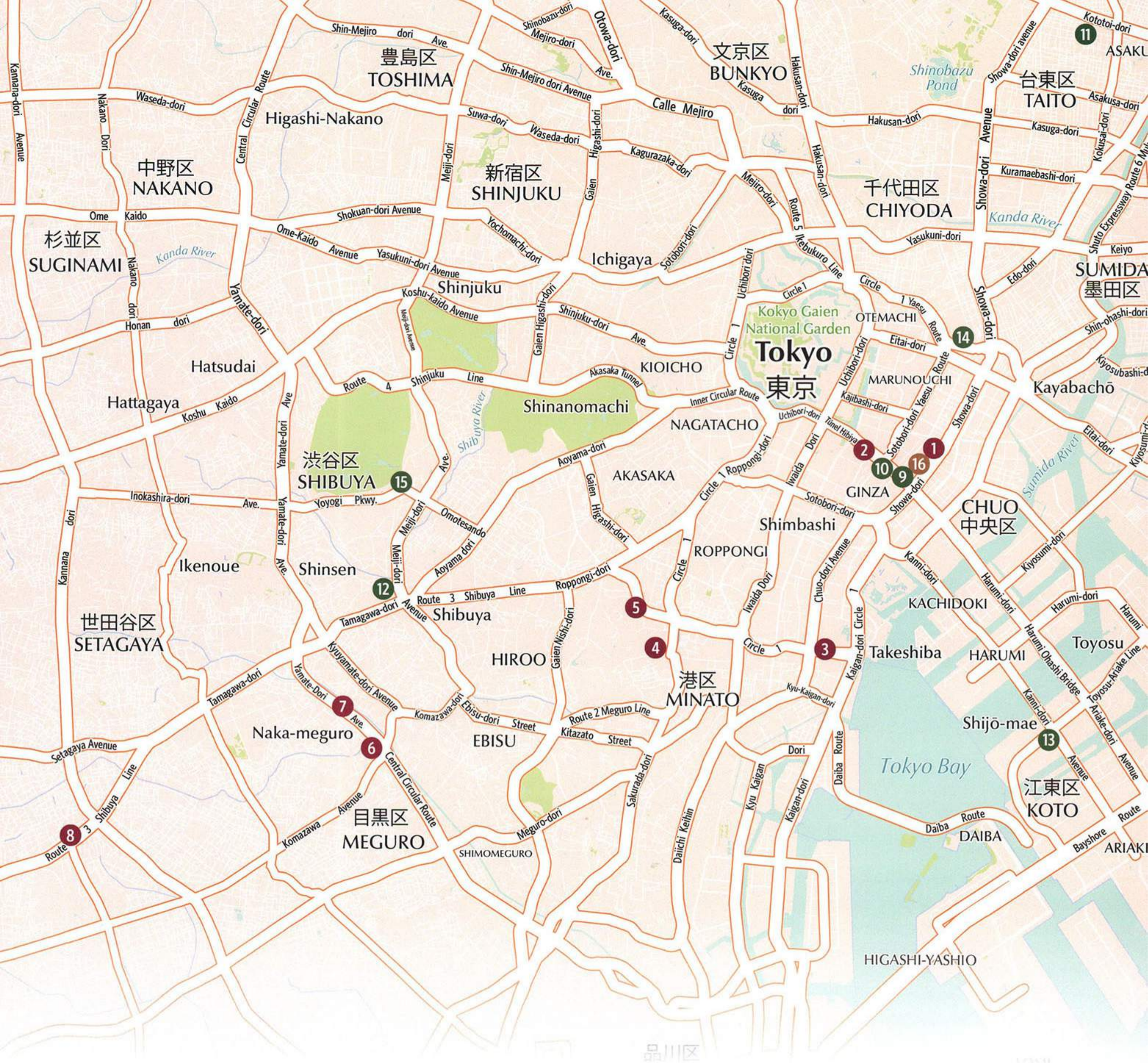
TOKYO BY THE NUMBERS

9 pizzerias visited

Most popular style of pizza:
Neapolitan

Most popular type of oven:
wood-fired

Unique set of toppings at Pizza Hut Japan: Idaho potato, grilled teriyaki, tuna, crab, Setouchi lemon, shrimp, squid



TOKYO

PIZZERIAS*

1. The Kitchen Salvatore Cuomo Ginza (see page 213)
2. Café Benisica
3. DevilCraft Hamamatsucho
4. Pizza Strada
5. Savoy Azabujuban (see next page)

6. Seirinkan (see page 212)
7. Pizzeria e Trattoria Da Isa (see next page)
8. Pizzeria da Peppe Napoli Sta' Ca" Komazawa

NOT TO BE MISSED

9. Ginza Mitsukoshi
10. Ginza Sembikiya

11. Kappabashi Street
12. Shibuya Scramble Crossing
13. Toyosu Market
14. Club Harie in Nihonbashi Mitsukoshi
15. Harajuku

WORTH SEEING

16. Kit Kat Chocolatory

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

**We visited Pizza Studio Tamaki, and we even took photos and interviewed the pizzaioli, but to this day we haven't received permission to include them in our book.*

Savoy

Savoy, we learned, is a Japanese pizzaiolo training ground. Several of the pizzaioli we met got their start at this Tokyo pizza institution. There are nine locations. When Chang visited on *Ugly Delicious*, he was fed a pizza made with Japanese mayo and raw tuna. But the tiny Azabujuban location, which we visited, has just two options on the menu: margherita and marinara. More would be unnecessary. What emerged from the hulking black metal oven was very good. The perfectly stretched dough was like a traditional Neapolitan. The marinara pizza here was perhaps the best we ever had. Yes, better even than the pizzas we ate in Italy. The ingredients were high quality, of course, but that didn't seem to be the secret to this pizza. What made the marinara so good was all the oil poured on top before baking (pictured below). You can also get a double cheese margherita, even though it isn't on the menu. See page 3:54 for our recipe for Tokyo Marinara Pizza, inspired by Savoy.



Pizzeria e Trattoria Da Isa

LISTED IN GAMBERO ROSSO'S BEST ITALIAN PIZZAS IN THE WORLD

The Italian food guide Gambero Rosso says Pizzeria e Trattoria Da Isa "feels like home." And by home, they mean Naples. Hisanori Yamamoto's pizzeria has a Neapolitan feel, from the bustling energy to the cramped tables to the classic Italian-style wood-fired oven. Yamamoto comes by it authentically. He's one of few Japanese pizzaioli we met who studied in Naples, and his mentor was Ernesto Cacialli. While he was rebuffed by Neapolitan pizzaioli at first because he was a foreigner, he eventually proved his skill, even winning several pizza competitions over locals who grew up with pizza in their DNA. He maintains his connections with regular trips back.

The pizzeria's offerings range from salad to fritti to about 30 different pizzas, most of them featuring traditional Italian ingredients such as artichokes, anchovies, and mushrooms. Fior di latte mozzarella, mozzarella di bufala, tomato sauce, and a number of other ingredients are from Italy. Toppings can be heavier than some Neapolitan pizzas we've had. The pizzas come out of the oven fairly charred. We tried the marinara, the margherita, and one called Diavola (pictured below) that was baked with olive oil and salt and then topped afterward with mozzarella di bufala, prosciutto, arugula, and cherry tomatoes. We considered the pizza good but not great.



Seirinkan

The pizza menu at Seirinkan lists two options: marinara or margherita, the two most iconic Neapolitan pizzas. When the pizzas arrive at your table, they look Neapolitan, but if you ask pizzaiolo Susumu Kakinuma, he insists otherwise. It's his own personal style, he told us. He has a point. The pizzeria is decorated with a Jules Verne motif. Beatles music plays on a continuous loop. As for the pizza, Kakinuma is self-taught. He says his awakening came in the 1980s on a visit to Italy. He went back later in the hopes of studying the craft of the pizzaiolo but said no one would take on a foreigner as an apprentice, so he learned by eating.

Back in Tokyo, he worked first at Savoy and then left to open Seirinkan. After more than a quarter century in front of the oven, he's considered a godfather of the Neapolitan pizza scene in Tokyo. He makes every pizza,

every shift, 365 days a year, using a blend of Japanese and Italian tomatoes and Japanese flour. Dough is cold-proofed for up to 3 days. Though he told us he sees pizza as equal parts dough, sauce, and cheese, in practice he's a minimalist: just a circle of crushed tomatoes in the center, a sprinkling of Italian fior di latte mozzarella, a handful of basil leaves, and some sliced garlic, leaving a fair amount of the surface bare. He likens pizza to sushi, in that the goal is to pull the inherent flavor from each ingredient. After anointing each pizza liberally with oil, he tosses some salt into the wood-fired yet very un-Italian-looking oven and bakes the pizza for up to 3 minutes. The pizzas come out looking spare but lovely. We considered Seirinkan to be one of the two best pizzerias we visited in Tokyo. Kakinuma himself manages to mix traditionalism and a unique character.



The Kitchen Salvatore Cuomo Ginza

For decades, Salvatore Cuomo (pictured bottom left, on the right) has been a sort of king of Italian food in Japan as well as a celebrity whose company is listed on the Tokyo stock exchange. Born in 1972 to a Japanese mother and Italian father, he moved with his family from Naples to Japan as a kid when his dad opened an Italian restaurant in Tokyo. None too enamored of the city, he returned to Naples for culinary school. After that, Cuomo embarked on what would become a wildly successful restaurant career, which today numbers around 80 restaurants and pizzerias in Asia.

The restaurants are Italian but also feature local ingredients inspired by Japanese culture. Cuomo calls his approach “the traditional Italian art of cooking with the Japanese art of perfection.” His margherita wouldn’t be out of place in Naples. But the offerings also include distinctly Japanese twists, including one pizza we tried with Iwanori, a green river algae, and nama shirasu, tiny raw Japanese fish. The dough was traditionally Neapolitan, the toppings were high quality, and the flavor combinations were the product of a chef’s mind. Some of his pizzaioli have won pizza-making competitions in Naples. There are additional dishes on the menu, including pasta, fish, and pork chops.





NEW YORK

Times Square, one of the busiest tourist destinations in New York City (and the world), is known for its brightly lit billboards and thrumming crowds. It was named in 1904 for the *New York Times* when their offices moved to the area.

We didn't expect too many big revelations on our tour of New York pizzerias. We'd all been there many times before, of course, and had plenty of pizza. In preparation for this trip, we'd done plenty of research. Yet there were several notable surprises, proving once again that our pizza-tasting trip around the globe was worthwhile.

We'll start with what we knew going in—or, rather, what we thought we knew: New York-style pizza is the stuff of legend. The pizzaioli live by high-minded principles. They find honor and inspiration in the city's history. New York is often said to be the location of the first pizzeria in the United States (see page 29); several families here have carried that

history forward, and they've been making quality pizza here for perhaps a century.

That's the story, anyway. The problem is, the reality tends to run afoul of the high-minded principles. (Moreover, some of the stories turned out to be dubious, see pages 31 and 32.) The reality is, New York pizza started off as a street food and has remained a street food in that slice shops are everywhere. The way the slice business works is, you bake a bunch of whole pizzas, put them in a case, and reheat slices for each customer. As you might imagine, the pizza tends to lose something along the way. It's cheap food, made with cheap ingredients, and a huge amount of pizza culture here has been



informed by the idea of the slice, which imposes certain constraints. Witness the rise of New York's 99-cent slice joints, which started springing up during the 2008 recession. More than a decade later, it's still a thriving business model. We sampled a few for curiosity's sake, and, well, we got exactly what we paid for: cheap commodity pizza.

As for the historic pizzerias, they get a lot of press coverage, but we found most of their pizza to be lackluster at best. Some were downright bad. Yes, we know we're going to take some heat for that, but part of our mission here is myth busting, and to say otherwise wouldn't be honest. We had a similar experience in New Haven (see page 228). In both cases, we attribute this, in part, to cost pressures that have undoubtedly led to using cheaper ingredients.

It's also about pressure from customers *and* from within to just keep doing things the same way they've always been done. In our view, if you're not reevaluating, you're going to be left behind by those who are.

We found much better pizza in another kind of New York niche: modern pizzerias trying to act like they're old-school. When done right, the model works. That's how Best Pizza and Paulie Gee's Slice Shop position themselves, and both served some very good slices.

To be sure, we also found other very good pizzerias in New York—mostly in Brooklyn. And—gasp!—New Jersey. Actually, Razza, in Jersey City, served the best pizza we've tasted.



NEW YORK BY THE NUMBERS

36 pizzerias visited

Most popular styles of pizza:
New York, New York square

Most popular toppings:
pepperoni, sausage,
mushrooms

Unique set of toppings:
Gorgonzola cheese,
Parmesan, Bing cherries,
arugula

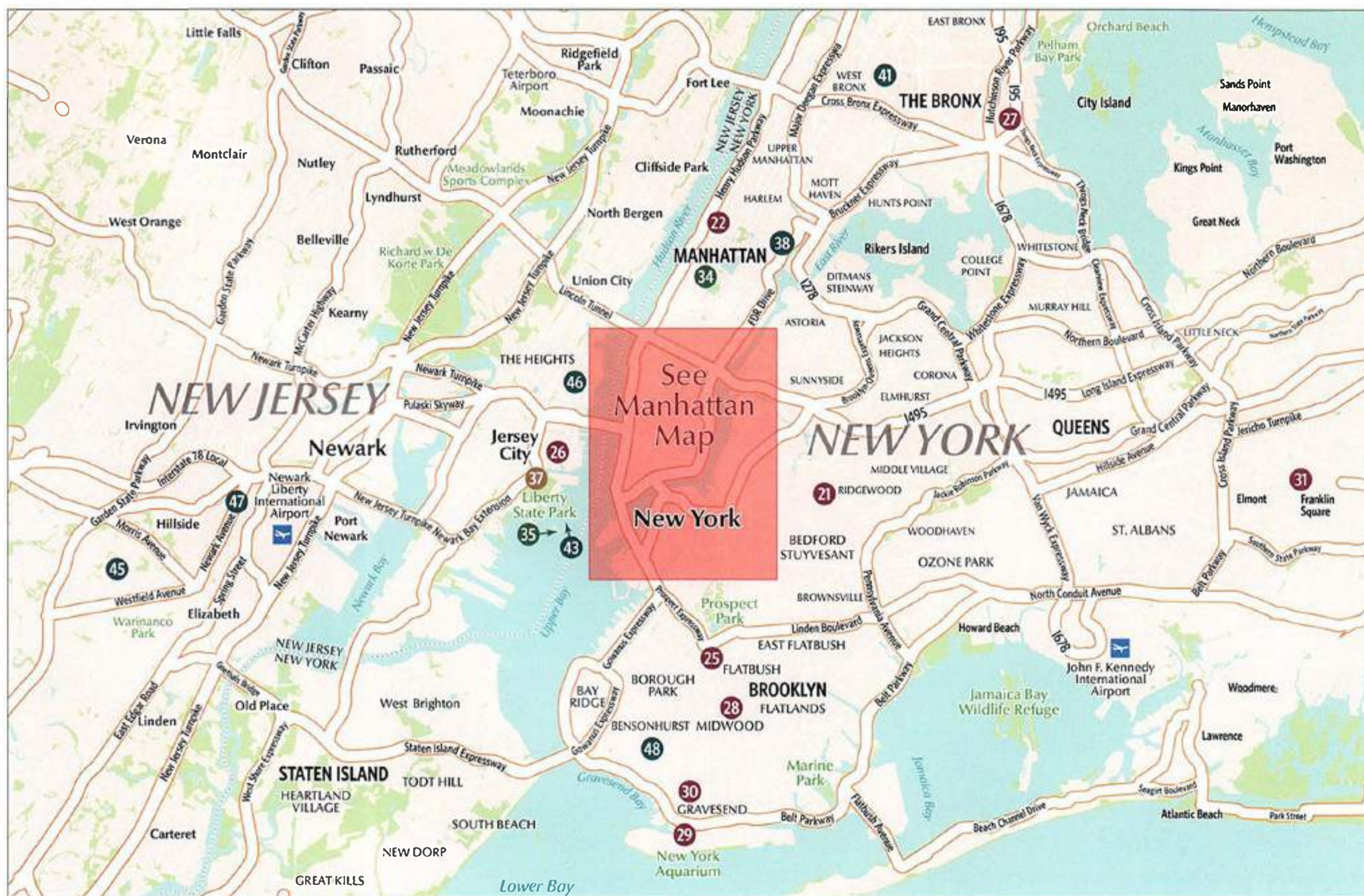
9,000+ pizzerias in New York
state

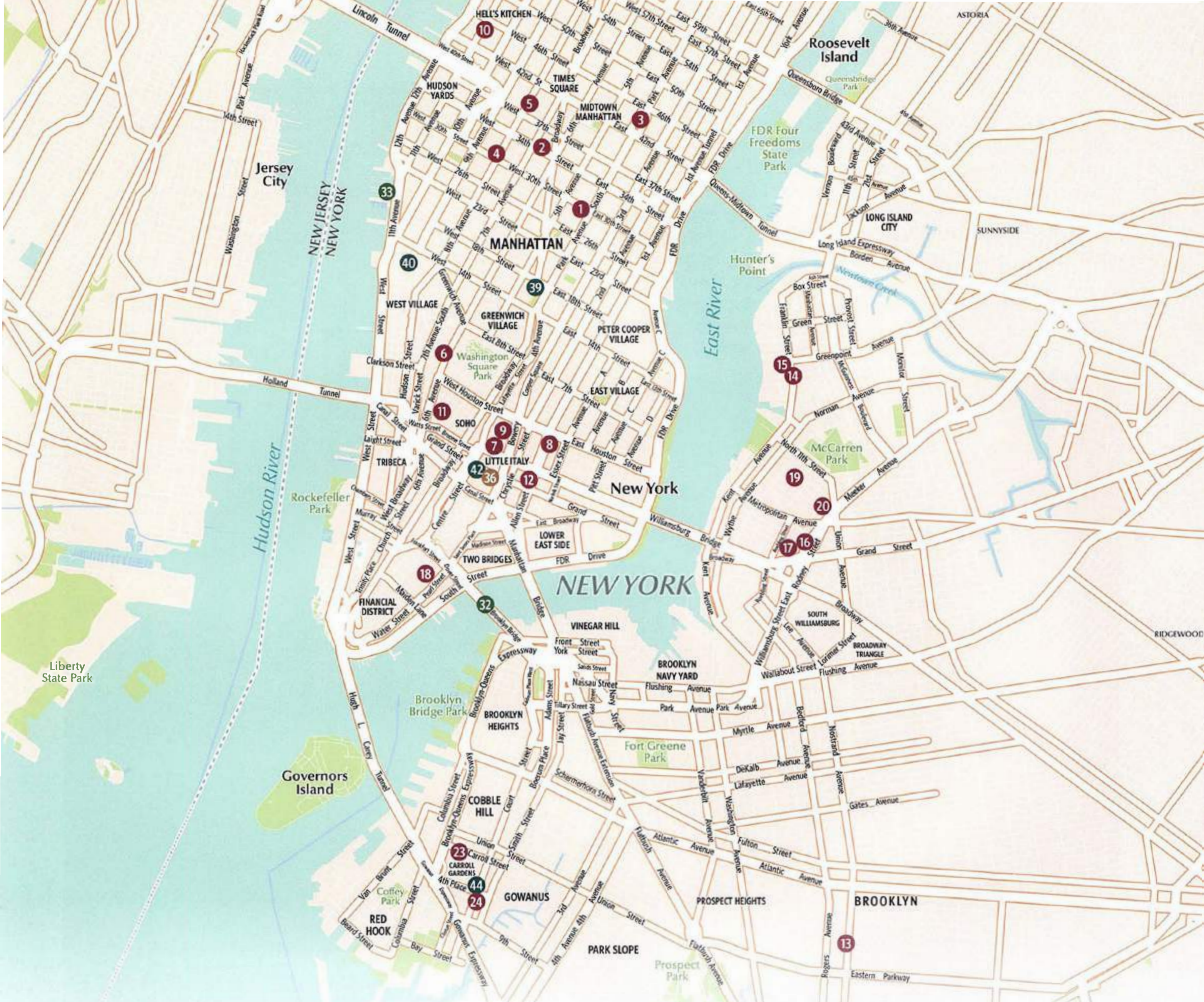
Home of Slice Out Hunger
festival (every October in
NYC)

Home of New York Pizza
Festival (every October in
the Bronx)

KEY TAKEAWAYS

- The best pizza in New York wasn't New York-style pizza. We found some great Neapolitan style (Kesté, Una Pizza Napoletana), artisan (Razza, Lucali, Ops, L'Industrie Pizzeria), Detroit style (Emmy Squared, which was better than any pizza we had in Detroit), and one complete outlier, the ultra-thin-crust pizza at Marta. What we didn't find in abundance was strikingly good New York-style pizza.
- We searched all over New York for Sicilian-style pizza, which we'd seen described as thick-crust, light, and airy. Guess what: it doesn't exist, not even at the purported best Sicilian pizzerias.
- Wait, so what *are* they serving at the Sicilian-style pizzerias? They're mostly using the same crust that's used for thin-crust offerings, rolling it a little bit thicker, putting it into the bottom of a pan, baking it, and then slicing it into squares. A different shape does not constitute a separate pizza style. The same goes for what's been called grandma style. We call Sicilian and grandma pizzas pseudo-styles, a term we also use for so-called Roman pizza (see page 107). For more, including how Sicilian pizza is like a unicorn, see page 101.
- We'll harp on Sicilian and grandma pizzas just one more time here to say almost all the samples we tried were gummy, marred by a partially cooked gel layer. Not good. We solved that problem with our New York square pizza recipe on page 3:133.
- There was no real diversity of sauces or cheese in traditional New York pizzerias, only different brands of tomatoes and fresh or low-moisture mozzarella.
- The historic pizzerias served some of the worst pizza on our trip in both New York and New Haven. In part, we wonder whether these pizzerias are trapped by the notion of doing things as they've always done them, and also catering to customers who want the same exact pizza every time they visit.
- We were interested to see such good camaraderie here among some of the pizzaioli. Several mentioned how they hang out and talk shop with each other. Some of them even dine at each other's establishments. New York is obviously a competitive environment, but there's a friendliness here we didn't see many other places. With us, however, they were a bit cagier than pizzaioli elsewhere about sharing their dough recipes.





NEW YORK

PIZZERIAS*

1. Marta (see page 222)
2. Stella 34 Trattoria & Bar
3. Naples 45 Ristorante e Pizzeria
4. NY Pizza Suprema
5. Upside Pizza
6. Joe's Pizza (see page 219)
7. Lombardi's (see page 227)
8. Una Pizza Napoletana (see page 226)
9. Prince Street Pizza
10. Corner Slice
11. Famous Ben's Pizza
12. Williamsburg Pizza (see page 220)
13. Brooklyn Pizza Crew (see page 220)
14. Paulie Gee's Slice Shop (see page 224)
15. Paulie Gee's (see page 224)
16. Emmy Squared (see page 222)
17. L'Industrie Pizzeria (see page 222)
18. Kesté (see page 220)
19. Vinnie's Pizzeria
20. Best Pizza (see page 218)
21. Ops (see page 223)
22. Mama's TOO!
23. Lucali (see page 221)
24. F&F Pizzeria
25. Wheated
26. Razza (see page 225)
27. Louie & Ernie's (see page 227)
28. Di Fara (see page 227)
29. Totonno's Pizzeria Napolitano

30. L&B Spumoni Gardens (see page 227)
31. King Umberto (see page 227)

NOT TO BE MISSED

32. Brooklyn Bridge
33. The High Line
34. American Museum of Natural History
35. Statue of Liberty

WORTH SEEING

36. Cannoli King at Caffé Palermo
37. Liberty Science Center

PIZZA RELATED

38. Milone Trail
39. Union Square Greenmarket
40. Chelsea Market
41. Arthur Avenue Market
42. Little Italy
43. Ellis Island Immigration Museum
44. Caputo's Fine Foods
45. Lioni Latticini, Inc.
46. Fiore's
47. Antonio Mozzarella Factory
48. Frank and Sal Prime Meats

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

**We reached out to Roberta's, Patsy's Pizzeria, John's of Bleecker Street, and Scarr's Pizza (and ate there) but did not receive permission to photograph and interview staff, so they are not included here.*

Best Pizza

Yes, Frank Pinello (pictured below), the host of *The Pizza Show* on Vice from 2016–2018, calls his place Best Pizza. And on paper, he certainly has the right credentials: he learned Italian cooking from his Sicilian grandmother, then went on to study at the Culinary Institute of America. His Best Pizza, opened in 2010, has a great story, too: Pinello aimed to create the kind of slice shop he remembers from his Brooklyn childhood, serving pizza made with quality ingredients by people who'd devoted their lives to the craft. In other words, it's one of those modern pizzerias trying to act old-school.

Turns out the story holds up in real life. Best Pizza serves very good slices and whole pizzas, including a white pizza with ricotta, caramelized

onion, and pecorino, with a sesame seed-studded crust (pictured below). Not only do the seeds work, they're a nod to sesame-studded cookies from Sicily. The mozzarella is made from curds.

Pinello got early backing from Roberta's, another Brooklyn hot spot. *The Pizza Show* has made him a recognizable figure, with his thick New York accent and backwards baseball cap. He's also traveled to such far-flung destinations as Kuwait and Hong Kong as a professional pizza consultant. He says his dream is to run the kind of neighborhood pizzeria that people return to decade after decade because it reminds them of all the best parts about home.





Joe's Pizza (50)^{NA #21}

This is an old-school place with few frills but plenty of its own kind of charm. You can get regular New York-style slices or square slices (pictured below), which are mostly what we came in search of. After being disappointed by several of New York's best-known purveyors of square, so-called Sicilian pizza, we finally found one we liked. Joe's thick squares are made using the same dough as their regular New York-style slices, but the square pizza is parbaked in a sheet pan—which is probably why it doesn't suffer from the gel layer we found in so many of the other examples of this style. The sauce is tomatoes pureed with an immersion blender. The mozzarella is Grande brand low-moisture.

Opened in 1975 by Pino "Joe" Pozzuoli, an immigrant from Naples, it started out as a late-night pizza joint for the nearby clubs. Joe's has since become a Greenwich Village institution, although it's moved a few doors down from its original location. It's still family owned, with Joe's grandchildren now in charge. You can buy whole pizzas here, but it's mostly sold by the slice. "You can ask for a topping," restaurant critic Alan Richman wrote, "but then everybody in the tiny, cramped shop will know you're from out of town." There are now five locations in New York and one in Shanghai, each one run by a family member.



Williamsburg Pizza; Brooklyn Pizza Crew

It used to be that restaurants would open in Manhattan, then think about opening second locations in Brooklyn. Williamsburg Pizza did the opposite, starting out in the now-trendy Williamsburg neighborhood, then branching out to other locations, including three in Manhattan and one in Crown Heights, Brooklyn, called Brooklyn Pizza Crew.

Award-winning pizzaiolo Nino Coniglio (pictured below) has honors ranging from winner of Food Network's *Chopped* to Pizza Maker of the Year at the International Pizza Expo in Las Vegas. His experience includes an apprenticeship at Domenico DeMarco's legendary Di Fara in Brooklyn. Owner of Williamsburg Pizza, Brooklyn Pizza Crew, and The Woodstock NYC, Coniglio has taken on a new venture in Greenport with Pizzeria Baccano. He believes pizza to be the great

unifier and takes pride in bringing the best product using the highest quality ingredients.

On our visit, Coniglio was a chatty host who's genuinely interested in the science of dough. He also shared his dough recipe with us. His pizzerias have an old-school look, with paper plates, basic décor, and striped awnings, despite their relatively short history, and Coniglio has focused energy on recreating what he sees as the vaunted slices of yore. We tried Manhattan and Brooklyn locations and are happy to report they serve very good New York-style slices. You can also order whole pizzas here—either choose-your-own toppings or menu items such as a margherita (pictured below) or some more unusual combinations such as a pizza with bacon, smoked mozzarella, walnuts, apples, and gorgonzola.



Kesté (50) NA #28

New York has a number of restaurants serving Neapolitan-style pizza, but none with the standing of Kesté, run by the father-daughter team of Roberto and Giorgia Caporuscio. The elder Caporuscio was raised on a dairy farm in Italy and worked as a cheese maker before embarking on his pizza career. He studied in Naples, including under Antonio Starita (see page 166), then immigrated to the United States, opening pizzerias in Pennsylvania, New Jersey, and finally in New York's Greenwich Village, where he founded Kesté in 2009. Giorgia, also born in Italy, first learned from her father and has gone on to become a skilled pizzaiola in her own right. In 2013, while in her twenties, she became the second woman to win first place at the Caputo Cup Pizza Competition in Naples in the "Classic Pizza" category. The winning entry was pizza montanara (pictured left), a take on the fried pizza traditionally made by women and sold in the streets of Naples.

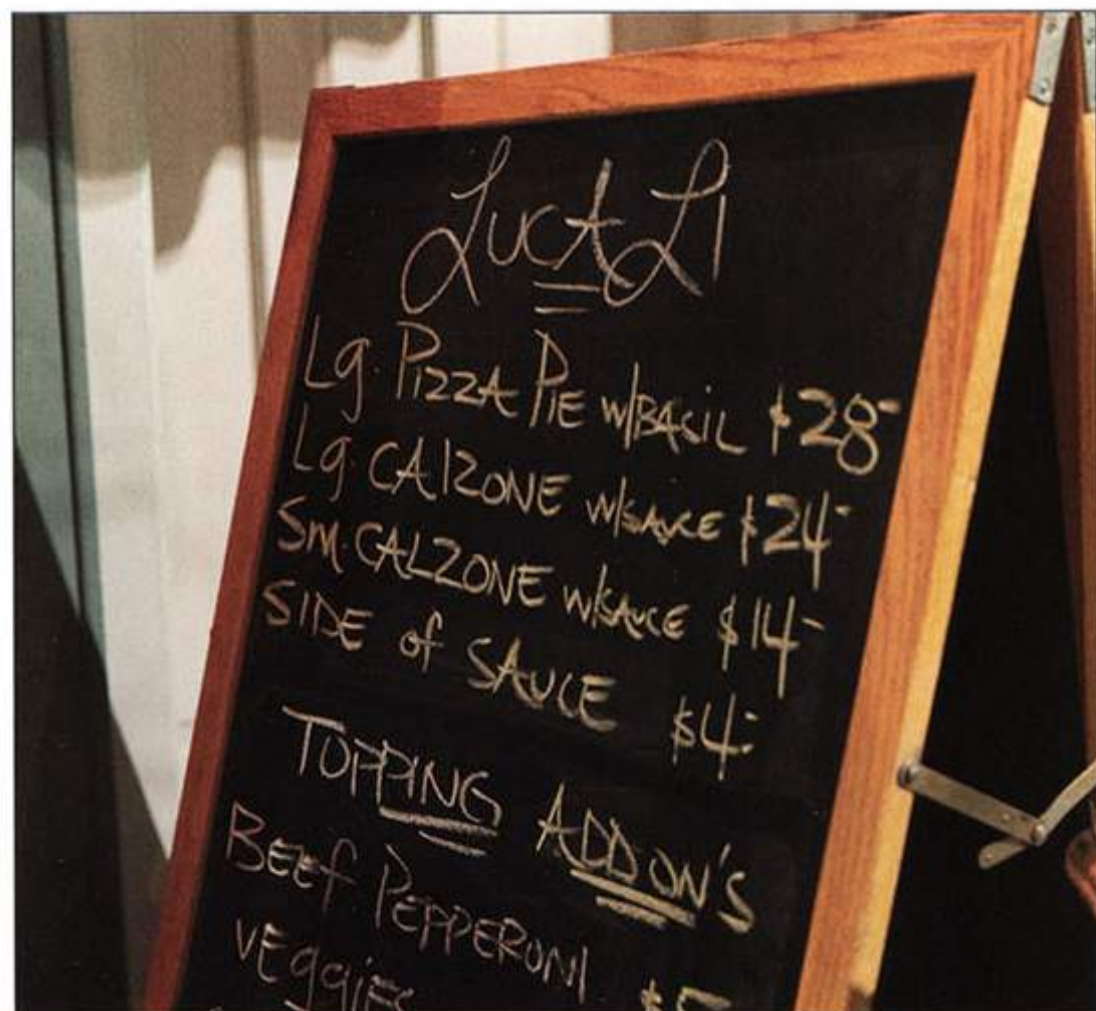
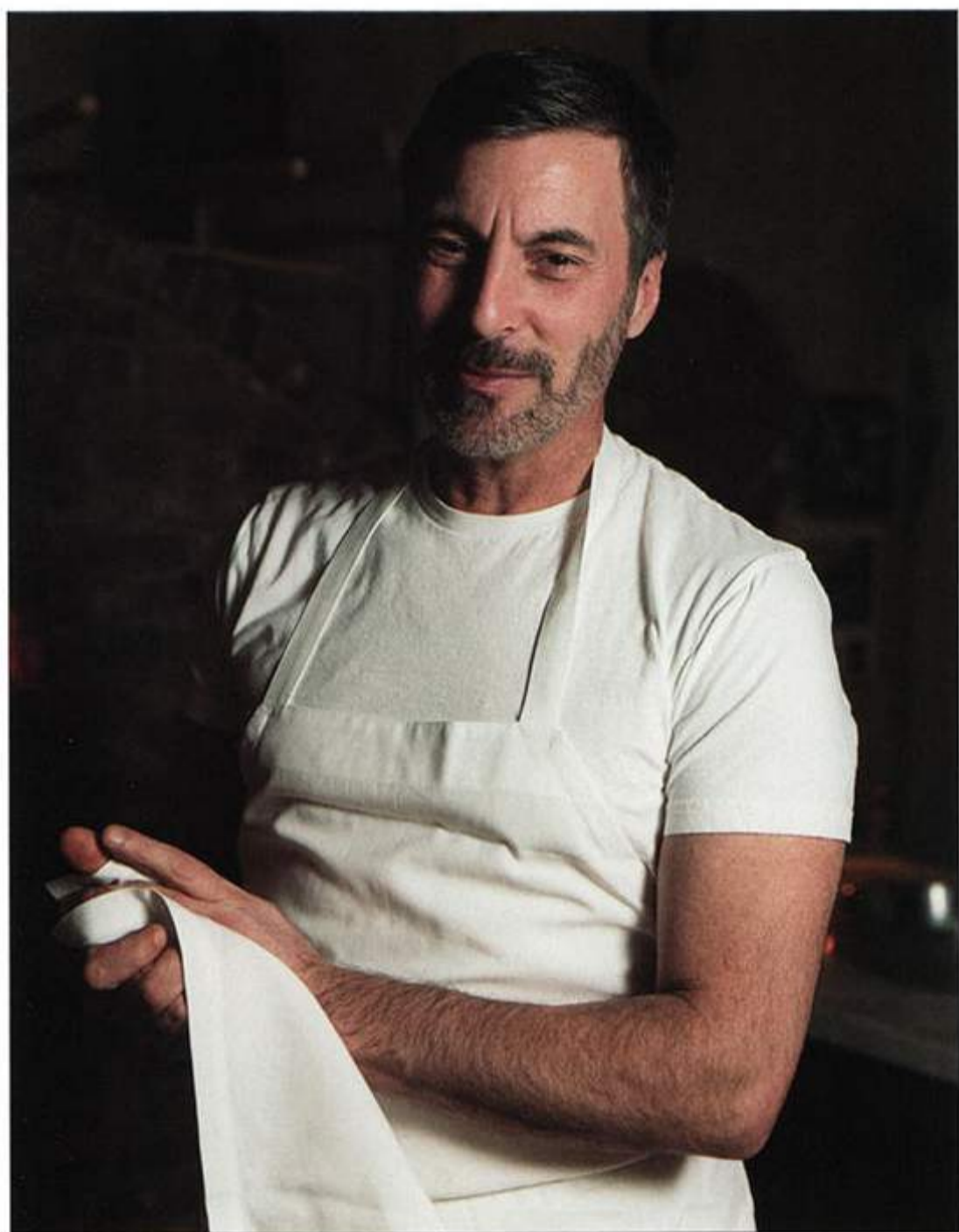
On our visit, we sampled a montanara, made by first frying the dough, then baking it topped with tomato sauce, imported smoked mozzarella di bufala, and fresh basil. Overall, Kesté's Neapolitan style was very much like what we had in Naples. There are now three Kesté locations in New York. In 2012, the Caporuscios partnered with Starita to open Don Antonio in New York, another Neapolitan-style pizzeria. They also run a serious pizza training school, with every kind of oven you can imagine.

Lucali 50^{NA #3}

Lucali is an interesting contradiction. Proprietor Mark Iacono (pictured below) reveres traditional New York pizza and the old-school pizzerias that made this a pizza town, and that's how he positions Lucali. But that's not really what Lucali is. (For one thing, we're not sure there ever was a golden age of New York pizza.) Instead, Iacono makes great artisan-style pizza informed by his New York roots, but the pizzas are his own uniquely personal creation. Iacono, a former stonemason, decided to open a pizzeria with no experience at all. He makes superb pizza at a candlelit marble table as diners watch in reverence "as if sitting in church . . . in the presence of a kind of sacrament," the *New York Times's* Sam Sifton wrote.

Part of the charm is the seeming simplicity, including a wine-bottle rolling pin (born, he said, of the fact that especially in the early days, the dough was too stiff to stretch, and he didn't have time to wait for his brother to run over with Grandma's rolling pin). The restaurant is simple

but beautiful, with a patina and a personality you just can't buy. The oven is gas but has a compartment for wood because customers like to see the flames. The basement kitchen was immaculate compared to what we saw in the kitchens of other pizzerias. Iacono's earnestness apparently extends to staff, who take the same perfectionist pride in their craft as he does. Iacono graciously shared his approach with us but said he didn't actually have a recipe. They take a bag of flour, fill a bucket up to a certain line with water, and mix. But it works. We were smitten by the pepperoni pizza with shallots, tomato sauce, fresh mozzarella, mozzarella di bufala, fresh basil, and Parmesan (pictured below). The only problem is the place is so darn popular. To have any chance, the website says to show up *before* five, put your name on a list, and find a way to kill time elsewhere. They'll call when a table's ready. Iacono also has a fun pizza show, *Really Dough?*, an original video series by Thrillist, with tour guide and pizza enthusiast Scott Wiener (see page 153).





Emmy Squared

Emmy Squared (like Ops, see next page) is probably better understood as an interesting restaurant opened by talented young partners than as a pizzeria, per se. Emily and Matt Hyland serve rectangular pizzas that are a take on Detroit style. Emmy Squared is also known for its pretzel-bun burgers and chicken Parmesan sandwiches. They use a very simple dough formula, but also have a careful, technical approach to each step of the process. When we tried the pizza—including one called The Emmy (pictured above), with pickled banana peppers, red onions, homemade ranch dressing, and a side of tomato sauce—we were impressed. It came out on a simple metal tray but looked very appealing, with a perfectly crispy outer rim. Cutting into the pizza, we saw a great crumb structure, and the flavors were spot-on.

The experience brought to mind a *New York Times* article about Razza (see page 225) that argued New York's best pizza was actually in New Jersey. Similarly, we think the best Detroit-style pizza isn't in Detroit; instead, it's here, or at Paulie Gee's in Chicago (see page 244), or, even better still, at Apollonia's Pizzeria in Los Angeles (see page 263). There are three Emmy Squared locations in New York, two in Nashville, one in Louisville, one in Philadelphia, and one in Washington, DC. The Hylands also run the pizzeria Emily in New York, which has two locations.

Marta

Marta is part of super-restaurateur Danny Meyer's Union Square Hospitality Group and is the only pizzeria in the bunch. The pizza is billed as Roman style, but it's nothing like what we had in Rome (see page 168). It's ridiculously thin, along the lines of the best pizza in São Paulo (see page 190), and it's remarkably good. Meyer, who was raised in a reform Jewish family in St. Louis, has gravitated to Italian cuisine and told us the pizza was inspired by Da Remo (see page 107). Run by executive chef Lena Ciardullo, Marta feels truly original, and one reason we like it is it doesn't conform to some tired old standard.

L'Industrie Pizzeria

Owner Massimo Laveglia came to the United States from Florence, Italy, and worked in several restaurants before opening L'Industrie. (The somewhat incongruous name was already on the sign out front, and Laveglia told us a new sign was expensive.) This tiny Brooklyn joint wins our best-pizza-per-square-foot-of-restaurant-space prize. They're so small we had to do our photo shoot outside under an awning in the rain. L'Industrie makes excellent crisp-crust pizza, both round and square. The style is hard to classify, somewhere between artisan and Rest-of-Italy Neapolitan, with a little bit of New York vernacular thrown in by virtue of the fact that they focus on takeaway slices. There is, after all, no place to sit down.

We enjoyed a light, round pizza (pictured above) with burrata, tomato sauce, Parmesan, and fresh basil, and another excellent square pizza with mozzarella di bufala, tomato sauce, Parmesan, and fresh basil baked on dough made with a biga starter. We considered the idea of befriending someone in the neighborhood just so we could order fresh, hot, whole pizzas to eat on a nearby stoop.



Ops 50^{NA #26}

Ops is a terrific pizzeria that is also an elegant restaurant with a patina of Bushwick, Brooklyn, hipster. As for the name, we thought we knew our classical mythology but the goddess Ops had somehow slipped past our radar. A Roman deity symbolizing fertility and plenty, Ops is related to "opulent," and "opus" means "work" or "plenty," and "the harvest." She's often symbolized by bread, seeds, and soil.

Ops, the restaurant, serves excellent artisan-style pizza featuring a levain-raised crust (unusual in New York). The menu is short and sweet.

In addition to the basic marinara and margherita, plus what they call a "square pie," there are some more interesting offerings: Juno, with broccoli rabe, potatoes, provola, and ricotta salata; Cicero, with "many onions," sharp provolone, mozzarella, and preserved tomato; and a pizza called Pops (pictured below), with house-made mozzarella, guanciale, onions, and pecorino. The oven is wood-fired. The restaurant was started in 2016 by alumni of Andrew Tarlow's Brooklyn restaurant juggernaut that helped turn this outer borough into a foodie destination.



Paulie Gee's Slice Shop ⑤0^{NA}#18; Paulie Gee's

There are two Paulie Gee's locations in Brooklyn, and they are quite different places. The first, opened in 2010, is a sit-down restaurant serving Neapolitan-style pizza, complete with candlelight and waiters and the feel of a wine cellar. It's something of a destination and waits for a table can be long, but they didn't do takeout so customers were stuck. Proprietor Paul Giannone, a former IT professional uninspired by his job who followed his dream to open a world-class pizzeria, worked hard to remedy that, opening a second location just around the corner for takeout and slices. For this operation, he had a specific idea in mind: old-school New York pizza. It's decorated with secondhand orange booths and scads of old memorabilia. In other words, it's a new pizzeria masquerading as old-school. And the slices are excellent, far exceeding

any of the slices from the actual old-school pizzerias we tried. Even the square, "Sicilian-style" slice (see page 101) was good because, unlike most, it didn't have a gummy gel layer.

Part of the Paulie Gee's shtick is the pizzas have funny names. There's Hellboy (pictured below), with tomatoes, mozzarella, pepperoni, and a drizzle of hot honey; Ricotta Be Kiddin' Me, with fresh mozzarella, Canadian bacon, fennel sausage, fresh basil, and "post-oven fresh ricotta dollops"; and Better Off Fed, with broccoli rabe and roast pork from another Brooklyn joint called Federoff's, which specializes in Italian-meets-Philly-style sandwiches. The menu also includes a long list of vegan pizzas. There are also Paulie Gee's restaurants in Columbus, Ohio; Baltimore, Maryland; and Chicago, Illinois.





Razza 50^{NA #1}

Not long after we sat down at Razza in Jersey City, New Jersey, a course of bread and butter arrived at our table. Bread and butter? Who eats bread and butter before pizza? And then we tasted the bread. It is astoundingly good, made from a levain starter, served warm with homemade cultured butter, and was the perfect way to start the meal. Dan Richer (pictured above right) is a New Jersey native who made a beeline for Italy after graduating from Rutgers University. It must have made an impression on him. His wood-oven pizza is also astoundingly good. It's crispy and brown with carefully selected toppings. We tried one with burrata, tomato sauce, garlic, and fresh basil on a levain-raised crust, and a margherita with handmade fresh mozzarella on a yeast-raised crust.

As we watched the work in the kitchen, we saw a meticulous attention to detail that was unmatched in all of the other pizzerias we visited. Richer later showed us his elaborate procedure manual that the kitchen line must follow, with certain rubrics that must be met. No wonder the *New York Times* said that New York's best pizza could be found here, in New Jersey. Jersey City is part of the PATH transit system that connects to the subway in New York City. It's sometimes easier to get from Jersey City to Manhattan than from the other boroughs to Manhattan. See page 3:222 for our recipe for Il Porco Pizza, inspired by Dan Richer.



Una Pizza Napoletana 50^{NA}#6

LISTED IN GAMBERO ROSSO'S BEST ITALIAN PIZZAS IN THE WORLD

Owner and New Jersey native Anthony Mangieri (pictured above) opened his first pizzeria on the Jersey Shore, shut that down and opened in New York, shut that down and opened in San Francisco, then, in 2018, moved back to New York (he also recently opened another pizzeria in Atlantic Highlands, NJ). This was the only pizzeria outside of Italy we tried that was making canotto-style (or lifeboat) pizzas, with huge, puffy rims, that are a new trend in Italy (see page 135). It appears Mangieri's crusts have evolved over the years to reach this point; in his earlier establishments, the pizza looked like much more traditional Neapolitan.

Its location at the edge of touristy Little Italy is a strange choice for a restaurant that offers an authentic artisan experience nothing like the tourist traps down the block. The twist here is he doesn't use any commercial yeast; it's all made with sourdough starter. Mangieri was happy to share information with us but explained that his dough changes every day and can involve mixing several different flours to the result he wants. We tried a margherita, a marinara, and an Ilaria pizza (pictured left), named for his wife, that featured smoked mozzarella, fresh cherry tomatoes, and arugula and was a lovely combination. Minimalism is the name of the game here. There are five pizzas on the regular menu, with one additional option added on Friday and another on Saturday. We respect the fact that substitutions are prohibited. The desserts are an extra bonus. Wonderful gelato, made by one of Mangieri's business partners, chef Fabián von Hauske Valtierra, comes out in a frosty stainless steel cup shaped like a champagne coupe.

Historic Pizzerias

DI FARA (50) NA #8

Di Fara is one of the places that prompted quite a bit of soul searching for us. People make pilgrimages to eat pizza made by the legendary Domenico DeMarco. Now in his 80s, he's manned the oven since 1964. He has a reputation for being meticulous. We really wanted to like Di Fara's pizza, too, but we felt it didn't compare to so many others we tried.



KING UMBERTO

This huge and popular Long Island pizzeria cranks out New York-style pizzas that are better than those at most of the famous pizzerias. We went there because it's well documented as the home of grandma-style pizza (see page 101). Under the original pizzaiolo's son, Giovanni, they are making even more artisanal pizzas, including their take on pizza a metro (pictured below).



L&B SPUMONI GARDENS

The pizzeria was founded by Ludovico Barbati, who began peddling pizza from a horse and wagon around 1938, then built a successful spumoni factory before opening the pizzeria. The Barbati family still runs the business and added a second location. It's best known for its thick-crust, square-cut "Sicilian" pizza (pictured below), but this version suffered from the flaws discussed on page 114.



LOMBARDI'S

Lombardi's is a decades-old institution, and it's long claimed to be the first pizzeria in the United States. Turns out the story has some holes (see page 32), yet that claim to fame is one reason it draws huge crowds of hungry tourists.



LOUIE & ERNIE'S

The Pelham Bay section of the Bronx has been home to Louie & Ernie's since 1959. This pizzeria, originally founded 12 years earlier in Harlem by Italian brothers named Louie and Ernie Ottuso, is run out of a converted house in a residential neighborhood full of low-rise duplexes. In the 1980s, former employees took it over, and it serves mostly neighborhood patrons.



NEW HAVEN

In all our travels, New Haven was one of our biggest surprises. Unfortunately, it wasn't a good surprise.

Before our trip, we'd heard plenty of raves about this unique pizza style. We'd seen several of the city's pizzerias on "best pizza in America" lists, stretching from the present back to at least 1999. (For more on what we think of "best of" lists, see page 152.) We'd also heard intriguing stories about the history of this pizza (see page 48) from a local expert, our pizza tour guide Colin Caplan. Only some of us had sampled New Haven pizza before, so we were eager to give it a try. And each of us was disappointed by the experience.

While New Haven-style pizza sounds great on paper, we found it has some serious flaws in the execution. It's characterized by a dough that produces a crust that is dry and dense, almost like hardtack. To compound matters, it's charred to the point of being burnt. (At one pizzeria, the manager insisted on sending back to the kitchen what looked to be a perfectly baked pizza, saying it needed more time in the oven.) The dough is also very low on salt. Our palates told us this, and our tasting notes were confirmed by a recipe that one pizzeria shared with us.

We didn't find these characteristics at just one place; this, apparently, is the way New Haven pizza is intended to be, the way it's served in most of its world-famous pizzerias. Zuppardi's Apizza and Ernie's Pizzeria are partial exceptions, which we'll describe more.

For the most part, the presentation wasn't up to modern standards, either: lackluster sauce, toppings tossed on haphazardly, and a paltry grating of Pecorino.

We've thought a lot about this experience. Were we simply feeling a letdown after all the New Haven hype? We don't think so. Was the pizza better in the past? Perhaps, though it's a point of pride among the New Haven crowd to insist that the recipes have never changed. Have we just grown accustomed to the pizza we eat regularly? Or is something more emotional at work, a kind of passion for the pizza one grew up with? We think it's the latter. We see the love of pizza as somewhat akin to the love a die-hard sports fan has for his or her favorite team. That passion is always there, whether they're winning the World Series or deep into a losing streak.

We know denizens of the Elm City take their pizza very seriously, and we're pretty sure some are going to be outraged by our view. But when we started on this journey, we promised we would tell it like it is, no matter what. So we'll just say it plainly: in all of our travels, we found some of the worst pizzas in New Haven. However, we also had an important insight here. The connection back to Naples is both strong and deep (see page 49). We have come to believe that the pizza here may be the closest in style to the ancestral pizza sold on Naples's cobblestone streets 150 years ago. Which is actually pretty cool.

The coal-fired brick oven at Frank Pepe Pizzeria Napoletana, which helps produce the signature char on the crust of the pizza, burns at around 315°C / 600°F. The oven originally burned on coke, which is a type of coal.



KEY TAKEAWAYS

- New Haven pizza is a style that's characterized by a thin, dense, and dry crust, made with little salt. And then cooked to the point of being burnt. In our view, not a good combination.
- Several of the historic pizzerias use coal ovens—a throwback to the days when New England produced coke, a type of coal—and the pizzas come out with a significant char.
- The oldest of the major pizzerias started in 1923. The youngest of the famous ones started in 1971. Other than the introduction of clams in the 1960s, this style of pizza has been pretty static. We came away convinced that New Haven pizza may be the closest in style to the original pizza served in 19th-century Naples (see page 39). We also found a lot of similarities with the pizza served in Buenos Aires (see page 200).
- Even today, you'll find people clinging to the wildly mistaken notion that pizza was invented here by an Italian immigrant named Pepe.
- One delightful surprise: clam pizza! We thought clams would turn to rubber in a roaring hot oven. The ones we tried didn't. Clam pizza is one great New Haven invention. (Only two of the places we tried used fresh-shucked clams and we suggest you stick with them. Canned clams just aren't the same.)
- The pizza culture here is both strong and unique, with its own language. Instead of pizza, it's apizza (pronounced "uh-BEETz"), a holdover from the Neapolitan dialect (see page 51). If you order a "plain," your pizza will not have mozzarella. Grated pecorino Romano is the cheese of choice, but it doesn't make for a cheesy pizza. A plain pizza in New Haven is much more like a marinara pizza with a sprinkle of cheese.
- Sally's Apizza and Frank Pepe Pizzeria Napoletana, which often make the "best pizzeria" lists, were our least favorite of the New Haven pizzerias we visited.

NEW HAVEN BY THE NUMBERS

6 pizzerias visited

4 pizzerias named after owners

Most popular style of pizza:
New Haven

Popular pizzas: white clam;
tomato pie

Home of Apizza Feast festival
(every September)

Wooster Square, also known as Little Italy and named for Revolutionary War general David Wooster, is one of New Haven's cultural hubs. It's known for its pizza, Italian pastries, and a farmers' market.





NEW HAVEN

PIZZERIAS*

1. Frank Pepe Pizzeria Napoletana and The Spot (see next page)
2. Modern Apizza (see page 232)
3. Zuppardi's Apizza (see page 233)
4. Ernie's Pizzeria (see next page)

PIZZA RELATED

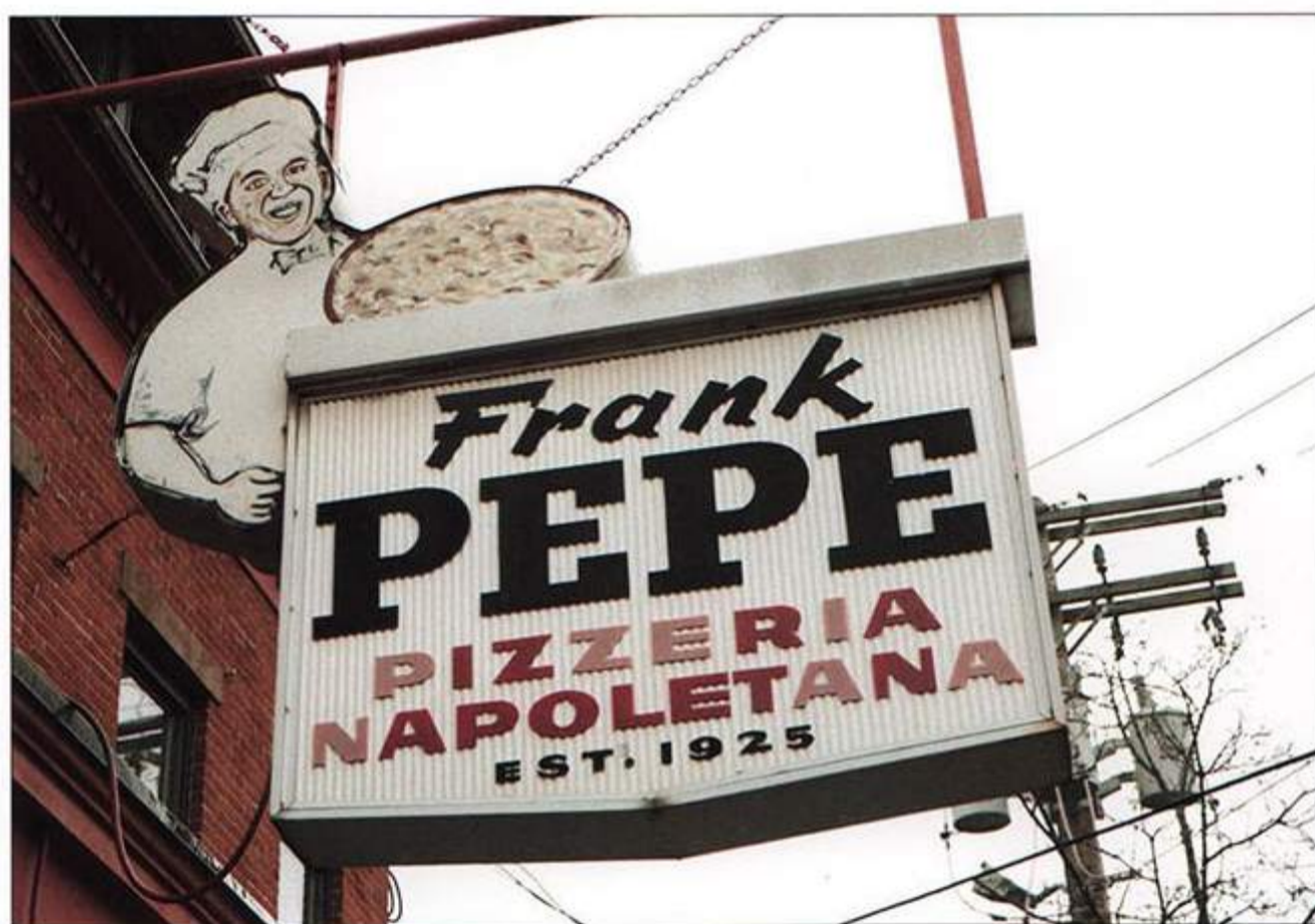
5. Wooster Street
6. Strouse, Adler Corset Company
7. New Haven Wooster Square Farmers' Market
8. Sargent Manufacturing Company headquarters

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

**We reached out to Sally's Apizza and BAR (and ate there) but did not receive permission to photograph and interview staff, so they are not featured in the following pages.*

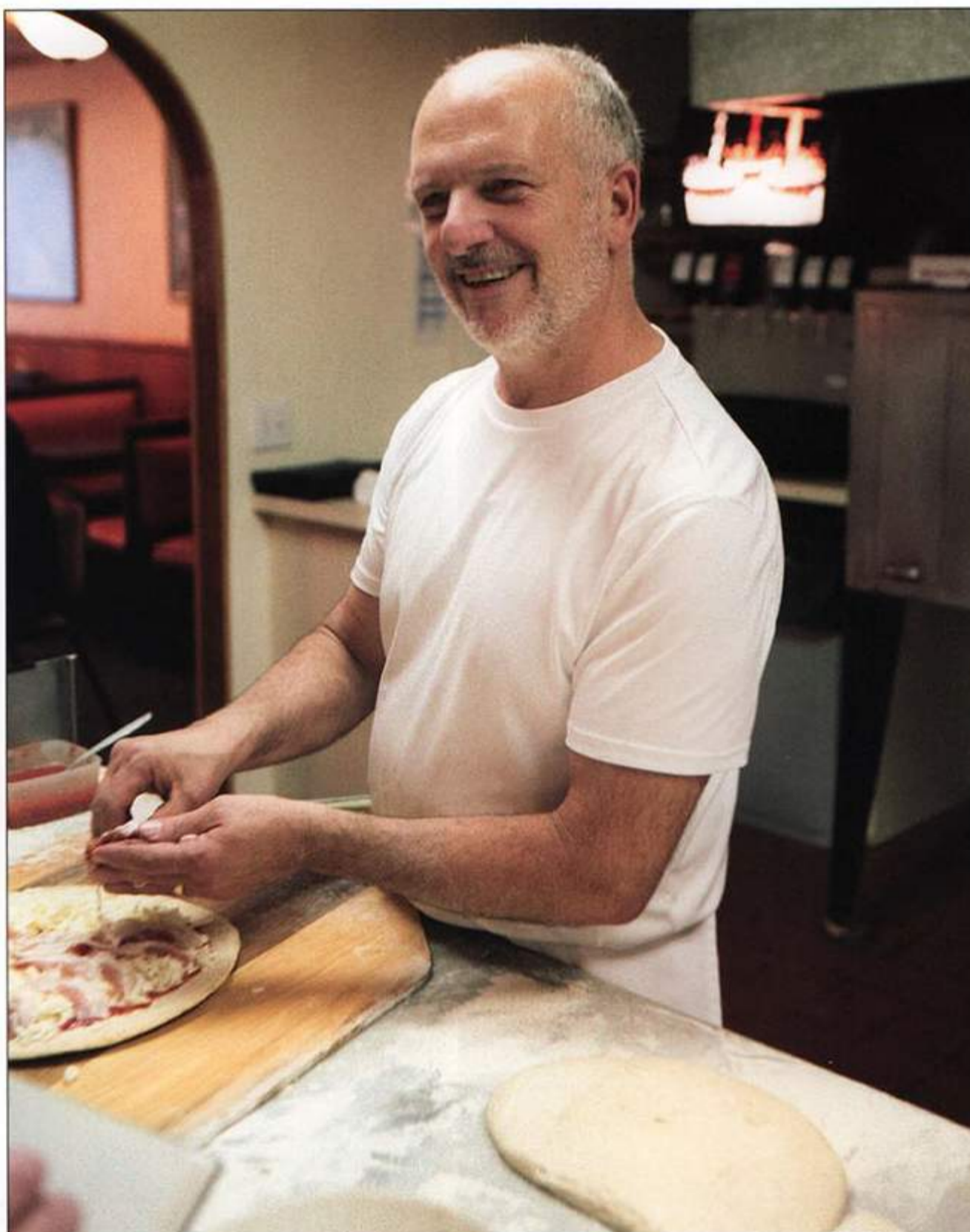
Frank Pepe Pizzeria Napoletana (50) ^{NA #13}; The Spot

Frank Pepe's pizzeria certainly gets credit for longevity. Founded by Pepe and his wife in 1925, it's still going strong and still family owned, now with thirteen locations in Connecticut, Rhode Island, New York, and Massachusetts. It's clearly an originator of the New Haven style. In the 1960s, Pepe started offering fresh-shucked clam pizzas, with Romano cheese, garlic, oil, and oregano. They're still shucking them to order. You can also visit The Spot, Pepe's original smaller location, which is located just behind the newer pizzeria. For more on Pepe's and the history of New Haven's Italian immigrant community, see page 49.



Ernie's Pizzeria

In the pantheon of famous New Haven pizzerias, Ernie's is a new kid on the block—dating “only” to 1971. It was opened by Ernie DeRiso, an Italian immigrant who learned the craft working in another local pizzeria. Today, his son, Pat (pictured below), is still making pizza, and various members of the extended family also work here. It's a real family place, and Pat greeted us warmly. We liked Ernie's mozzarella pizza, which came out browned, not burned (though we still think the crust needed salt). There've been a few changes here over the years, including the addition of gluten-free or whole wheat crusts. Ernie's also offers a cooking class, taught with pizza tour guide Colin Caplan.



Modern Apizza

When Louis Persano took over the ownership of an existing pizzeria in the 1940s, he didn't know what to call it. Someone chimed in with the idea of "Modern Apizza." After all, it was a new owner and a fresh start. Eighty years later, the name seems a little incongruous, but that hardly has mattered. (Actually, the 1940s logo is hip once more, and Modern is selling it on T-shirts.) In the 1980s, it was bought by current owner William Pustari, who grew the business significantly.

One distinction here is that the ovens are fueled by oil, not coal or gas. Even in 1992, when they expanded and installed a new oven, they

stuck with oil. It's also the only pizzeria we visited in New Haven that uses a levain rather than cake yeast. William "Butts" Cretella got a job making pizzas there in 1968, and you can still find him in front of the oven some days making standard New Haven-style pizzas as well as signature pizzas such as the five-vegetable Veggie Bomb and another with mozzarella and eggplant. Of all the pizzas we tried in New Haven, we liked Modern's plain (pictured below) and mozzarella pizzas best.



Zuppardi's Apizza

Dominic Zuppardi worked in bakeries around town before he opened his own, called Salerno's Bakery, in 1932. He had learned the trade back in Southern Italy, and he did a steady business in Italian breads and apizza among the large immigrant community here. Within two years, he moved the shop to West Haven (about 10 minutes away from New Haven's pizza epicenter), and the business has been there ever since. By the 1940s, Dominic's son, Anthony, who worked as a navy cook in World War II, took over the business. Tallying the books, he realized apizza sales were beating out bread sales. They decided that's where their focus should be. In 1947, they changed the name to Zuppardi's Apizza and developed a specialty

making fresh fennel sausage. Today, it's run by the next generation, sisters Cheryl Zuppardi Pearce and Lori Zuppardi (pictured bottom left).

When we visited, they were gracious hosts. (That in itself was a breath of fresh air. The management at the two best-known pizzerias in town have a reputation for being prickly.) We thought Zuppardi's dough, like others in New Haven, needed more salt and was too dry, but unlike those elsewhere, the pizzas here were perfectly baked. We enjoyed Zuppardi's clam pizza (pictured below), made with fresh-shucked clams, not canned, and the sausage was fresh, as advertised. See page 3:73 for our recipe for Apizza, inspired by Zuppardi's.





CHICAGO

The sculpture *Cloud Gate*, more popularly known as “The Bean,” is located in Chicago’s Millennium Park, one of the city’s most popular tourist destinations. The park sits along Lake Michigan in what’s referred to as the downtown Loop.

There is a widespread story that “native Chicagoans don’t eat deep-dish”; that it’s “for tourists.” One fact that belies this is that Gino’s East, Giordano’s, and Lou Malnati’s Pizzeria all have lots of branches in the neighborhoods and suburbs. Malnati’s told us that in downtown Chicago their sales ratio of deep-dish to thin crust is 70%–30%, while in the neighborhoods it is more like 50%–50%, which means half of suburban guests are eating deep-dish.

You can get all kinds of pizza in the Windy City (and trust us, we did), but what most people talk about is “Chicago-style pizza,” a deep-dish pie that was born at Pizzeria Uno decades ago (see page 62). It’s the first truly original pizza style invented in the United States—and its story isn’t quite what you might expect. For one thing, African American women, not Italian immigrants, played a key role in its success (see page 64).

Uno’s-style pizza spread to other Chicago pizzerias, sometimes when new restaurants hired pizzaioli away. The crusts at many deep-dish pizzerias seem remarkably similar and can be divided into two basic dough types: one is a short, pie-crust-like dough that’s pressed into the pan like Play-Doh rather than being evenly rolled out, and the other is like a pillowy white sandwich bread. There’s a further

variation in which the fillings are topped with a second crust, making a stuffed-crust pizza, an invention from the 1970s.

This city’s other big pizza claim to fame is “Chicago thin crust,” which we found isn’t really that thin at all—in some cases, only a tiny bit thinner than a classic New York-style pizza. The difference is that here the dough is sauced and topped all the way to the edge, and the pizza is sliced into little squares. Matching a type of pizza widely known as tavern style, it doesn’t seem to us that there is anything unique about Chicago thin-crust pizza (see page 105). In Chicago, toppings were often so generous that the crust got soggy, and cheese was often applied in such a thick layer that it pulled off at the table in one piece like a bad toupee. Cutting the pizza into tiny squares arguably made sense when



offered as hors d'oeuvres or bar food back in the day, but not so much in big pizzerias where families go for dinner now. Tiny squares with too many toppings are just hard to eat. One thing the pizzas of Chicago have in common is sausage. Lots of fresh Italian pork sausage (typically made with garlic and not fennel).

Unfortunately, the pizzas we sampled in Chicago shared other traits, too. The dough was chronically low in salt, which was most apparent in the thin-crust pizzas (unlike the deep-dish pizzas, they didn't have two pounds of toppings to disguise the lack of salt). Sometimes the sauce was oversalted to compensate, but this isn't a solution; it's simply another problem.

Many of the pizzas here also had a significant gel layer (a problem so pronounced in the stuffed-crust

pizzas that the still-raw white dough that makes up the top crust is sometimes mistaken for cheese). In our recipe section (starting on page 3:3), we've included tips so you can avoid the dreaded gel and a lot of the other Chicago pizza pitfalls. We also have our own versions of the two typical deep-dish crusts we found in which we've upped the salt (see pages 2:118 and 2:123).

At the end of our pizza-tasting tour, we agreed the best pizzas we ate in Chicago were not native to the city: Neapolitan at Spacca Napoli, Detroit style at Paulie Gee's Logan Square, and al taglio style at Bonci Pizzeria. One thing that impressed us here was how owners and managers at several of the pizzerias spoke highly of their competitors. In the cutthroat world of restaurants, we found this to be quite uncommon.



CHICAGO BY THE NUMBERS

16 pizzerias visited

Most popular style of pizza: deep-dish

Most popular toppings: meats (beef, chicken, sausage); giardiniera

Unique set of toppings: ground beef, mozzarella cheese, onion, lettuce, pickles, tomatoes, French fries

Giardiniera is 10 times more likely to be ordered on pizza here than anywhere else in the US

Home of Chicago Pizza Party festival (every February)

April 5 is National Deep-Dish Pizza Day

KEY TAKEAWAYS

- The deep-dish pizza was invented in the 1940s. It was available at only two pizzerias under the same ownership (Uno and Due) until 1965, and it was considered a downtown Chicago thing. The suburbs were all about the thin crust.
- So. Much. Sausage. In Chicago, we had so many sausage pizzas we wondered whether city statutes made it a requirement. If you're a meat lover, this is your town.
- So. Much. Everything. A deep-dish might have two pounds of dough, two pounds of cheese, two pounds of sausage, plus sauce and other toppings, with a single slice weighing in at a pound. We know this not because we brought a scale (though that's an idea!) but because a pizzeria told us.
- There are two basic kinds of deep-dish doughs here. One, from Pizzeria Uno, is yellow, high fat, low salt, and seems to be inspired not by Italian tradition but by biscuit or pie dough (see page 64). The other was apparently originated by Burt Katz and is white, pillowy, and bready, similar to what we found in Argentina (see page 200).
- Chicago thin crust isn't a true pizza style. (Gasp!) It's thin-ish, cut in squares, and we didn't see any significant differences between it and bar pies anywhere else (see page 105).
- There's a chronic problem with undersalting of both thin- and deep-dish doughs. A lot of places had really salty sauce to compensate.
- Several places offered a pickled-vegetable giardiniera, made with some combination of pickled jalapeños, carrots, and cauliflower. The combination is often chopped small, so you can eat it as a topping.
- Italian sausage in the United States typically has fennel, but not in the city of Chicago. Garlic is usually the main seasoning, and several pizzerias got their sausage from Anichini Brothers, an old Italian meat shop downtown.

We noticed some weird pricing on several of the Chicago pizza menus. At Pequod's, for example, a small thin crust is \$11.32. At Pizano's, a medium sausage pizza is \$18.20. We were puzzled until we found it includes the tax.

We enjoyed how many pizzerias featured fun neon signs out front.





CHICAGO

PIZZERIAS

1. Pizano's Pizza & Pasta (see page 243)
2. Labriola (see page 242)
3. Dough Bros Pizza (see page 238)
4. Pizzeria Uno (see page 245)
5. Flo & Santos
6. Giordano's (see page 241)
7. Gino's East (see page 241)
8. Lou Malnati's Pizzeria (see page 242)
9. Bonci Pizzeria (see page 239)
10. Chicago Pizza and Oven Grinder Co.

11. Roots Handmade Pizza (see page 243)
12. Bacino's (see page 238)
13. Pequod's Pizza (see page 243)
14. Paulie Gee's Logan Square (see page 244)
15. Spacca Napoli (see page 246)
16. Vito & Nick's Pizzeria
17. Burt's Place (see page 240)
18. Louisa's Pizza and Pasta (see page 242)
19. Aurelio's Pizza Homewood

NOT TO BE MISSED

20. *Cloud Gate* at Millennium Park
21. Art Institute of Chicago

WORTH SEEING

22. Chicago History Museum
23. Garfield Park Conservatory
24. Shedd Aquarium

PIZZA RELATED

25. Anichini Brothers
26. Logan Square Farmers' Market
27. Green City Market

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.



Bacino's

Dan Bacin originally set out to open a Giordano's franchise (see page 241) but backed out at the last minute and instead founded his own pizzeria, Italian-izing his name (sort of) to get Bacino's, which opened in 1978. It's best known for stuffed pizzas but also serves thin crust. We tried the Spinach Supreme (pictured left), which also featured herbs and mushrooms, and found the top crust gooey like the other stuffed pizzas we had in Chicago.



Dough Bros Pizza

In a city known for pizza that can weigh a pound per slice, slices on the street are just not a Chicago thing. The weather, which would either blow a slice away or freeze it solid, may also have something to do with that.

Nevertheless, Dough Bros Pizza is a slice shop that makes reasonable New York-style pizza and is open late. The menu also includes whole pizzas, calzones, and Italian beef sandwiches.



Bonci Pizzeria 50^{NA #46} LISTED IN GAMBERO ROSSO'S BEST ITALIAN PIZZAS IN THE WORLD

The first US outpost for the Rome-based chef Gabriele Bonci (see page 176) offers pizza that is as different as you can imagine from heavy Chicago-style deep-dish. In Italy, Bonci popularized a new way of looking at pizza, using high-hydration, long-fermented dough with super-creative toppings, served *al taglio*, or by the cut. Ordering your pizza here is a little different than elsewhere. Pizzas are baked in advance and you order from a display case, like a typical slice house. But here, you can tell the server exactly how big a piece you want. They'll cut off a piece and heat it up. The price is calculated based on the pizza's weight. The pizzas are light, airy, and even surprising.

A chain restaurant executive (Rick Tasman, pictured above left, former COO of P.F. Chang's, CEO of Buca di Beppo and Flip Burger

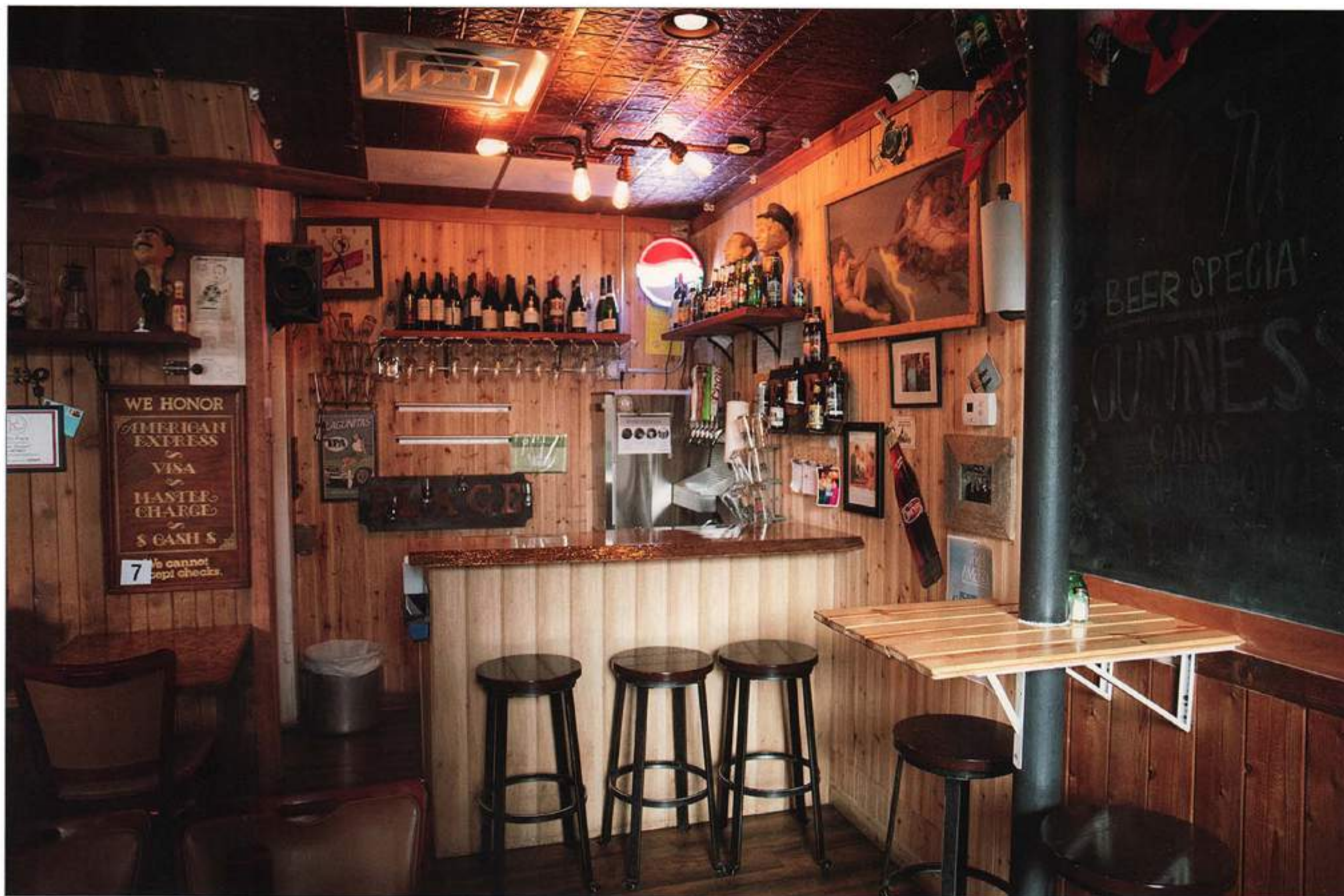
Boutique) partnered with Bonci to open in Chicago, and there are now two locations here, with visions for a broader expansion. This was among our favorite pizzerias in Chicago, and the display case from which customers order their fresh-cut strips of pizza is full of color and always changing. You might see pink prosciutto or even flower petals, dark-green leaves of fresh basil or mint, light-green slices of avocado, scallop-cut yellow potato, and more. (Bonci says he created 1,500 different kinds of pizza, and we almost believe him.) We tried one with anchovy and burrata (pictured above right), another with spicy eggplant and octopus (pictured top), and a third with potato and rosemary and loved them all.

Burt's Place

This suburban Chicago pizzeria was the last opened by Burt Katz, a one-of-a-kind personality, a serial pizza entrepreneur for more than 40 years, and the creator of a new take on Chicago deep-dish. His pizzas were different in two ways. First, he deviated from the Uno's-style pressed-in-the-pan crust and made something more like a low-hydration white sandwich bread. (Some of the pizzas we ate in Buenos Aires also had this kind of crust, although Burt doesn't get credit for those.) Second, he packed extra cheese around the edges, which forms a caramelized cheese crust while baking. He initially developed this style of pizza at Pequod's (see page 243), which he owned before Burt's.

While Burt's was long popular with locals, he reached an entirely different level of fame when he appeared on chef Anthony Bourdain's

television show. Later, Bourdain called Burt's pizza "the only deep-dish pizza I ever loved." We tried the same pizza (pictured bottom left) as Bourdain, with sliced tomatoes, sausage, and fresh spinach, and while we won't rave as much as he did, we all felt this was the best exemplar of the white-bread-crust style. After decades making pizza, an ailing Katz decided to close, but he was approached by Jerry Petrow and John Munao, two unusually brave commodities traders who wanted to buy it. They jumped into the pizza business with no experience, taking over from Katz, undoubtedly a hard act to follow. Katz reportedly shared recipes with the two men from a hospital bed. He passed away in 2016, but his pizza lives on. See page 3:114 for our recipe for Our Burt's Place-Style Pizza, inspired by Burt Katz.





Giordano's

Giordano's crust falls into the pillowy white-bread category, and because the specialty is stuffed pizza, you get it twice: on the bottom and on the top. Well, sort of. The top crust winds up being a pasty white gel layer (see page 370). The pizzeria was founded in 1974 by brothers Efen and Joseph Boglio, who say the inspiration was "Mama Giordano's" Easter



pie. We're a bit skeptical, in part because traditional Italian Easter pie is often made with ricotta, eggs, and little meat. Nonetheless, we find it interesting that so many kinds of pizza have some kind of equivalent in Italy (see page 124).



Gino's East

Founded in 1966 by two taxicab moguls and a guy in the grocery business, Gino's East is the second-oldest deep-dish joint in Chicago, now with multiple locations across the US. The dough is pressed into the pan,

Play-Doh-style, similar to Uno's. Like at all Chicago pizzerias, sausage is king, but here it's a patty that looks like a humongous machine-made pork hamburger and turns gray, dense, and rubbery in the oven.



Labriola 50^{NA #11}

The newest of the pizzerias we tried, Labriola was founded in 2015 by Rich Labriola, who first made a name for himself in the mid-'90s by opening a bread bakery that grew to be wildly successful. Unlike other pizzerias whose origin stories include recipes that came from Italian grandmas, Labriola proudly says he developed the recipe himself, using what he'd learned over the years as an artisan bread baker. We tried a Chicago tavern-style pizza (pictured above) with sausage and cheese and noticed a significant gel layer. We also tried a deep-dish meatball pizza, which had the white-sandwich-bread-style crust we noticed elsewhere and a caramelized mozzarella crust, perhaps in a nod to Burt Katz.



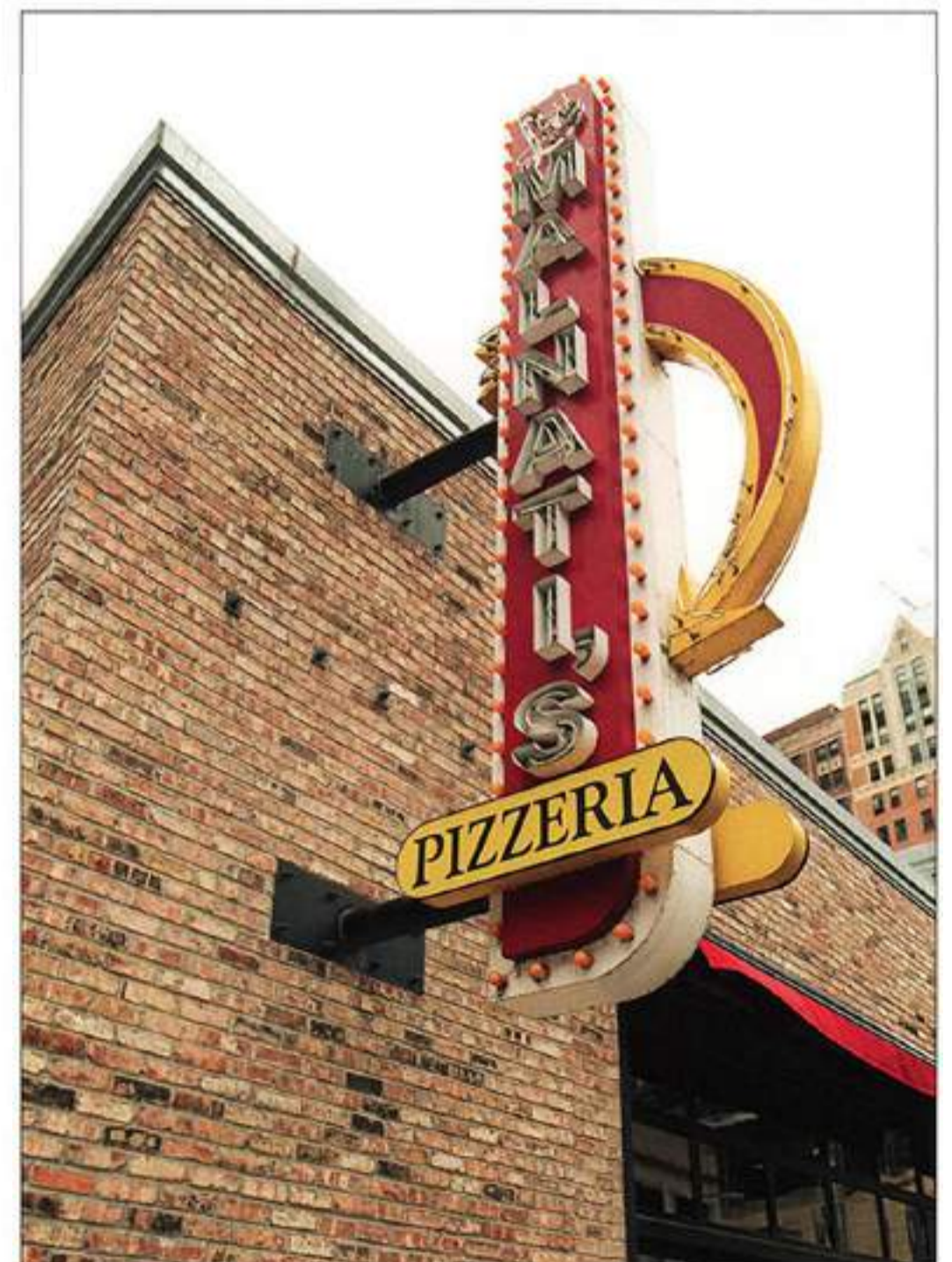
Louisa's Pizza and Pasta

After working at Pizzeria Due for 21 years, in 1981 Louisa DeGenero fulfilled a lifelong dream and opened her own pizzeria. "It was just like having a baby at 60," she told a reporter. The daughter of Italian immigrants, DeGenero did quite well for herself despite quitting school in the fifth grade to clean houses with her sister. Her suburban pizzeria is now run by her daughter and granddaughter, who say they have honored Louisa's deathbed wish not to change a thing. Louisa's serves deep-dish (but not too deep) pizza (pictured above).



Lou Malnati's Pizzeria

Malnati is one of the biggest names in Chicago pizza. Lou and his father, Rudy, worked at the original Pizzeria Uno in the 1940s. In 1971, Lou and his wife, Jean, opened their first Lou Malnati's Pizzeria in a northern



suburb. It's still a family business, with 56 locations. Their deep-dish pizza features Uno's-style pressed-in-the-pan crust. The menu highlights the "butter crust" but we found it fell short. It was hard, with a yellowish cast.



Pizano's Pizza & Pasta

Pizano's was founded in 1991 by Rudy Malnati Jr., a son of the original manager of Pizzeria Uno. (Rudy's brother founded Lou Malnati's; see previous page.) The pizzas here have a short pressed-in-the-pan crust that's said to be based on the original Uno's recipe, but we found it to be extremely dry and hard. After the toppings and sauce are in place, the top is drizzled with Parkay from a squeeze bottle, something we had never seen before. We tried a deep-dish sausage, mushroom, onion, and green pepper pizza (pictured left) and a thin-crust pizza with anchovies and cheese, but were not fans.



Roots Handmade Pizza

Opened in 2011 by a restaurant group that got its start in an upscale sports bar known for its "40 oz. of the week" specials, Roots specializes in Quad Cities-style pizza (see page 248). One signature of this style is the use of malt syrup in the dough, and at Roots we enjoyed the flavor. The crust otherwise was akin to New York-style pizza. It's the other key signature of Quad Cities pizza that we just don't get: the edge-to-edge layer of twice-ground sausage—yes, twice. It's ground and cooked, then ground again, lending a quality that felt to us . . . well, like it was pre-chewed. We also sampled a Root's specialty (pictured left)—a taco pizza with taco-seasoned crumbled sausage, red sauce, mozzarella, cheddar, lettuce, tomatoes, taco-seasoned chips, and sour cream, served with taco sauce packets on the side. You know, like an American taco.



Pequod's Pizza (50) NA #30

Named for the whaling ship in the novel *Moby-Dick*, this suburban Chicago pizzeria was opened in 1971 by Burt Katz (see Burt's Place, page 240), who sold it to businessman Keith Jackson in 1986. Pequod's serves pan-baked pizzas (pictured above right) with a cottony sandwich-bread-style crust and a caramelized cheese rim, a style that Katz created but



that Jackson has apparently tweaked a little. Jackson was not amused when Katz opened a new pizzeria around the corner a few years later. The original Pequod's logo was a whale, but legend has it that a thong was added as a slap in the face to Katz.



Paulie Gee's Logan Square

A franchise of the popular Brooklyn-based pizzeria founded by Paul Giannone, this was among our favorite pizzerias in Chicago—only it didn't serve Chicago-style pizza. Owner Derrick Tung (pictured above) has replicated many of the favorites from the original Paulie Gee's, which are creatively named (and sometimes creatively topped) Neapolitan-style wood-fired pizzas. But the franchise agreement also allows Tung to add his own touches to Giannone's menu. Our favorite was Tung's spin on Detroit-style pizza that he calls Logan Squares, which are pan-baked pizzas with crispy cheese rims and topping choices that are rotated monthly. A Logan Square pizza won the gluten-free category at the 2018 US Pizza Cup.

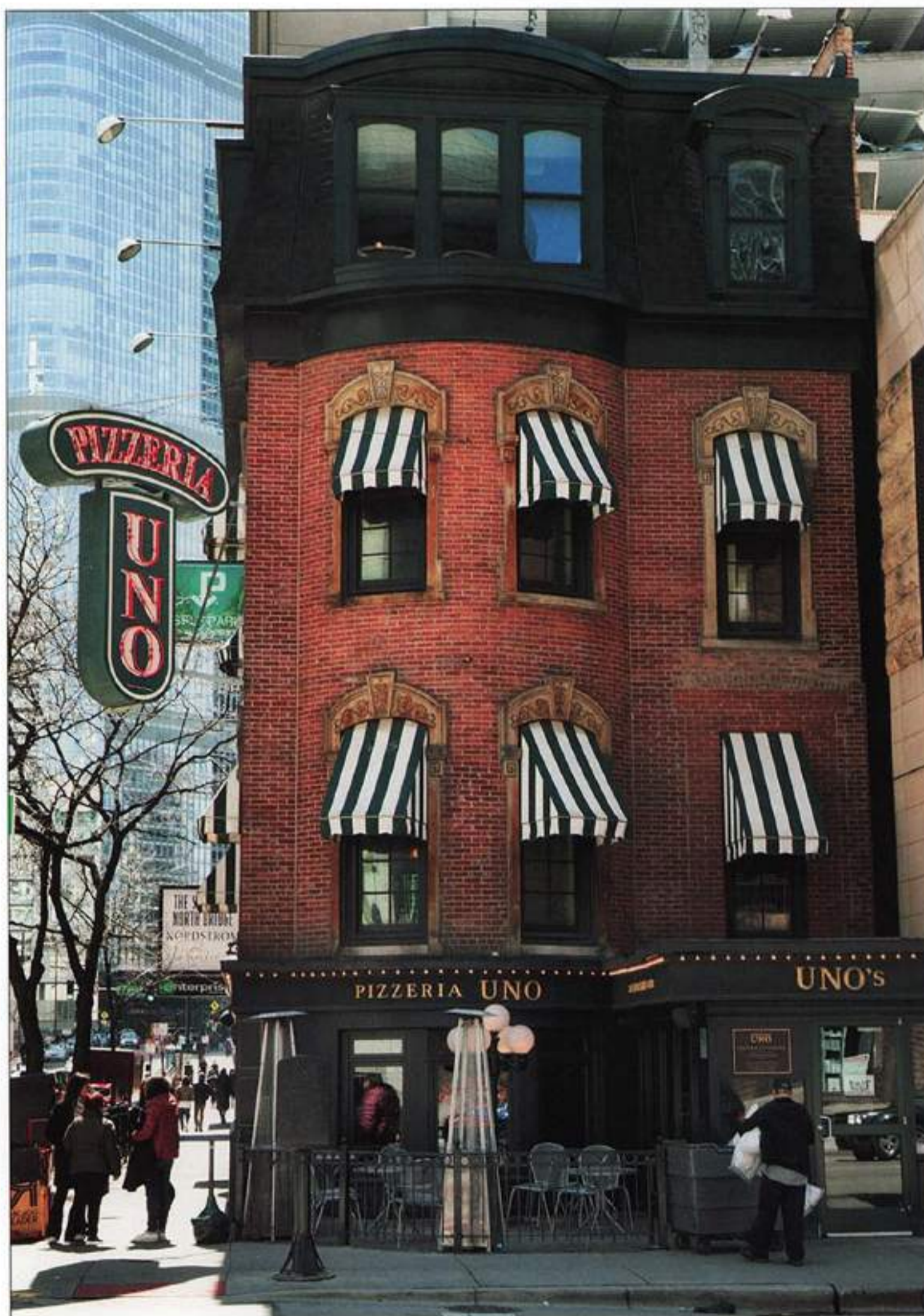
On our visit, we tried a wheat-flour version of that recipe, with cheddar, mozzarella, pepperoni cups, bacon jam, and red sauce, with cold ricotta piped on after baking and a drizzle of Mike's Hot Honey (pictured above right). The pizza has a fluffy levain-raised crust, which is parbaked to avoid a gel layer. Not only was it delicious, it was better than any of the Detroit-style pizzas we ate in Detroit. Now the Logan Squares are the top sellers here. Tung was a health-care administrator who got in the pizza business after developing a mentee relationship with Giannone online.

Pizzeria Uno

There are over 100 franchise locations of this Chicago pizzeria where deep-dish was invented (see page 62). But unlike most franchises, they operate under a different name than the original (Uno Pizzeria & Grill) and also use a different recipe. So we were very interested to try the fare at the original Pizzeria Uno, still at its old spot on Ohio Avenue. The owners of the original Pizzeria Uno, Ike Sewell and Ric Riccardo, weren't dough men. (They reportedly even considered Mexican food before settling on pizza; see page 63.) That meant they had to hire folks to come up with the recipes. Alice Mae Redmond (see page 64) is believed to be the cook behind Uno's iconic deep-dish recipe.

Our deep dive into deep-dish was enlightening. We found two distinct styles of deep-dish dough. The one invented here is yeast-raised, with a lot of oil or shortening. Both this crust and its imitators have some corn element, whether cornmeal, corn flour, or corn oil. It's yellowish in color, has the consistency of Play-Doh, and is roughly pressed into the pan before cheese, sauce, and other toppings are added. We see a lot of similarities with pie dough. Though we felt this dough needed salt, it was our favorite example of this style on our trip, and it also had the thinnest gel layer we saw amongst deep-dish pizzas. You can find our version of

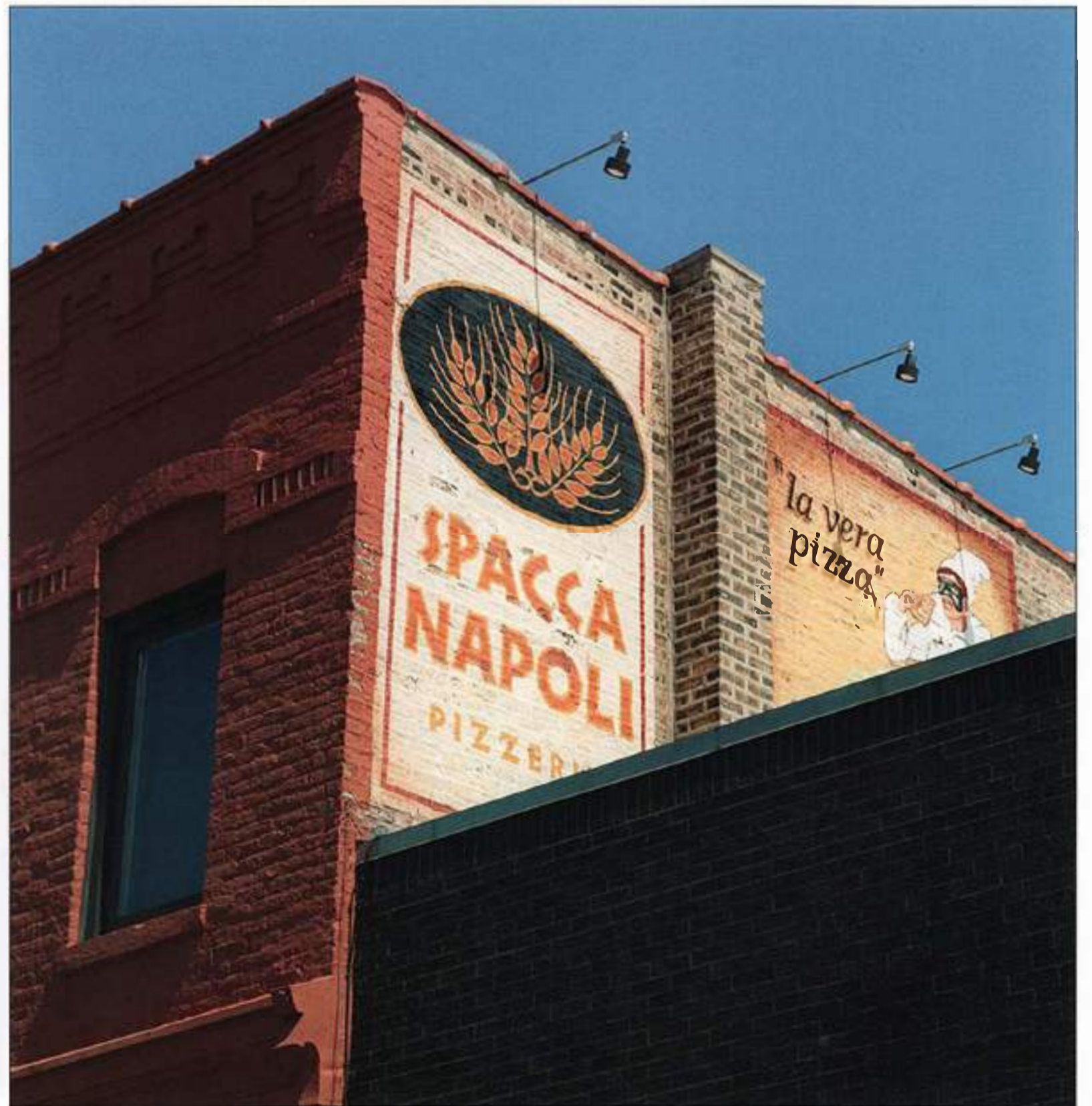
the dough, with the proper amount of salt, on page 2:118. We also recommend parbaking deep-dish pizzas to speed up the otherwise intolerably long time they take in the oven (see page 3:88). For reasons that we don't understand, parbaking is considered a no-no in Chicago.



Spacca Napoli 50^{NA}#15 LISTED IN GAMBERO ROSSO'S BEST ITALIAN PIZZAS IN THE WORLD

One of our favorite pizzerias in Chicago (located in a suburb, actually), Spacca Napoli is worlds away from typical Chicago-style pizza: light, creative, and very Italian. It was born of a love for Italian culture. Jonathan Goldsmith (pictured below) had lived in Italy as a young man with his wife and daughter, and, even after moving back to the United States in 1991, remained connected with the culture. In 2003, he was working in real estate and volunteering as a cook for an organization that serves people who are homeless, when the family took another trip. On the plane, an Italian man suggested he should open a pizzeria. The idea took hold of Goldsmith.

He studied the art and craft of pizza in Naples, including under Enzo Coccia (see page 164). He found restaurant space and hired Italian oven makers to build the perfect oven. His wife, Ginny Sykes, is an artist whose vision helped with the design. And in 2006, Spacca Napoli opened its doors. "At 50 years of age," he told *Pizza Today*, "I found my calling." Many of the ingredients are imported, and Goldsmith is certified by the AVPN (see page 74). His pizzas are often an homage to other chefs and pizzaioli. We tried the Lampi ala Mozza, an ode to Nancy Silverton (see page 264). The A16 is a shout-out to an Italian restaurant by that name in San Francisco and also to a road that runs from Naples to the Adriatic Coast.



THIN-CRUST PIZZAS OF THE MIDWEST AND NORTHEAST

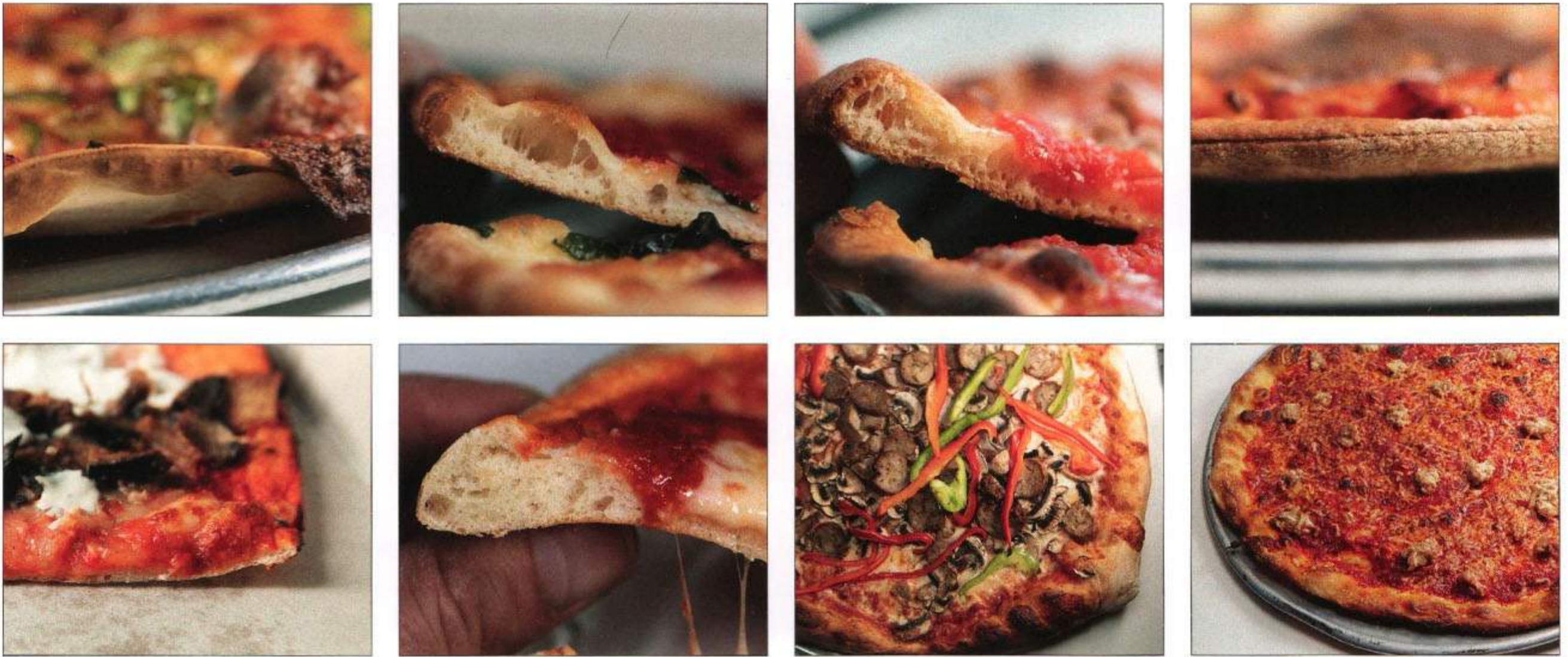
All across the Midwest you can find a thin-crust pizza that's sauced to the edge and "party" cut (cut into tiny squares). The geographic range spans from as far west as Connecticut, as far south as St. Louis, Missouri, and as far north as Chicago, Illinois. These regions will claim the pizzas as their own particular style: St. Louis-style, Chicago-style thin crust, or the like.

Similarly, across the Atlantic Seaboard, you can find another pizza that's also thin crust. These pizzas are typically very similar to the

Midwest thin-crust pizzas, except they're not square cut, they're wedge cut. In addition to being thin, these pizzas are also sauced to the edge and are often referred to as bar- or tavern-style pizzas (see page 105).

We visited these pizzerias across the Midwest and Northeast out of historical curiosity. Unfortunately we still haven't solved the mystery of why so many parts of the country seem to call the same kind of pizza their own. Nor did we find a lot of great thin-crust pizzas to actually eat.

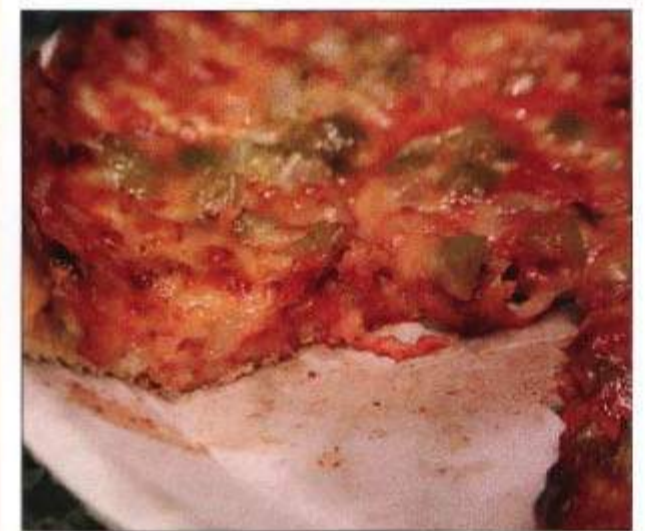
New Jersey



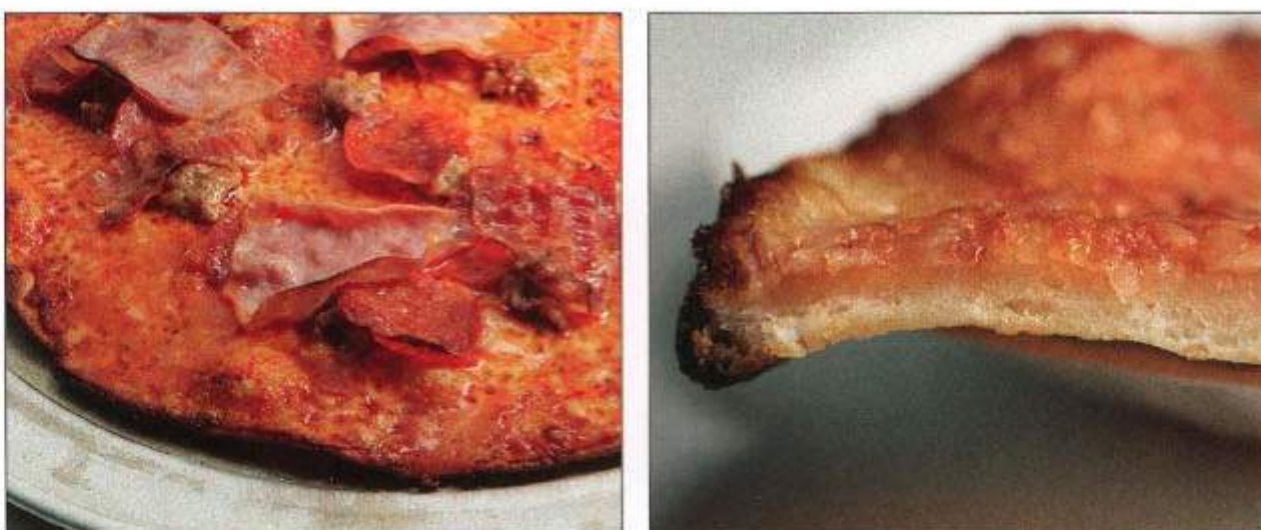
New York



Massachusetts



Connecticut



Missouri



For more on thin-crust pizza, see page 126.

QUAD CITIES

We didn't make it to Happy Joe's, which is said to be the originator of the taco pizza.

Now that we know what Quad Cities pizza is, we had to find out more about the Quad Cities themselves. The area includes the small cities of Davenport and Bettendorf in Iowa, and Moline, Rock Island, and East Moline in Illinois—which, as you might have noticed, is actually five. Bettendorf is the late-comer to the group, added in the 1970s after its population took off. The Quad Cities name, which had been in use at least since the 1960s, stuck.

It wasn't until our book was well underway that we even heard of Quad Cities-style pizza. Intrigued, we made the pilgrimage to the Quad Cities, which straddle the Iowa–Illinois border. Elsewhere, when we've gone to investigate niche pizza styles, we've found they aren't true styles by our definition. That's what happened with Chicago thin crust (page 105). But in this case, the folks in the Quad Cities were doing several unique things. The dough is made differently than any others we'd seen. The toppings are made and applied differently. The pizza is cut quite differently, too.

People in the Quad Cities really like their pizza, and we respect their personal preferences. But from a culinary point of view, there are a number of things about this style that strike us as illogical, leading us to wonder how it all came about.

We learned that at least two of the region's extant pizzerias are currently vying for the honor of being the originator of the Quad Cities style: Frank's Pizzeria and Harris Pizza, although there are some holdouts who maintain that it was actually invented on the other side of Illinois in the 1940s by two Italian brothers who later moved to the Quad Cities and shared the recipe with the man who owned Frank's. Putting aside the brothers, we know that Frank's opened in 1955 and Harris in 1960, which may be a clue, but isn't definitive proof of what, exactly, was on each pizzeria's menu. We did find this quote, though, which may be illuminating in terms of why this pizza is so different. Kathleen Mosley told the

Quad-City Times that her mother, Mary Harris, came up with Harris Pizza's original recipe long before pizza was popular in this region. "She had probably never seen a pizza before," Mosley said.

Today, this is mostly a local pizza style, although you can find some examples elsewhere, including at Roots Handmade Pizza in Chicago (see page 243).

KEY TAKEAWAYS

- The dough typically contains malt syrup and molasses, but we really couldn't detect the flavor.
- The sauce typically includes cayenne or red chili flakes, but it was applied sparingly and it didn't come across as spicy to us.
- For sausage pizzas, fennel-laced pork sausage is cooked, cooled, then run through a grinder, after which it's cooked again. It's applied in a thick coat, like a gravel road.
- The cheese is applied after the other toppings. This is problematic when you try to eat it because it pulls off like a blanket on the first bite.
- It's not cut in triangles like most pizzas. Instead, it's first cut down the middle, then sliced with a series of cuts running perpendicular to that. The result is a bunch of long strips with heavy toppings, making it really hard to eat (see page 3:300).
- Many menus include "taco pizza," with or without meat and refried beans. After baking, lettuce, cold shredded cheese, and crumbled taco-seasoned chips are piled on top.



Frank's Pizzeria

This old-school joint in Silvis, Illinois, was opened by Frank Serra in 1955 and still has its distinctive sign out front calling it "Club Napoli." Back then, few in the region had heard of pizza, but by the 1990s it was popular enough to open a second location in Bettendorf, Iowa, which later closed. At this point, the business had passed on to Frank's four sons, and it's still family owned. Frank's also serves pasta and sandwiches.



Harris Pizza

When Leonard and Mary Harris opened shop in 1960, business was slow. But their pizzas eventually caught on and now they have four locations. They retired in the 1990s, and their daughter Kathleen Mosley and her family took over. Operations manager Rich Meeker offered up the standard sausage pizza plus another one with diced chicken, frozen spinach, tomatoes, red onion, and cheese direct from Wisconsin. Harris also serves wings.

OLD FORGE

On our world tour of pizzerias, we saw some unusual things. But nothing was stranger than our trip to Old Forge, Pennsylvania, the “Pizza Capital of the World.”

If you’ve never heard of it, we can assure you of two things: the homey “pizza cafés” that line the main street are proof that this is indeed a pizza town, and they serve a very specific style of pizza. But the whole thing left us scratching our heads.

For starters, the pizza. All the pizzerias serve pan-baked pizza with a sweetened white-bread-style crust and many places used processed cheese or a proprietary blend of cheeses. You can choose “red,” with sauce, or “white,” which is more like a cheese-filled calzone. There’s a whole lingo to it. Instead of slices, for example, you order “cuts,” and you order whole pizzas as “trays.”

On the plus side, the crust is typically prebaked, avoiding the gummy gel layer we found in a lot of thicker-crust pizzas. But beyond that, it reminded us of school cafeteria pizza, albeit much browner.

We wanted to know the story of how this small town got in the pizza game and learned that 40% of the community claims Italian heritage. This could explain the interest in pizza, but not so much the

style of pizza. Why does it seem so un-Italian? And why do all of the places make the same kind of pizza?

The story goes something like this. In the 1930s, while the men were off mining coal, the women ran speakeasies, where the men came to eat, drink, and play cards after work. Different stories name one or another of these 1930s-era speakeasy matrons as the originator of the Old Forge style, but the most repeated one gives the crown to “Grandma Ghigiarelli.” Ghigiarelli’s pizza café was open until 2017. Curiously, we find no mention of Philomena Ghigiarelli’s famous pizza in her obituary, dated 1959.

What we do know is that pizzerias were advertising in Old Forge by the 1940s. By then, the town’s population, and its fortunes, were starting to decline. We found a 1962 ad for Arcaro & Genell, which is still operating today. The town started calling itself the “pizza capital of the world” sometime after that.

Another unusual thing is that the pizzerias don’t compete; they support one another, lending cheese, sauce, and dough to each other when someone needs it. In the end, maybe the story of Old Forge isn’t so much about pizza as it is about a struggling small town creating a shared identity with the tools they had at their disposal.



Old Forge proudly calls itself the pizza capital of the world. In the small town of less than 10,000 people, about 40% of them claim Italian ancestry.



DETROIT

DETROIT BY THE NUMBERS

5 pizzerias visited

Most popular style of pizza:
Detroit

Popular toppings: pepperoni,
mushrooms, onions

Unique set of toppings:
cheese, bacon, lettuce,
tomatoes, mayonnaise,
Coney dog

In 1972, Little Caesars founder and Detroit native Mike Ilitch made a prediction: “In the next four or five years, you’re going to see the square, deep-dish pizza take over from the round pizza.”

Ilitch was off by a few decades, but finally, Detroit-style pizza is coming into its own. It still hasn’t overtaken the popularity of round pizza, as Ilitch suggested, but it’s definitely an up-and-comer. Some of the credit goes to the late Shawn Randazzo, who was named World Champion Pizza Maker of the Year at the 2012 International Pizza Expo. His thick, square pie with the crown of caramelized cheese wowed the judges.

Before Randazzo’s victory, Detroit-style pizza was mostly a Detroit thing. But since then, we’ve seen more pizzerias serving this style outside the Motor City, including Emmy Squared in Brooklyn (see page 222), Paulie Gee’s Logan Square in Chicago (see page 244), and Apollonia’s Pizzeria in Los Angeles (see page 263). We’ll confess that we liked the Detroit-style pizza we tried outside of Detroit better than the locally made versions, but we also were intrigued by the through line represented by this pizza. You can trace a lineage from Randazzo and other key aficionados back to the originator of this style, Gus Guerra.

In the 1940s, Guerra was trying to figure out how to increase profits at his bar, Buddy’s Rendezvous, when his wife’s Sicilian mother showed him how

to make her home-style pan-baked pizza. When Guerra left Buddy’s, he opened another bar, Cloverleaf Bar and Restaurant. Randazzo worked at Cloverleaf Pizza before opening his own pizzeria. Other Buddy’s pizzaioli spun off and opened their own pizzerias. For example, Loui Tourtois, who founded Loui’s Pizza in the 1970s, learned the craft at Buddy’s. The close connection among these pizzerias reminded us of Tokyo (see page 208), where a number of the city’s best-known pizzaioli developed their chops at one pizzeria.

Randazzo not only has a pizzeria, but also offers a class and certificate program, which we attended, for making this unique style. That class is what first drew us to Detroit. You’ll find our Detroit-style pizza master recipe on page 3:109.

KEY TAKEAWAYS

- Detroit-style pizza has a close connection with the American auto industry, which is based in and around the Motor City. The dough is pressed into a deep, rectangular blue steel pan that, we were told, was originally designed to hold small parts at auto factories in Guerra’s day. Initially, we wondered whether this was just folklore, but we were able to find old photos of auto workers using these very pans.
- The cheese is key. Many Detroit-style pizzas are made with Wisconsin brick cheese, liberally applied. The cheese caramelizes along the edges of the steel pan, forming a frico crown.
- Sauce is applied after baking. This helps keep the crust from getting gummy, unlike some other deep-dish pizzas we’ve tried.
- Because this pizza is more bread-like, a normal pizza oven is not that appropriate, which is why most pizzerias here use a regular gas oven. An impinger oven also works well for baking this style of pizza (see page 386).
- The key pizzerias here are family-friendly places with old-school décor. There’s a certain pride in doing things the same way for decades. On the other hand, doing things the same way doesn’t leave room for innovation. We felt the ingredient quality could have been upgraded in some cases. This is why we say our favorite Detroit-style pizzas aren’t in Detroit. They’re at places like Apollonia’s Pizzeria (see page 263), Paulie Gee’s Logan Square (see page 244), and Emmy Squared (see page 222).

Detroit, Michigan’s largest city, is synonymous with both the auto manufacturing industry and pizza.





DETROIT

PIZZERIAS*

- 1. Loui's Pizza (see page 252)
- 2. Cloverleaf Pizza (see page 252)
- 3. Detroit Style Pizza Company (see page 253)
- 4. Shield's

NOT TO BE MISSED

- 5. Motown Museum

WORTH SEEING

- 6. Fox Theatre Detroit
- 7. Third Man Records
- 8. Anna Scripps Whitcomb Conservatory

PIZZA RELATED

- 9. Little Caesars Headquarters

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

**We reached out to Buddy's (and ate there) but did not receive permission to photograph and interview staff, so it's not featured in the following pages.*

Cloverleaf Pizza (50) NA #23

This is the pizzeria opened in 1953 by the godfather of Detroit-style pizza, Gus Guerra. Back then, it was more like a little roadhouse bar. Today, there are seven branches, including a large, family-friendly pizzeria with a heated outdoor patio at the original location and five in the suburbs surrounding Detroit. The business is still run by Guerra's descendants, who were generous with their time. On our visit, Cloverleaf was packed with families. The menu includes salads, pasta, sandwiches, and steak. We tried the Detroit-style cheese pizza, which is what initially made Guerra a pizza inventor. There's certainly an affinity for meat here, and the menu includes not only a cheeseburger pizza with bacon but a meat lover's special with five different meats.



Loui's Pizza

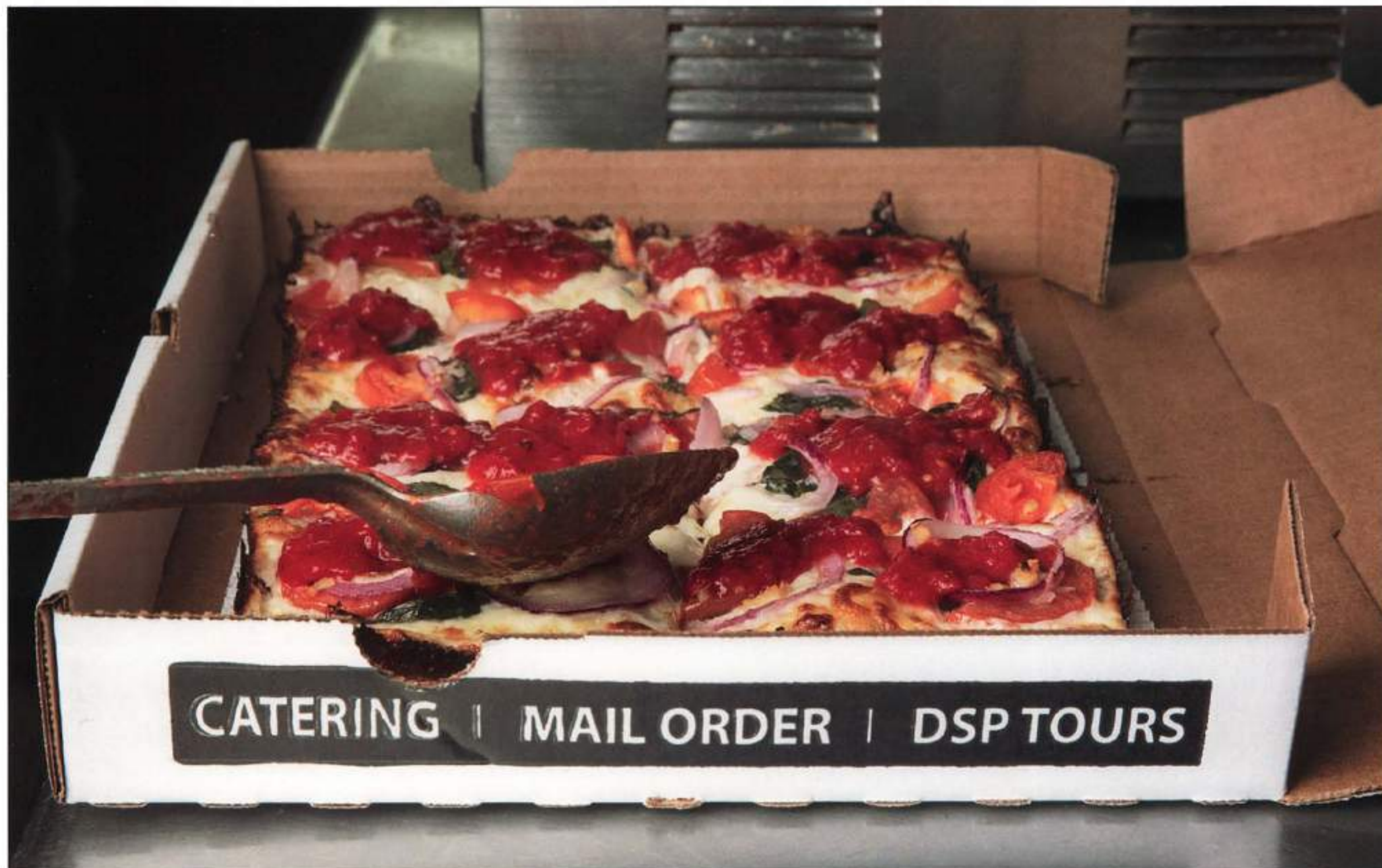
Loui's, family run since it opened in the 1970s, struck us more like an old-school Italian restaurant than strictly a pizzeria. There's spaghetti, antipasto salads, lasagna, and the most noticeable feature, empty straw-covered Chianti bottles strung along the ceiling, many of them signed by

customers. We made a Modernist Cuisine bottle to add to the collection. The pizza here was the cheesiest among those we tried, which was a plus for some, a minus for others. We found the toppings mediocre.

Detroit Style Pizza Company

Shawn Randazzo (pictured below) founded Detroit Style Pizza Company in a little strip mall in 2012, after getting his start in the pizza business as a delivery driver for Cloverleaf and later a franchisee. You can also order his pizza shipped frozen. Randazzo was a true Motor City evangelist, out to sell the world on Detroit-style pizza. When we were doing our research, he was the only pizzaiolo running a training school specifically

geared to making this style. We took the class and also got the lowdown from Randazzo about the scene. This was our favorite among the Detroit-area pizzerias we visited, and his pizzas have won several awards. Our favorite was the killer barbecue chicken pizza (pictured bottom right). Randazzo also had a company that makes seasoned pans that work well for the style. Sadly, he passed away in 2020.





PORTLAND, OREGON

BEST PIZZA CITY IN THE UNITED STATES

Located thousands of miles from the pizza epicenters of New York and Italy, Portland might not be on everyone's pizza radar. And yet we were blown away by our visits here. Talking it through, we realized part of Portland's secret might be that distance—the fact that as a small West Coast outpost, the city wasn't beholden to a particular style. It doesn't have 100-plus continuous years of pizza history. Pizza lovers here were free to experiment, unlike in places like New York City, where the popularity of pizza at traditional pizzerias, which borders on worship, seems to have held back many of the young up-and-coming pizzaioli.

In fact, there still is no defined Portland-style pizza. But there is very good pizza to be had all over this city. We had some stunningly creative pizzas. We had pizza made by chefs with fine-dining backgrounds, and pizza made by folks who learned in their home kitchens, driven to obsession. And we had the kind of pizza that comes from years of practice in successful restaurants, years of keeping customers happy.

The godfathers of the Portland pizza scene are Ken Forkish and Brian Spangler. It's perhaps not a coincidence that both began as bread bakers. Forkish left a tech career in Silicon Valley to open Ken's Artisan Bakery in 2001. There, he studied the art of coaxing the most out of a simple flour-and-water mix. A few years in, he began hosting a weekly pizza night at the bakery. The pop-up pizzeria was such a smashing success that in 2006 he opened Ken's Artisan Pizza.

Spangler also started with bread and began baking as a teen in California. It wasn't until he and his wife, Kimberlee Nyland, moved to Scholls, a rural town 30 minutes outside of Portland, that it became an all-encompassing focus. He built an oven and began furiously baking, with Nyland in charge of deliveries. On Sundays, they began experimenting with pizza. Bring beer, they told everyone. First, they opened Scholls Public House alongside a rural highway; it was such a success that neighbors and county officials got annoyed at the cars lining up. Threatened with fines, they moved the place to

The Willamette River runs through the heart of Portland and later joins the Columbia River on its way to the Pacific Ocean. The city is nicknamed both Bridgetown and Bridge City for the 12 bridges that cross the Willamette.





Portland in 2005, calling it Apizza Scholls (think, “as in a piece of Scholls”).

Before Ken’s and Apizza Scholls, most agree there was a dearth of good pizza in Portland. There was Nostrana, which began serving fantastic Neapolitan-style pizza in 2005, but it’s seen as more restaurant than pizzeria. There was another forerunner in 2001 who pulled a wood-fired oven behind his truck to make pizza at a farmers’ market and still runs a neighborhood pizzeria. But after Forkish and Spangler proved there was quite a market for quality pizza, others saw the potential, too. In fact, these godfathers of Portland pizza set the bar so high that the young pizzaioli who followed them had to be even more inventive while mastering their craft.

Many of the Portland pizzerias use seasonal produce, and Oregon certainly has a bounty to offer. Some also use locally milled flour, avoiding the bleached and bromated stuff sometimes seen elsewhere. Many of the pizzerias we visited had a real sense of place, a quirky Portland charm. The pizzeria owners and pizzaioli were generous with their time and really fun to chat with. They seemed to know and even support one another.

In the end, we had to conclude Portland was the best pizza city in America, if not the world. Yes, we

know there will be hate mail. But first, you might want to check it out for yourself.

KEY TAKEAWAYS

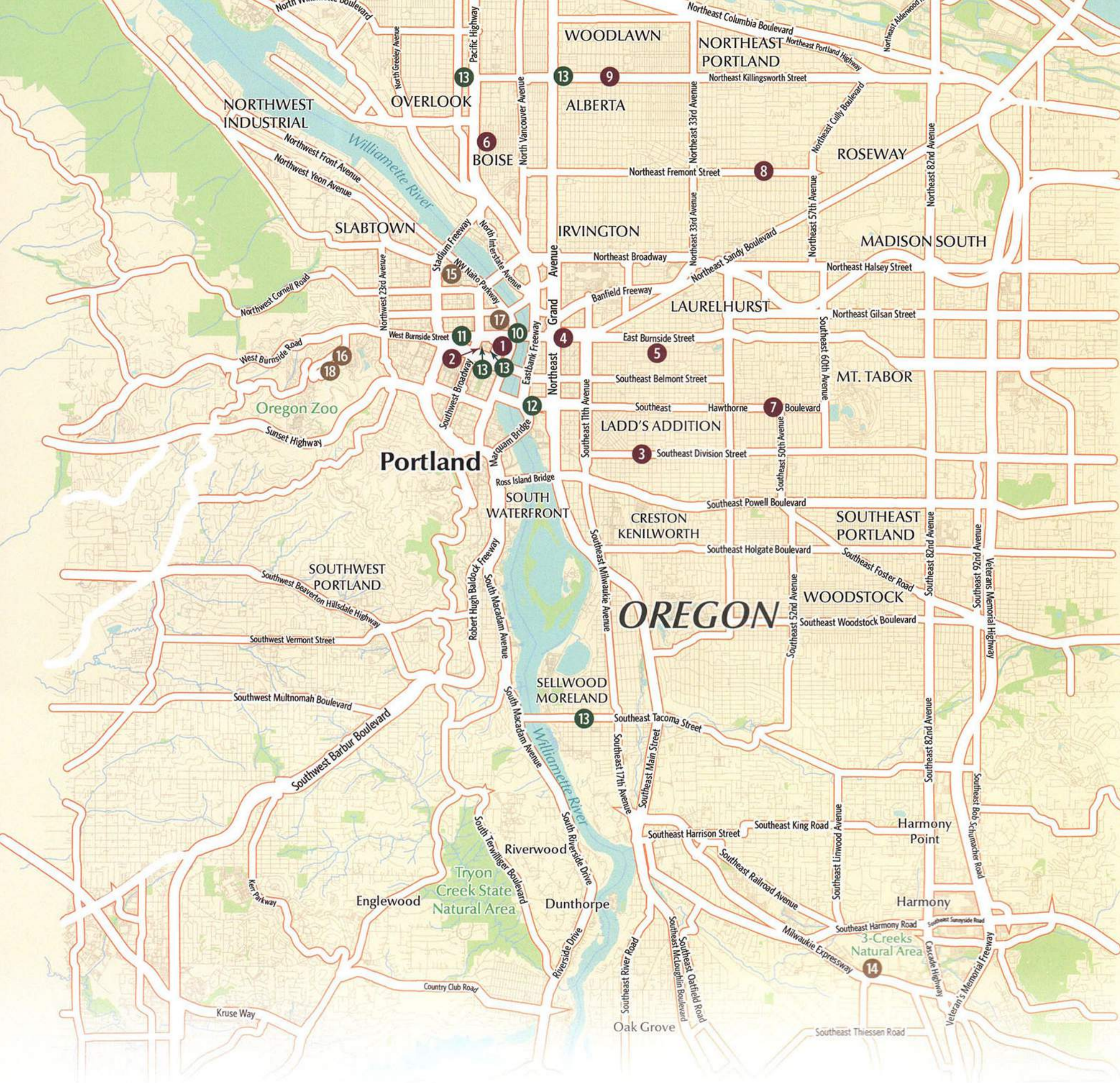
- Sure, people poke fun at “Portlandia.” But we can say with authority that this is truly a pizza city. It was certainly the best place we visited on our American tour, and we would argue it ranks among the best pizza cities in the world.
- We went into this book thinking that slice shops simply couldn’t compare with pizzerias specializing in whole pies. How could something taken from a case and unceremoniously reheated be good? Happily, Checkerboard Pizza and Scottie’s Pizza Parlor disabused us of that notion. Both served excellent slices.
- The fact that Portland isn’t commonly seen as a pizza town may be the secret to its success. Without a status quo to adhere to, pizza lovers here simply gave themselves permission to experiment. The result has been some standout pizza.
- Ingredients really matter. Portland pizzaioli were more focused on quality ingredients, preferably local, than in many other cities. It shows.

PORTLAND BY THE NUMBERS

15 pizzerias visited

Most popular style of pizza: artisan

Unique set of toppings: shredded buffalo jackfruit, vegan mozzarella, red onions, fresh green onions, vegan ranch, wing sauce



PORTLAND

PIZZERIAS

1. Checkerboard Pizza (see next page)
2. The Crown
3. Scottie's Pizza Parlor (see page 261)
4. Sizzle Pie (see page 260)
5. Ken's Artisan Pizza (see page 258)
6. Lovely's Fifty Fifty (see page 259)
7. Apizza Scholls (see next page)

8. Red Sauce Pizza (see page 260)
9. Handsome Pizza (see page 258)

NOT TO BE MISSED

10. Portland Saturday Market
11. Powell's Books
12. Vera Katz Eastbank Esplanade
13. Food cart pods

WORTH SEEING

14. Bob's Red Mill
15. Pearl District
16. International Rose Test Garden
17. Lan Su Chinese Garden
18. Portland Japanese Garden

The numbering system we've used for our maps is not a reflection of ranking—we've simply organized locations based on geographic proximity to the city center.

Apizza Scholls

We can tell Brian Spangler originally was a baker because of his fascination with dough—how it lives and breathes, how its needs can change with the weather. Kitchen staff record the temperature of the poolish and dough every day, to track and learn. Fresh yeast, not dried, is used. Sauce goes on top of cheese—an unusual assembly back in 2005 when they first opened, but more common now as pizzaioli recognize it as a way to thwart a gum line. When the dough runs out, customers are turned away. After starting his business in a backyard wood oven, Spangler swears by an electric pizza oven.



We tried the Amatriciana (pictured below), with mozzarella and Grana Padano, tomato sauce, house-cured bacon, and onions, and found it very satisfying. A local paper, *Willamette Week*, called the Sausage & Mama, with homemade sausage and Mama Lil's peppers, one of the "12 Wonders of Portland Food." This, Spangler feels, is both a blessing and a curse. With business still booming 15 years in, customers revolt if he tries to change anything, so his once-innovative ideas now feel much more common. To many, that matters none. They just want more of that good pizza, made from carefully crafted dough and quality ingredients.



Checkerboard Pizza

When downtown Portland's Pine Street Market food hall opened in 2016, Ken Forkish saw it as an opportunity. He initially envisioned a little outpost to highlight the bread he was making over at his bakery/restaurant, Trifecta, as well as some unusual pastries. Pizza by the slice also would be available. But a little more than a year later, he realized pizza was the hot item and shifted gears. Now, baked goods are the sideline. Forkish says the slices are a little bit Italian, a little bit New York; we'd characterize them as more the latter. The dough is proofed for three days, and the recipe here is different than at Ken's Artisan Pizza (see page 258). For one thing, it's made with 3% salt instead of 2.5%, which adds a bit of strength so the slices hold up. A display case holds six different slice options, including a seasonal selection, and the menu lists several other

whole pizzas available to order. The standards are very good, including a marinara with some anchovies tossed on at the very end to warm and almost melt into the sauce. We also enjoyed the Brooklyn slice, which had both fresh and aged mozzarella, capocollo, honey, and house-pickled jalapeños.

Order your slice, wait less than a minute for it to reheat, then take a seat at one of the long communal tables in this bustling food hall. The vibe here is casual—and Checkerboard offers not only beer and wine but shots of tequila or mescal to relax you even more. The pastry and bread are fun, too, including an unusual corn croissant, which has roasted corn husks ground into a dough that's hydrated with the juice from pressed kernels.





Handsome Pizza

Will Fain is such a pizza nerd that he was interviewed by the blog *Slice* even before he had his own pizzeria. He had caught the bug a few years earlier while working as a dishwasher in the pizza-forlorn region of New Zealand, and started obsessively making pizzas based on whatever tidbits he could pick up in the kitchen and on the internet. His Handsome Pizza, which shares the space with a bakery, is the only pizzeria we visited aside from Pepe in Grani (see page 161) where everything, including mixing, is done by hand.

Though Fain isn't an Oregon native, the place oozes Portland. There are pizzas named after locals (for instance, the founder of beloved bakery Tabor Bread), a dragon mural by the guy who did the special effects for *Gremlins* and *The Fly*, and comic book lamps made by a local artist. Perhaps most relevant, most of the ingredients come from local producers, including flour from Camas Country Mills in the nearby Willamette Valley. Everything about the place, including Fain himself, is inviting, right down to the mismatched vintage plates and the wood-fired oven. We tried the Gillian Richardson pizza (pictured left), with tomato sauce, Parmesan, Mama Lil's peppers, salt-cured olives, shallots, and seasonal greens, and could tell right away his flour mix was different. It includes about 25% whole wheat, which makes the crust darker and a little denser than most, with some nice char. A special pizza, with peaches, cherry tomatoes, fresh mozzarella, peppers, Grana Padano, and lemon zest, was also well balanced and delicious.

Ken's Artisan Pizza (50)^{NA #17}

A few years ago, a local Portland newspaper wrote a story about Ken's as a bastion of consistency. It was a compliment because the restaurant critic loved the pizza, but also a complaint because, heck, he was sick of seeing the same name on his "best pizzerias" list every year. Then a funny thing happened. Ken Forkish decided to change his recipe a bit. He told us the change came after a trip to Naples, where he studied with Enzo Coccia (see page 164) and became enamored with Neapolitan pizza. Forkish didn't want to be shackled to the same recipe forever, so after a long period of experimenting, he began introducing his customers to a slightly different version of pizza. In a beloved restaurant, this is a hard thing to do, but Forkish has pulled it off. The place is still just as packed and the pizza coming out of the wood-fired oven is very good.

Ken's take on Neapolitan is soft, but a little crispier than in Naples. The pizzas aren't crazy inventive like some we've seen elsewhere, but that isn't the point. The ingredients are refined, down to the house-made fresh mozzarella. We loved a seasonal pizza with sweet corn, squash, ricotta, and some pickled Jimmy Nardello peppers added after baking. Forkish is a welcoming host; the space is inviting and quintessentially Portland. It's built with Douglas fir beams, the tables are made from wood salvaged from a demolished local roller coaster, and its big sliding windows create an airy atmosphere. There's enough parking out front for 24 bicycles. See page 3:195 for our recipe for Soppressata Pizza, inspired by Ken Forkish.





Lovely's Fifty Fifty 50^{NA} #7

Walking into a restaurant featured in *Bon Appétit*, *Saveur*, *Goop*, and *Food & Wine*, you might expect to see a dose of attitude. Maybe something trendy. Certainly something overhyped. That's not what we saw. Lovely's first goal is to serve its North Portland neighborhood. Its food, mostly focused on pizza and ice cream, manages to be both affordable and cheffy, approachable and creative. Meanwhile, chef Sarah Minnick (pictured right) seemed as humble as she is talented. The pizza defies pigeonholing. Is it Neapolitan? Artisan? None of the above. Minnick has taken a centuries-old tradition and made something that's her own. It begins with an acidic sourdough crust made with locally sourced flour, including a fair amount of whole wheat. It was one of the best crusts we tried.

There aren't a lot of tomato sauce-based pizzas on the menu because she thinks it overwhelms the toppings. The menu changes frequently and is dictated, in part, by whatever local farmers can provide—which, sometimes, can seem a little weird. One day, it's flowers; another, it's goosefoot greens. But Minnick takes pains to say it's not fussy food. It's surprising, yes. Pretty to look at, too. Also, delicious.

We tried a pizza with nectarines, sweet corn, melted leeks, pancetta, and Il Nocciolo, a nutty, soft Italian cheese made from cow's, sheep's, and goat's milk. The combination was stunning. We thought at the time that this is how a fine-dining chef puts entrées together, balancing every ingredient against the others, each contributing to the whole. We were also blown away by a pizza with wilted greens, padrón peppers, green olives, lemon, fresh tomatoes, and Calabrian chilis. At that point, we were on our fourth pizzeria visit of the day, tired, and overfed. And yet we wanted to try everything on the menu.





Red Sauce Pizza

We tried hundreds of pizzas while researching this book. Yet there's one we all continued to talk about even months after our tasting tour was over. It wasn't the fanciest pizza we tried; it wasn't the most technically accomplished or the most original; it wasn't even the best. But everything about this place, and this particular pizza, felt so satisfying that it struck exactly the right chord for us. Shardell Dues, a firecracker who's funny, genuine, and swears like a sailor, opened Red Sauce Pizza in 2015. At the time, she'd been making pizza for nearly 20 years, including a management stint at Apizza Scholls. Her dream was to open her own restaurant that served good pizza in a place with no lines and no attitude, where neighborhood folks could gather. Her mom helped refurbish the secondhand chairs. Many of the pizzas are named after people who helped make her dream a reality. A patio even welcomed dogs, and

business hummed. A few months after our visit, Red Sauce moved to a new, slightly more upscale spot, but the charm remains. The pizza is New York-style, but Dues isn't one of those sticklers for perfection. The vibe was definitely chill.

That memorable pizza? It was a riff on a pie they call Cheeeeeeeeeeeeeeeeeese (pictured above)—listed on the menu with fresh and aged mozzarella, Grana Padano, and pecorino—but with the added bonus of fresh sliced green tomatoes, olive oil, and coarse salt added after baking. The crust had a slight char, the tomatoes were perfectly fresh (and, crucially, didn't make the crust gummy), and the whole thing was fantastic. If Red Sauce was in our neighborhood, we'd be there all the time.

Sizzle Pie

Among the Portland pizzerias we visited, Sizzle Pie is the only one (at the time) with multiple outlets—five in Portland and one each in Eugene, Oregon, and Reno, Nevada. It feels almost ironic that Sizzle has become a mini-chain. When Mikey McKennedy and Matt Jacobson first thought about opening a pizzeria, they envisioned a late-night joint that served stoner food, including pizza, waffles, and nachos. They weren't pizzaioli; they were heavy-metal heads. They ditched the nachos and waffles when they opened their first pizzeria in 2011, but the late-night heavy-metal vibe remains. The décor and merch look like they belong at a concert; the soundtrack is death metal; the pie names are often ironic nods to favorite movies and bands. The funny thing is, the place is run with a more corporate structure than most.

We categorize the pizza as New York-style, but they like to say it's also got "West Coast flair," and several local producers are featured on the menu. While there are many more high-quality pizzerias in Portland today than there were a decade ago, one thing that sets Sizzle Pie apart is its vegan pizza. We tried the Spiral Tap (pictured left), featuring creamy caramelized onion spread, a dusting of nutritional yeast, and a spiral of red sauce, and the Buffalo 666, with shredded buffalo jackfruit, vegan mozzarella, and ranch, red onions, and wing sauce. Meat eaters, do not despair: there are plenty of pork and chicken toppings, too.

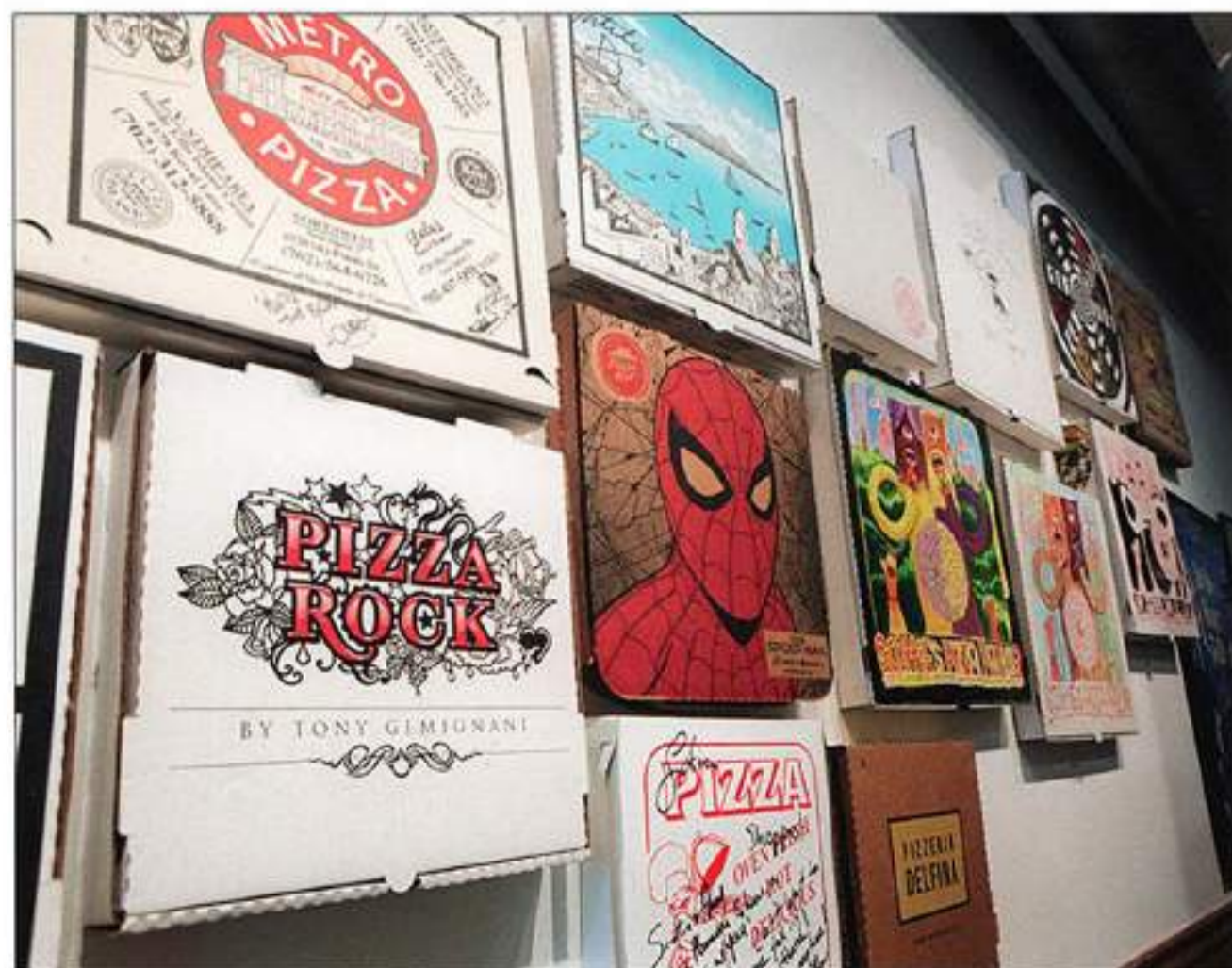


Scottie's Pizza Parlor

The throwback term "pizza parlor" makes sense here. Scottie's is old-fashioned in ways that feel good, yet manages to skip any old-fashioned stuff that's tired. Prominent features of the décor (for lack of a better term) include photos of Gene Wilder, Frida Kahlo, Bruce Lee, and other random famous people displayed in mismatched frames, along with pizza boxes from old-school New York pizzerias. Teenage Mutant Ninja Turtles and Pac-Man figure prominently.

Scottie Rivera (pictured below) was born in Brooklyn and, though he left New York as a kid, he really missed the corner pizzerias. He became obsessed, studying pizza books, blogs, and videos, and inching ever closer to what he considered the perfect pizza. We call it New York-style, but it has Rivera's spin. The dough is made with levain, which is unusual for

the style. He uses Shepherd's Grain flour. He sells both slices and whole pizzas that are baked using a proprietary process that drives off excess moisture, leaving the pizza just the right amount of crispy. Rivera spent some time working in fine dining, but decided he was more of a pizza guy and worked at Handsome Pizza (see page 258) before leaving to open his own place. We tried the Defino, a grandma-style square pie with fresh mozzarella, basil, oregano, garlic oil, pecorino, and tomato sauce. It was excellent, and we understand why it sells out almost every day. We also loved a pizza with tomato sauce, aged and fresh mozzarella, and pecorino, with basil, olive oil, and shaved Parmesan added after baking. Rivera's enthusiasm for pizza is as genuine as it is infectious. And he served us what turned out to be our favorite New York-style slice from across the country.



REST OF THE UNITED STATES

REST OF THE UNITED STATES BY THE NUMBERS

26 pizzerias visited

7 cities visited

Most popular styles of pizza:
artisan and New York

Unique set of toppings:
shrimp, banana, pineapple,
curry, peanuts

The average American eats about 10.4 kg (23 lbs) of it every year. We averaged about the much each research trip we took.

As an homage to America's favorite food, we made a classic pepperoni pizza in the shape of the United States.

A pilgrimage stopping at the places we visited across the rest of the United States would cover over 3,000 miles from Philadelphia, Pennsylvania, to San Francisco, California (with pit stops in Phoenix, Arizona, and Los Angeles, California). We might have added a few more stops, but the 2020 COVID-19 pandemic halted our travel. But the quality of the pizzas that we found in each of these cities would make the journey well worth it. Although the majority of the pizzerias that we went to served pizza that we would categorize as artisan (with the caveat that each pizza maker is really making their own style), we found outstanding Detroit-style pizza as well as a pizzeria that serves perhaps the highest number of unique styles under one roof (and executes each style at a high level).

San Francisco had a contingent of Italians that settled there during the late 19th century but the early pizzerias they opened didn't gain a foothold and spread across the region in the same way that

they did on the East Coast (see page 33). Several decades later, Los Angeles gave birth to an artisanal pizza movement that was much more popular and widespread. Two iconic pillars of this early LA pizza scene are Nancy Silverton and Wolfgang Puck (although we would be remiss not to mention that Alice Waters was also making artisan pizza up in San Francisco around this time). More recently, San Francisco and Los Angeles have become destinations for pizzas made by Tony Gemignani and Justin De Leon.

Similar to New York and Chicago, Philadelphia has a family tree of pizza makers that put their city on the map as a pizza destination. Pizzeria Beddia, Pizza Shackamaxon, and Pizza Brain are three highly acclaimed pizzerias that can all be found in the trendy Fishtown neighborhood in Philadelphia. It's a very different scene in Phoenix where Chris Bianco is the standard-bearer for making high-quality pizza and has been essentially from the time that he opened Pizzeria Bianco in the early 1990s.



LOS ANGELES

Apollonia's Pizzeria

If you asked us for a good place to eat pizza in Los Angeles, we'd send you to Apollonia's. If you asked us where you'd find the best Detroit-style pizza in the country, we'd say the same thing. Apollonia's. Yes, we realize we're sending you more than 2,000 miles from the Motor City, but this pizzeria really does have it going on. The fact that it's located in what used to be a strip-mall Chinese restaurant makes it all the more incongruous. It works because owner Justin De Leon (pictured right) pays attention to details. The ambiance is fun, with a large-scale mural by well-known local Chicano artist Gronk. The dough bakes up with nice, open crumb structure, the toppings are simple but well considered, and the presentation is fantastic, too. De Leon was a professional photographer and artist before opening Apollonia's in 2012, and his Instagram feed shows off that visual sense as it applies to pizza.

Initially, De Leon served only New York-style pizza, but after what he describes as four years of experimentation he added Detroit-style in 2018. The crust is prebaked, as we recommend (see page 3:110), the toppings are just short of over the top, and the frico around the rim rises over the pizza's edge in what he calls "scorpion tails."

We tried a pizza with pepperoni (pictured below) and added the optional dollop of burrata and Mike's Hot Honey (a common enhancement from a guy who likes spicy). We loved it. We tried another pizza featuring three cheeses, arugula, yellow grape tomatoes, and truffle oil. The beautiful presentation matched the flavor. De Leon is also into sausages made with less prevalent meats, such as rattlesnake.



Pizzeria Mozza (50)^{NA #5}

Nancy Silverton has been a vibrant presence on the California food scene for more than three decades, ever since opening La Brea Bakery in 1989 and, later, beloved restaurant Campanile. *Los Angeles Magazine* called her “one of the key architects of the artisanal bread movement we all take for granted today.” Her approach to cooking is painstaking, and her enormous baking experience has clearly influenced her pizza. At Pizzeria Mozza, the long-fermented dough is soft and light (made with a touch of milk), and the pizzas come out of the Italian-style wood-burning oven perfectly crispy.

In our taxonomy, we’d call her pizza artisan style, with topping combinations that are Italian-inspired but with a California twist. We tried a pizza with squash blossoms, tomato, and burrata that you could conceivably find on an Italian menu, was inventive and very Nancy. You can order a pizza margherita here, but you can also try Pizza alla Benno, with speck, pineapple, jalapeños, and mozzarella.



Initially, some customers were thrown. *What kind of pizza is this, anyway? Go to Italy and learn.* Silverton shrugged. She says it’s not supposed to be Neapolitan pizza; it’s her own creation. That was back in 2006, when the restaurant first opened, and when Americans were perhaps not as accustomed to pizza with complex topping combinations. Nearly 15 years later, Pizzeria Mozza is still wildly popular and quite enjoyable. The ambiance is casual but the menu invites exploration, with dozens of wines by the glass or bottle, along with painstakingly prepared salads, antipasti, and salumi.

In 2018, she and culinary partner Matt Molina opened a much more casual LA spot, Triple Beam Pizza, which sells pizza by the ounce inspired by Antico Forno Roscioli in Rome. See page 3:195 for our recipe for Sausage and Cream Pizza, inspired by Nancy Silverton.



Spago

When we were in Los Angeles, we knew we had to go to Spago, home of a 20th-century pizza revolution. When chef Wolfgang Puck hired a pizza maker named Ed LaDou, they had some wild ideas about what to put on pizza. At least they seemed pretty wacky back in the 1980s, when



the revolution started. Salmon? Caviar? Duck sausage? Sacrilege. But they did it anyway and, lo and behold, people flocked to Spago as a trendy hot spot. They created the category known as California-style pizza that spread around the world. Today we’d call this pizza artisan style.

Now, we’re much more accustomed to nontraditional pizza toppings and Spago’s menu doesn’t seem quite so wild anymore. Still, we had to experience it ourselves. The restaurant had closed its original, freewheeling West Hollywood location, but now the Puck empire circles the globe. We visited the location in Beverly Hills.

There are four pizzas on the lunch menu; during dinner, you can get pizza if you ask, but that’s no longer the focus here. Spago is much fancier than in its heyday, with pricey entrees, a tasting menu, and some nicely updated cocktails. We tried what is perhaps Puck’s most famous offering (pictured above), a pizza with house-cured smoked salmon, dill, crème fraîche, and salmon roe. If you’re looking for the original cheffy pizza, this was it. We also ordered a wild morel mushroom pizza with asparagus and goat cheese.

Even though it was nearly 40 years later and we had tasted pizzas around the world, we still considered the topping combinations good. Puck and LaDou’s revolution was more about the toppings than the dough, and by today’s standards, the dough wasn’t amazing. See page 3:79 for our recipe for Smoked Salmon and Caviar Pizza, inspired by Wolfgang Puck.

SAN FRANCISCO AND BAY AREA

Tony's Pizza Napoletana

The menu at Tony's Pizza Napoletana is impressive. There are over 10 unique styles of pizzas, ranging from Neapolitan to Detroit-style to New York (and almost every style in between). Each pizza is baked at a particular temperature in a specific oven; the kitchen is very unusual in that it features multiple ovens, including deck ovens, wood-fired pizza ovens, a Rotoflex pizza oven, and even a coal-fired pizza oven. The level of attention to detail that is paid to each pizza at Tony's Pizza Napoletana is plain to see.

Tony Gemignani started working at his brother's pizzeria in 1991 before traveling throughout Italy and the United States studying a wide variety of pizzas. In 2007, he entered the World Pizza Cup in Naples and managed to become the first American and non-Neapolitan to win the top prize. He later went on to win a total of 13 pizza competitions and is one of only three people in the world to be an official US Ambassador of Neapolitan Pizza, an award bestowed on him by the city of Naples. Gemignani also oversees his eponymous International School of Pizza

and 30 pizzerias located throughout California and in Las Vegas, Nevada.

A pizza maker that has been a central figure in Gemignani's pizza journey is Laura Meyer (shown below at right). She got her start in the pizza business at the age of 16 and Gemignani became her mentor right away. Meyer also traveled around Italy to study pizza while simultaneously entering pizza competitions. She was the first female and first American to win in the Pizza in Teglia (pizza in the pan) category in Parma. In 2012, she took over as head chef at Tony's Pizza Napoletana and she is currently the head chef at Capo's in San Francisco.

Tony takes every step of the pizza making process seriously, from the way that he mixes his doughs to the methodical ways in which he develops the flavor profiles of his pizzas. His motto to "respect the craft" is evident in every aspect of his business and in his book *The Pizza Bible*. See page 3:227 for our recipe for Cal-Italia Pizza, inspired by Tony Gemignani.



PHILADELPHIA

Pizzeria Beddia (50)^{NA} #24

There have been two incarnations of Pizzeria Beddia. Beddia 1.0 was famous for its excellent pizza and also its quotient of quirk. No phone orders, no seats, no credit cards, no décor to speak of, unless you count a couple of broken Dr. J bobbleheads. All that was part of its charm, which led *Bon Appétit* to declare it the best pizza in America. A reviewer for *Philadelphia* magazine called it “Jiro Dreams of Sushi, but Pizza.” He then posed a question: “What happens when a pizza that was once named the best in America is stripped of almost everything that made it that?” Which brings us to Beddia 2.0. It has all the normal attributes of a nice restaurant, including reservations, thoughtful décor, a cocktail list, and even a horse-shoe-shaped bar. The holdover, though, is some very good pizza.

Joe Beddia was a restaurant industry veteran who got the pizza bug after going to Japan, where he saw pizzaioli utterly devoted to their craft (see page 208). The experience was life changing. A few months later, he cold-called Chris Bianco (see next page), who shared this tip: find your voice. Your pizza voice. Beddia’s pizza featured simple ingredients: a well-fermented dough, canned Jersey tomatoes, house-made pork sausage, and fresh and aged mozzarella. Then, after baking, he’d finish it all off with a healthy grating of made-in-Pennsylvania cheese and a drizzle

of olive oil. He and a single employee made 40 pizzas a day in a way that seemed like some kind of penance. Customers were nuts for it.

In 2018, Beddia shut the place down. About a year later, he reopened, with a larger restaurant, partners, employees, the whole shebang. This is the pizzeria we visited. It’s still a little quirky, with its entrance tucked in an alley, beyond some razor wire and a chain-link fence. Above the bar hangs a smiling cloud light fixture. He says the dough is the same but he no longer makes all the pizzas. Instead, there’s a well-oiled assembly line, where everything is prepped in advance and pizzas are passed down the line on screens to be stretched, topped, baked, and finished. While it might sound rote, it ensures quality.

The pizza, by the way, is excellent. We’d classify it as New York style or artisan. There are four on the menu. We loved the #2 (pictured below left), with Calabrian chilis, garlic, dandelion greens, Royer Mountain cheese, and an amazing emulsified cream. Other pizzas are finished with Galen’s Good Old, another local cheese. They’re all rich and baked up crispy. He still favors local ingredients over Italian imports, just like at the original Pizzeria Beddia. But now, there are four ovens used in rotation to crank out up to 350 pizzas per night.



PHOENIX

Pizzeria Bianco 50^{NA}#2

Nowadays, you can find artisanal pizza in just about every city in America. When Chris Bianco (pictured below) started selling his handcrafted pizzas in 1988, the term wasn't on the radar. Even in 1994, when he opened Pizzeria Bianco, his style of pizza making—with well-fermented dough baked in a wood-fired oven, and locally sourced toppings chosen with the eye of a chef—was practically unheard of. What set Bianco apart even more was his devotion to craft. Some see Bianco as the spark of a pizza revolution that is still going strong today.

The fact that Pizzeria Bianco is in a desert 2,500 miles from New York makes the story seem surprising. Then again, Bianco told us that if he hadn't wound up in Phoenix, he probably wouldn't have come up with his heralded pizzas.

He grew up in New York in an Italian-American family who bonded around a boisterous dinner table. It was a world, he has said, where food was central. Asthma kept him inside as a kid, and he watched his Aunt Margie cook. As a teen, he worked at a local pizza joint, and then, after dropping out of school, worked at other restaurants, but didn't think of cooking as a profession. It was just biding time. Looking back, he realizes, he felt like he didn't have much to offer.

Then he and a friend took a trip to Phoenix, which, improbably, felt like home. Bianco began making fresh mozzarella in his apartment and selling it to local restaurants. While the operation wasn't exactly government approved, he figured, "How much time can you do for mozzarella?" The underground cheese gig led to catering, which led to an upscale grocery

store, where he leased a corner to make pizza. Over time, he found himself in the orbit of accomplished chefs such as Deborah Madison and soaked up everything he could, and he spent some time in Italy.

Suddenly, cooking wasn't just a job; it was a calling. It was family and struggle, sustenance and passion. It was a place where his background—from Aunt Margie to the Italian-American dinner table to the teenage pizzeria gig—had meaning. Finally, he knew he had something to offer. He realized something else, too: pizza didn't have to be like it was in New York, which at the time was rather, well, stale. Being so far from pizza's epicenter allowed him to create his own kind of pizza, made exactly how he chose. He wasn't judged according to some pre-established standard of how every other pizza maker had been operating for decades. It allowed him to create, for example, his famous Rosa (pictured below), a white pizza with Parmigiano-Reggiano, rosemary, slivered onions, and, of all things, Arizona pistachios. It's among our favorite artisanal pizzas. All of the pizzas we've eaten here have been well thought-out, from dough to sauce to toppings, and very good. His use of poolish reminded us of what we saw at Berberè (see page 186).

Bianco speaks in a stream-of-consciousness manner that made it hard to get very far on our most basic questions, such as "tell us about your dough." But we do know he believes in using basic but high-quality ingredients, doing each step as best as he possibly can, and working hard. Really hard. See page 2:225 for our recipe for Pizza Rossa, inspired by Chris Bianco.



CHAPTER 4
PIZZA DOUGH INGREDIENTS





FLOUR	273
WATER	288
YEAST	292
PREFERMENTS	298
SALT	313
SUGAR	315
FATS AND OILS	316
IMPROVING PIZZA DOUGH	322
INCLUSIONS	331



ANTICO MOINO
NAPOLI
1924
Produced by
ANTIMO CAPUTO

PIZZA DOUGH INGREDIENTS

Most pizza dough is made from four ingredients: flour, water, yeast, and salt. In a handful of recipes, olive oil is also present in the mix. What amazes us is how such a simple combination of ingredients can yield crusts with incredibly divergent flavors and textures, from the chewy, wide open rim of Neapolitan pizza to the crackerlike crispiness of thin-crust pizza. Because pizza dough is made from so few and such basic ingredients, it's important to understand their properties and how they interact with one another. Once you have that foundation, you will be able to manipulate these basic ingredients to achieve the outcomes you're looking for.

Flour (wheat flour, more precisely) contains the proteins that combine to create structure in your pizza dough in the form of gluten (see page 274). It also provides the sugars that feed the yeast and contribute to the browning of the crust in the oven. Yeast (in the form of commercial yeast or a preferment) drives fermentation (see page 292), which produces the gases (carbon dioxide) and alcohol (ethanol) that cause your pizza dough to rise and contribute to the quality of the interior crumb of the crust. It can also add flavor. Salt both enhances flavor and affects gluten development and the rate of fermentation. Water is perhaps the most important ingredient of all because, as a solvent, it kicks off all the chemical reactions that will determine the final characteristics of your baked crust. And along with

the carbon dioxide and ethanol produced by the yeast, it is responsible for the rapid rise of your pizza dough in the oven, known as oven spring (see page 3:392). In some instances, oil is added to the dough. Small percentages of fat can help increase volume in the crust and are used in pizzas that are parbaked or fully baked and reheated, like New York pizza dough, New York square pizza dough, and al taglio dough.

As superficially simple as pizza dough seems, it can provide the pizza maker with challenges. What if you want to make your crust gluten-free, or add other flours that aren't as effective at creating structure as wheat flour? Or if you want a browner, crispier crust? Or you want a dough that you can easily roll out very thinly? Each of these outcomes can be achieved by adjusting your ingredients and/or technique.

We also include an overview of inclusions, the flavor and/or texture enhancers you can add directly to the pizza dough—cheese, nuts, fresh herbs, cured meats, chopped cooked or raw vegetables and fruits. We also cover grains and seeds that can be soaked, sprouted, or cooked to al dente or into porridge or puree, each yielding a different crust texture. Another option is to add flavored liquids and purees to the dough, including raw, cooked, and canned fruits and vegetables, sauces, stocks, and nut butters and pastes. We provide you with handy charts and instructions that will allow you to mix, match, and improvise your own creative pizza crusts.

The two preferments that we use in our pizza dough recipes are poolish (a combination of flour, water, and instant yeast) and levain (flour, water, wild yeast, and lactic acid bacteria). Both allow the flour to get a jump-start on fermentation and add flavor to the dough (see page 298).

NEW DISCOVERIES AND TECHNIQUES

Our Recommended Flours (see page 283)

Flour particle size experiment (see page 284)

Does your water make a difference? (see page 291)

Second-Chance Levain (see page 310)

Varying fat in our master pizza doughs (see page 318)

How to improve volume in bread-like pizzas (see page 325)

Our Favorite Dough Relaxers (see page 327)

Our homage to the 16th-century Italian painter Giuseppe Arcimboldo, famous for his playful portraits made of fruits and vegetables, includes one of a handful of simple ingredients used in pizza dough—flour.



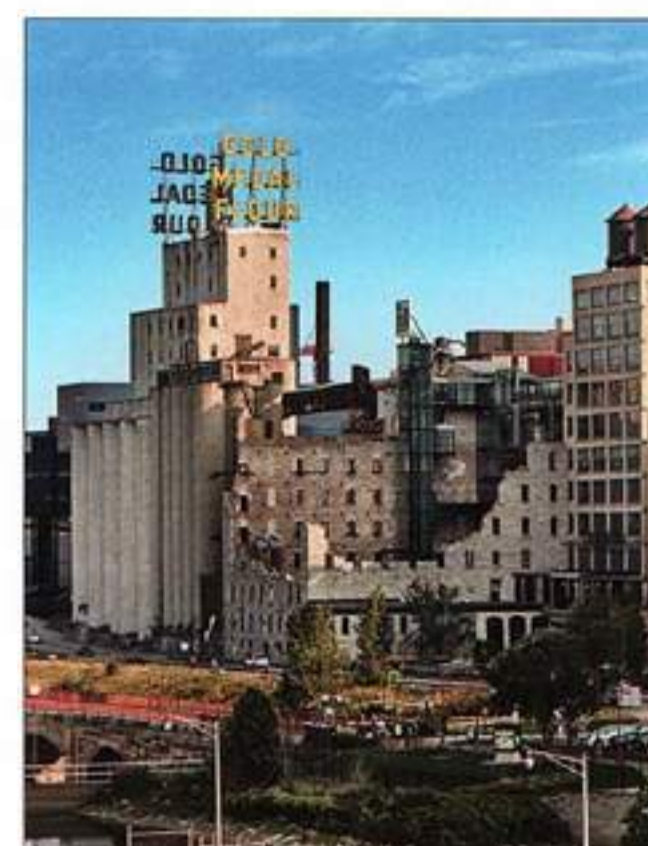
FLOUR

Flour is the fundamental building block of pizza dough. In much of the world, it has played a vital role in the human diet. Over time, we've come to think of all flour as uniform and entirely interchangeable. In fact, until about 135 years ago, flour mills didn't even put brand names on their packaging (General Mills was the first to do so, with its Gold Medal flour). They simply sold bags labeled "flour."

But all flour is not created equal. It can be made from any number of different grains that can vary radically in flavor and composition, both of which can have a significant impact on the final baked product. In pizza making, wheat is largely the flour of choice, but even within wheat flour there are more decisions to be made. There are different

species of wheat, different strains of wheat within the same species, and different ways of milling flour, all of which can affect the quality of your dough and your baked crust. It might sound overwhelming, but a basic understanding of the different types of wheat and wheat flours will help you achieve the baked outcome you want.

We also touch on the world of gluten-free flours. In our opinion, this realm is still in its infancy, and many of the gluten-free flour blends on the market today aren't as well developed as wheat flours—yet. Later in this book, we explore this growing world in our recipes, including a gluten-free flour blend on page 2:199 that we developed in our kitchen.



In 1880, Gold Medal flour became the first US flour to be marketed nationally. It was shipped cross-country from Minneapolis via railcar. Today, the old mill buildings still stand in the downtown area.

ANATOMY OF A WHEAT KERNEL

Like all grain kernels, the wheat kernel is composed of three main parts: the bran, germ, and endosperm. The vast majority of wheat flour on the market is made from the endosperm, which is slightly softer and whiter than the other two parts. In whole wheat flour, the bran and germ

are removed and then added back to the endosperm after it has been ground (see page 285), unless you are buying your flour from a specialty mill that grinds the whole kernels.

WHOLE KERNEL

Botanists call this the caryopsis; in grocery stores, you might see it sold as a wheat berry, but here we call it a wheat kernel.

BRAN

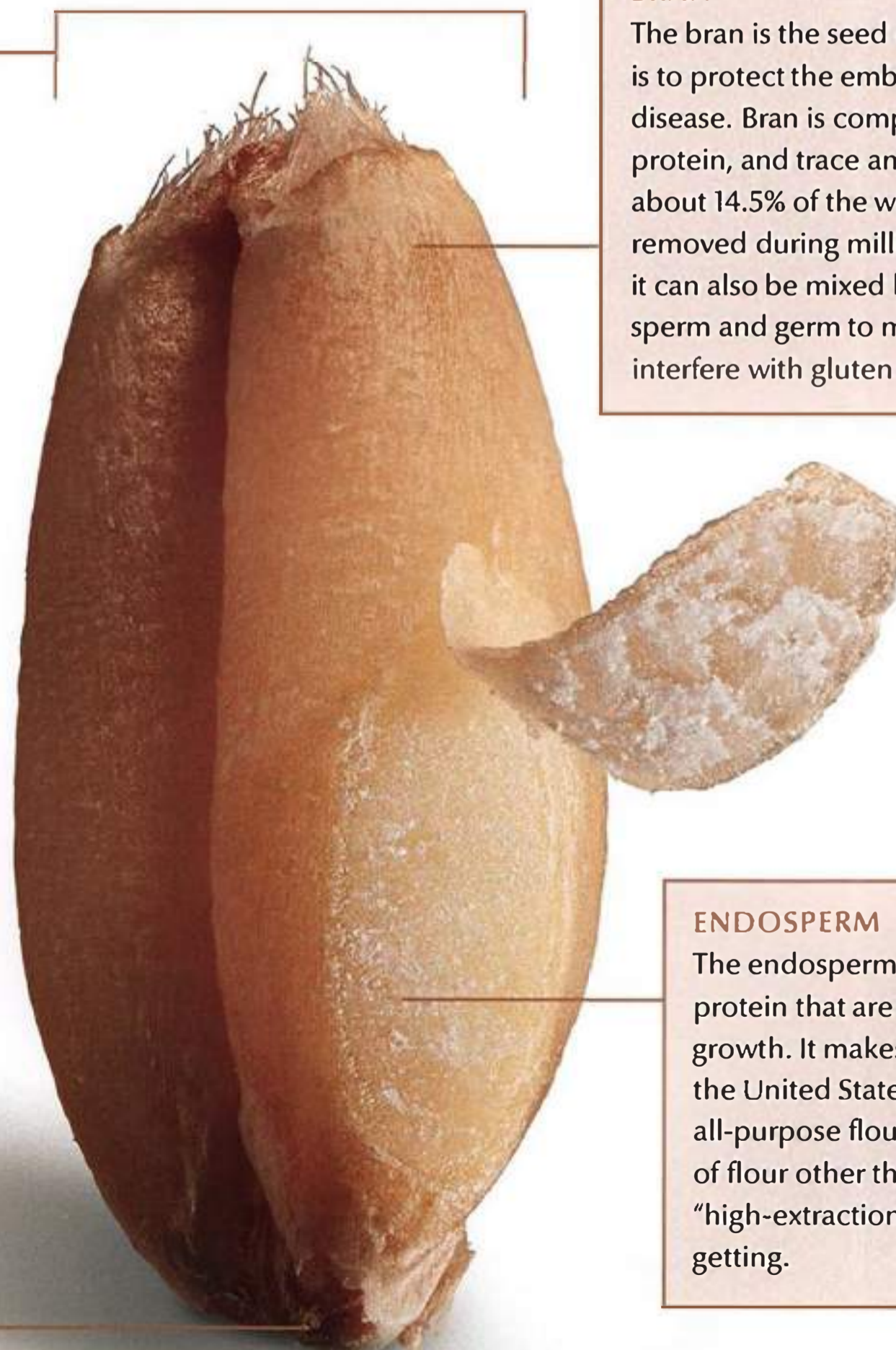
The bran is the seed coat of the kernel, and its role is to protect the embryonic plant from pests and disease. Bran is composed of fiber, vitamins, a bit of protein, and trace amounts of minerals; it accounts for about 14.5% of the wheat kernel. Typically the bran is removed during milling. It can be sold separately, but it can also be mixed back in with the ground endosperm and germ to make whole wheat flour. Bran can interfere with gluten development (see page 285).

GERM

The germ is the embryo of the living grain and makes up 2.5% of the wheat kernel; it contains proteins, oils, and vitamins, as well as enzymes that, as part of the growing process, trigger the release of nutrients from the remainder of the seed to sustain it. Like the bran, this part is typically separated out during milling. It can be sold separately as wheat germ or mixed back in with ground endosperm and bran to make whole wheat flour.

ENDOSPERM

The endosperm contains the carbohydrates and protein that are the energy source for the seed's growth. It makes up 83% of the wheat kernel. In the United States, if you're buying bread flour, all-purpose flour, high-gluten flour, or any kind of flour other than that labeled "whole wheat" or "high-extraction," the endosperm is what you're getting.



Sometimes, you'll see the terms "gelatinization" and "gelation" in the cooking world. And sometimes, they're used incorrectly. Gelatinization is the structural transformation—that is, the breakdown of intermolecular bonds—that occurs when starch granules are heated with water. This causes a loss of order and crystallinity in the starch granule, which results in a loss of birefringence (the double refraction of light). The loss of crystallinity allows the starch granule to absorb water and swell. Gelation, on the other hand, is the formation of a cross-linked network upon cooling of the swollen starch.



What happens when you cook a starch with water? It becomes a clear gel. That's right, a gel. And yes, while the inside of your pizza rim may appear white, if you look closely at an open-crust pizza crust, the very thin alveoli are transparent sheets of set gel. When the sections of crumb overlap (with drops of water stacking up), they appear white.

For more on the formation and development of gluten, see page 2:29.

WHAT IS IN FLOUR?

At its most basic, flour is just pulverized grain. Recent research suggests it may have been used for food since the Paleolithic period. But flour is an ingredient far more complex than it may first appear. Flour's components—including protein, starch, water, fats, and enzymes—all impact the way a dough mixes, ferments, and bakes.

Protein

There are many types of proteins, and they have different properties. Wheat flour contains four groups of proteins: albumin, globulin, gliadin, and glutenin. For pizza and bread makers, it's the latter two that matter because they are the proteins responsible for creating gluten. Without gluten, we would not have the chewy, crispy, open-crust breads and crusts we love so well.

Wheat flour itself does not contain gluten. Gluten is formed when glutenin and gliadin are hydrated. Until the proteins come into contact with water, there is no gluten. So, when discussing a particular flour, it is more accurate to talk about its gluten potential than its protein percentage (bakers often refer to good gluten-forming flours as "strong" and those that aren't as "weak"). But accuracy doesn't always win out, so you will see flours labeled "high-gluten" and bakers talking about a flour's gluten content.

This leads to a second point that needs to be understood. Gluten content and protein content are not interchangeable. In the field, wheat protein levels can range from about 8%–18%, depending not only on genetic differences among wheat varieties but also on soil conditions, rainfall, and temperature

during the growing season. At the mill, a variety of grains are often blended to reach a targeted protein count to make a more reliable and consistent product for the baker or pizzaiolo.

Starch

Starch is the largest component of flour, making up 63%–72% of its total weight. Chemically, starch consists of two sugar polymers, amylose and amylopectin. The polymers are long chains of the simple sugar glucose and occur in flour in small granules. The granules are too small to see with the naked eye but can be seen with a simple microscope. They are water insoluble and partially crystalline.

When making a dough, as broken starch granules (see Starch Damage below) come into contact with water, they swell like sponges. When the dough goes into the oven, this water-starch combination will start to gelatinize, or convert from a solid to a soft starch-water gel. At about 85°C / 185°F, the majority of the starch granules have gelatinized and the dough is considered to be "pasted" or, in more colloquial terms, cooked out. The starch continues to take on water from the gluten, producing a consistent gel (the paste) and carrying the water throughout the dough. As the temperature of the dough increases, the water is converted to steam, and that vapor inflates the bubbles in the dough (see page 2:392). As the gelatinized starch around the bubbles sets, it forms the crumb structure. Once the pizza is removed from the oven and cools, the amylopectin and amylose take on new, crystallized forms. Over time, the starch will go through a process called retrogradation—a technical term for staling.

STARCH DAMAGE

Starch granules can be damaged during the milling process, which uses pressure and shear to crush the grains. Since it takes greater force to mill harder grains, hard wheat generally sustains more starch damage than soft wheat.

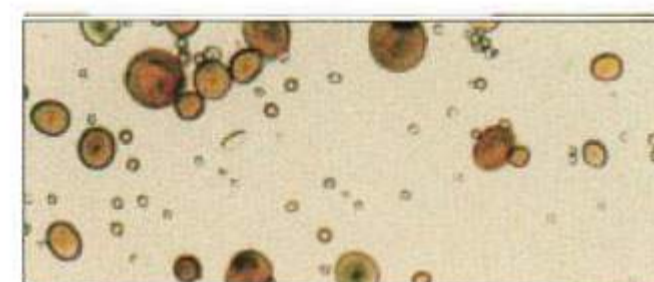
When flour is mixed with water to form dough, the broken starch granules tend to absorb more water than intact ones. Because there is less starch damage in soft wheats, their flours (cake flour, pastry flour) absorb much less water than flours made from hard wheats, such as bread flour.

If there is too much starch damage, the flour will adsorb excess water, resulting in a flattened dough

during proofing (see page 2:65). If there is too little starch damage, the flour will have a lower adsorption and be difficult to handle.

Additionally, damaged starch is broken down (via hydrolysis) by the enzyme amylase (see next page) into the sugars that yeast feed on (see page 292); granules that aren't damaged (known as native starches) are not.

Millers can fine-tune the process to hit a targeted percentage of starch damage. The typical range for hard wheats (red winter and red spring) is 8%–12%; for soft wheats, it's below 4%.



Microscopic images of starch granules stained with iodine show the difference between intact granules (above) and granules that have been damaged from milling (below). The black arrows point to the damaged starch.



Water

Although it might not be immediately evident, there is water in flour. The grain contains water when harvested, and water is added during the milling process in a step called tempering, which improves the efficiency of flour extraction. Part of this water remains in the flour after milling, typically 12%–14%, depending on the flour type. The water content will also depend on the relative humidity of the storage environment.

Fats

On average, fats, or lipids, represent about 2.5% of the total weight of 100% whole wheat flour. Notable lipids found in flour include tocopherols, which work as antioxidants and are collectively known as vitamin E, as well as carotenoids, whose orange-yellow pigment gives the crumb of some pizza crusts a creamy yellow color. Durum wheat has a bright yellow color because it contains a higher level of carotenoids.

Note that the majority of a grain's lipids are contained in the germ, which is generally removed during milling. Part of the reason it's removed is because fats can oxidize and turn rancid, so removing the germ extends flour's shelf life.

Enzymes

Flour supplies three enzymes that are indispensable in making pizza dough: amylase, protease, and pentosanase (present in rye flour; see page 286). Amylase breaks down the amylose and amylopectin present in starch into the sugars that yeast feed on (see page 315). Protease snips gluten strands, which (counterintuitively) can speed gluten development (see page 2:29). Pentosanase reacts with the polysaccharide pentosan to help create a gas-retaining structure in rye bread (see page 286). All of these reactions happen when water is added to flour.

Phytase enzymes liberate the phosphate from wheat, which is bound to a molecule called phytate. Phytate is important in nutrition; in the case of whole wheat bread, it can actually make it less nutritious than white bread (see page 285).

Lipoxidases (also known as lipoxygenases) specialize in breaking down fatty acids. Lipoxidases can also destroy the carotenoid pigments that give flour its creamy off-white color. That's good when bakers want a very white crumb; for a creamy yellow crumb, the trick is to avoid overmixing (see page 2:36) because oxygen is also required for lipoxygenase activity.

When you stick a bunch of sugars together, you get a polysaccharide. Starch is a polysaccharide.

Flour naturally contains numerous enzymes, but millers can also add certain enzymes to their flour to achieve desired results (see page 281).

CHEMISTRY CHEAT SHEET

The world of chemistry is very neatly organized. The names, or nomenclature, given to chemical substances are so specific that you can figure out what a chemical is or what it does based on the last few letters in its name. The most common endings for various chemical terms that link to pizza-making include:

-ose: sugar.

Examples: *sucrose, lactose, fructose*

-ol: alcohol.

Examples: *ethanol, methanol, cholesterol (yes, it's an alcohol)*

-ase: enzyme.

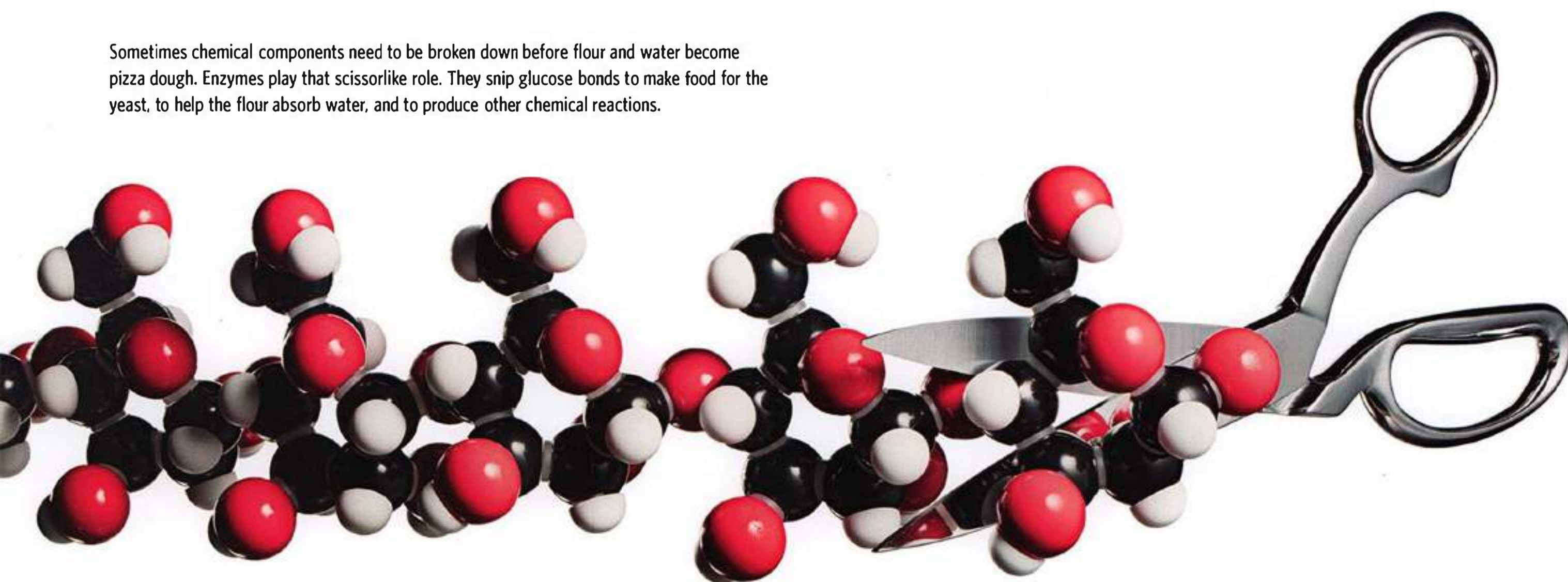
Examples: *amylase, lipoxidase, protease.*

Enzymes break down their matching sugars or proteins, so amylase breaks down amylose, lactase breaks down lactose, and so on.

Enzymes

Enzyme name	Function in flour	Function in dough
amylase	breaks down amylose and amylopectin	makes food for the yeast
lipoxidase	breaks down lipids (fats)	affects the color of the crumb
pentosanase	breaks down pentosan	affects dough's ability to absorb water
phytase	liberates phosphate (bound in a molecule called phytate)	makes minerals in grain, such as calcium and magnesium, digestible for humans
protease	breaks down protein	can make dough more extensible

Sometimes chemical components need to be broken down before flour and water become pizza dough. Enzymes play that scissorlike role. They snip glucose bonds to make food for the yeast, to help the flour absorb water, and to produce other chemical reactions.





TYPES OF WHEAT FLOUR

There are two overarching categories that wheat flour can fall into: refined flour and whole wheat flour. Within those two big buckets is a tangle of subcategories and systems of flour classification that differ from country to country. Our focus here is on those most commonly used in pizza making.

In the industrial milling process, the wheat kernels are sheared by rollers, and then the crushed grains are passed through sifters to remove the bran and germ. This process is repeated several times. With each pass, the particles get smaller, and with each sifting the flour gets whiter as more of the bran and germ is captured and removed, until very little remains. This is refined flour, also called white flour.

Refined flour can be made from all types of wheat and used for any number of purposes, from cake flour to all-purpose flour to bread flour. The qualities of the wheat itself are what distinguish one type of flour from another. However, almost all flours are blended from multiple wheats with the aim of keeping the dough and baking properties consistent over time. Generally though, hard wheat flours have a higher protein content and are used for bread and most pizza doughs, while soft wheat flours usually have a lower protein content and are mostly used for pastries and cookies, or in a blend with hard wheat flour to make all-purpose flour. In the world of pizza, the flour type will vary as some pizza doughs benefit from the inclusion of soft wheat flour (such as Brazilian thin-crust pizza dough) and others from the use of hard wheat flour (such as focaccia and New York pizza doughs).

All-Purpose, Bread, and High-Gluten Bread Flours

In the United States, the primary flours used for pizza making are high-gluten bread flour, bread flour, and all-purpose flour. There's a lot of all-purpose flour out there, but unfortunately there's not an agreement on what all-purpose flour is, so the term has become somewhat of a catchall. Generally all-purpose flour is made with a blend of hard and soft wheats and has a protein content of 10%–11%. But it can also be made from entirely hard or soft wheat, and in our research and testing, we have found flours labeled as “all-purpose” with protein contents ranging from 8%–13%. This can have a significant impact on your baked pizza, but this probably matters less if you're baking something like cookies. Compounding this is the fact that the percentage of protein a flour contains isn't always listed on the packaging; if you are lucky, you might find it on the manufacturer's website. Because protein counts vary from brand to brand, we strongly encourage you to try to find out the protein content of your flour to help ensure that you will successfully execute the recipes in this book. If you can't find information online, try reaching out to the manufacturer directly. Alternatively, you can pay to have the flour tested by a lab like we did when we wanted to analyze the particle sizes of different flours (see page 284).

Bread flour is milled from hard red spring and/or winter wheat and has a protein content of 11%–13%. High-gluten bread flour is milled mostly from hard red spring wheat, which often contains the highest percentage of protein (it can be 13% or higher).

When we traveled the globe researching pizza (see page 149), we always asked what kind of flour the pizzeria used. We found several establishments that proudly displayed a flour that was blended exclusively for them. Do the slight differences in the custom flour blend really make that much of a difference when compared with commercially available flour? We don't buy it. Also, we literally can't.

We have a thorough discussion of the flour milling process in *Modernist Bread* if you would like more details about how grains are turned into flour.

The Antico Molino Caputo mill in Naples, Italy, dates back to 1924. The interior of the mill (left) reveals a maze of pipes connecting the sifters to the roller mills. This location is the very heart of the mill.

EXPERIMENT

USING CAKE FLOUR IN OUR BRAZILIAN THIN-CRUST PIZZA DOUGH

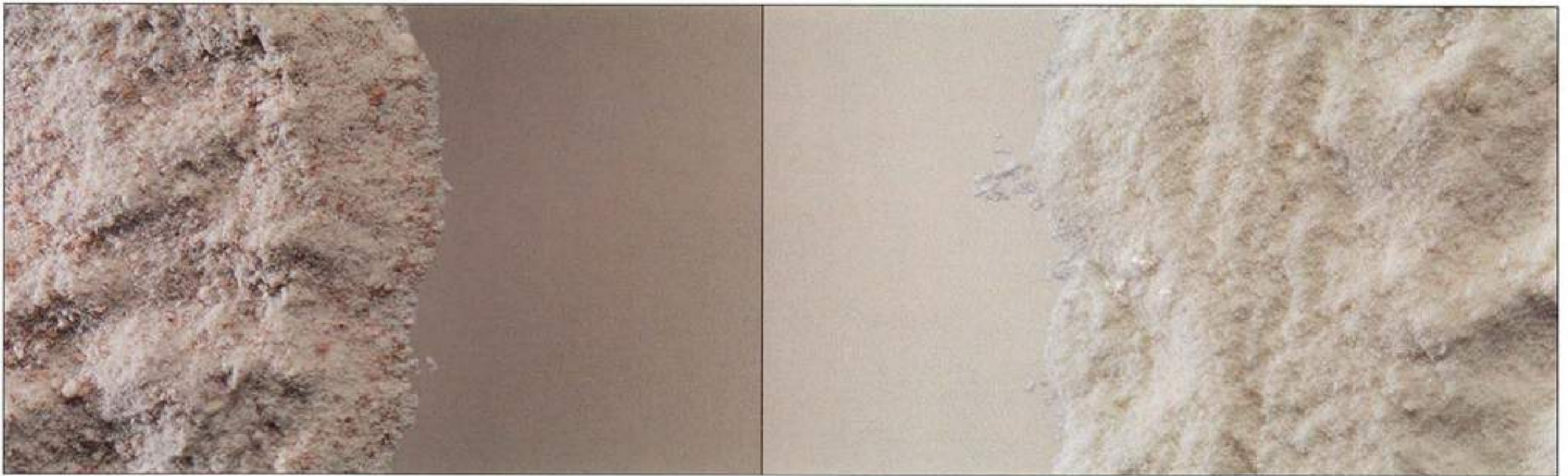
After indulging in pizza in Brazil, we found that there is a favorite flour brand among the Paulistano pizzaioli: Anaconda (specifically Farinha de Trigo, Tipo 1). This softer flour contributes to a light crunch in the crust, while the low hydration of our Brazilian Thin-Crust Pizza Dough (see page 2:114) adds a firm structure. This combination creates a thin crust that can support heavy toppings.

Since Anaconda can be challenging to find outside of Brazil, we set about creating a flour blend with similar attributes. Anaconda flour has a moderate to low protein content; to mimic this, we tested our dough with combinations of cake and bread flour as well as 100% cake flour and 100% bread flour. After several trials, we concluded that 60% cake flour and 40% bread flour yielded the closest thing to the thin-crust pizzas that we ate in Brazil.

While the main focus of the experiment was to re-create the original flour, we made some interesting observations about the dough while we were testing. It was very forgiving when we adjusted the flour protein levels because of the low hydration. While we recommend 60% cake

flour and 40% bread flour, you can basically adjust this ratio however you like. Just keep in mind that the dough might handle slightly differently, and the texture of the finished crust might vary. For example, when using 100% cake flour, the dough is much easier to mix but also leads to a dough that is soft and weak. Shaping is a more delicate process for a soft dough, and the baked pizza crust will be more brittle. Conversely, a stronger dough is formed when using only bread flour. This dough will require a bit more muscle to extend and shape, but it provides a solid pizza base. This stability leads to a crunchier crust and the capacity to withstand more toppings.





The bran and germ in the 100% stone-ground whole wheat flour on the left could produce a pizza crust with a lower volume than one made with the 00 flour on the right. It all depends on how much whole wheat flour is included in the dough—less than 30% shouldn't make a difference.

Hard wheat sustains a lot of starch damage (see page 274) during milling; this, together with the high protein content, means it requires a lot more water when used to make dough.

As you can see, with each of these types of flour, there is overlap in protein content. In our recipes we specify the preferred protein content of the flour(s) called for and suggest some specific brands. Use whatever brand appeals to you or is available, so long as you stay within the recommended range.

Specific Pizza Flours

When we started making pizza doughs for *Modernist Bread*, we made them exclusively with the bread flour that we used for most of the breads in the book. We reasoned that these recipes were ones that bread bakers would make, either at home or in their bakeries or restaurants, and they would need to use the flour they had at hand. While you can make a very good pizza with pretty much any kind of bread flour or all-purpose flour, we knew we needed to reevaluate and expand our flour repertoire for *Modernist Pizza*.

When you start making different styles of pizza, the flour that you choose can have a substantial impact. Neapolitan pizza dough is radically different from New York square pizza dough, so you'll need a strong flour for the latter in order for it to be able to expand when the water in the dough converts to steam in the oven. A weaker flour makes for Neapolitan pizzas that are easy to shape just before baking. Our recipes specify the type of flour and the brand we recommend. We also provide a table of flour substitutions on page 283 in case you can't find our recommended flour.

Different pizzaioli (and bakers) look for different things in their flour—specific properties that they need for their dough to perform a certain way. Many of them will start with the spec sheet the flour mill provides that list the pertinent details of the flour. Interestingly, depending on which part of the world

you are in, pizzaioli often zero in on a single section of the spec sheet. In the United States, it is typically the protein content, which ties into the gluten-forming properties (see page 274) and indicates the potential strength of the dough. In France and in Germany, it is the ash content. The lower the ash content percentage, the softer the flour and the less bran and germ it will contain (see page 273).

In Italy, they home in on what is informally called the W number, which measures viscoelasticity. This number is akin to the results that you get from the alveograph, a machine that measures the resistance (strength) and the extensibility of a dough (in other words, the viscoelastic properties of the dough). The weaker the flour, the smaller the W number. Strength and extensibility are desirable for making bread-like pizzas, such as al taglio pizza or focaccia, so you would choose a flour with a higher W number. For pizzas like Neapolitan pizza, a much lower W number is desired. If you make a Neapolitan pizza dough two days before you need it, however, the dough will be easy to shape no matter how strong the gluten is since the dough will have had enough time to relax.

While all of these measurements give you valuable information, we would argue that no single number matters the most. We suggest taking more numbers into consideration to get a full picture of a flour before you decide. Even then, it is a good idea to test different flours that are similar to each other before you decide on the one for your establishment.

00 Flour

When it comes to making Neapolitan and Neapolitan-style pizza, the type of flour that we saw most used around the world was 00 flour. Some pizza makers swear by it for other styles of pizza, too. While we had successful results using this flour and recommend it for our Neapolitan pizza, we want to stress that there are many flours besides 00 that can be used to make outstanding pizza. There is a lot of



For the alveograph test, flour is mixed with water and salt to make a dough that is extruded into a thin sheet. This sheet is then expanded with compressed air until the bubble pops. The resulting numbers are averaged out and displayed as a curve on a graph. The length of the curve in the graph is directly related to the extensibility of the dough, while the height of the peak of the curve measures the resistance of the dough to deformation. The area under the curve of the graph shows the force that is needed for the dough to expand. This is taken as a measure of the baking strength of the flour.

mysticism surrounding flour. Some people swear by 00 flour because they believe that the label means a smaller particle size, which, in theory, guarantees a superior pizza because a smaller particle size means better water absorption. This is not the case (see page 284) and points to a misinterpretation of what the 00 designation means.

Different parts of the world have different ways of grading flours. In France, for example, millers grade their flours using a T rating, which is based on the ash content of the flour. The ash count measures the flour's mineral content. Since most of the minerals contained in a wheat kernel are in the bran and germ, the higher the ash content, the more of the bran and germ that remain, and the darker the color of the flour. For example, T85 flour contains 0.75%–0.9% ash, while T65 flour contains 0.62%–0.75% ash. T55 flour would be commensurate to bread flour. In the United States, Central Milling sells various grades of almost whole wheat flour using a T grading system, too.

A similar classification system based on ash content is used in Italy. These are the types of flour according to Italian legislation, and their ash content by weight:

Tipo 00: $\leq 0.55\%$

Tipo 0: 0.55%–0.65%

Tipo 1: 0.65%–0.8%

Tipo 2: 0.8%–0.95%

Integrale (which would be classified as whole wheat in the US): 1.4%–1.7%

The Italian classification system has nothing to do with the particle size of the flour; 00 is not that

different in size from 0 or even Tipo 2 (see page 284). In part, the particle size is determined by the mill and its capacity. The Neapolitan mill Antico Molino Caputo, for instance, runs the grain through 32 rollers before bagging it, avoiding starch damage and yielding a finer flour. Since their method involves milling the grain in many small stages, they're able to prevent problems that other mills may face. But not every mill has this capacity, so particle size varies across the same grade for flours from different mills.

The Italian system also establishes protein content minimums for each grade, but that doesn't necessarily indicate how strong any particular flour is. Any of these grades can be made with soft wheat or hard wheat. 00 flour can be made with soft (low protein) wheat or hard (high protein) wheat. Here are the protein minimums for each grade by weight:

Tipo 00: $> 9\%$

Tipo 0: $\geq 11\%$

Tipo 1: $\geq 12\%$

Tipo 2: $\geq 12\%$

Integrale (which would be classified as whole wheat in the US): $> 12\%$

Flour can also be classified by its extraction rate. This refers to how much flour can be extracted from a shipment of grain. While there is a positive correlation between the extraction rate and ash content, they are not synonymous. In general, the higher the extraction rate, the greater the percentage of bran and germ in the flour. When deciding whether to work with high-extraction flours, keep in mind that bran and germ can interfere with gluten development.

To determine the ash content, a sample of flour is incinerated in a furnace that is heated to temperatures between 570–600°C / 1,060–1,110°F. Anything that does not volatilize is weighed, and the ash is expressed as a percentage of the amount of flour that was incinerated.

00 flour is not just for pizzas; there are 00 flours formulated for pastries and gnocchi. Some pizzaioli blend 00 flour to obtain their preferred pizzas. We even ran across a champion pizza maker who blended six different types of flour to obtain the result he wanted. We have our flour recommendations on page 283 but use what works for you. Keep in mind that certain flours, like whole wheat flour or corn flour, will add a specific flavor to your pizza.

In the realm of pizza, flour is one of the cheapest ingredients. But what if you want to use imported flour? It may or may not be available in your area. In order to offset the cost of shipping flour, it is often shipped in containers on boats, which is the slowest possible way but also the cheapest. Pizzerias in or near large cities can usually count on their distributor carrying the flour they want. But you can make great pizza without having to rely on imported flour (see Our Recommended Flours, page 283).

THE POPULARITY OF CAPUTO FLOUR

There are a number of very good mills that produce high-quality flour in Italy and the United States. It is Caputo, however, that has long been making a consistent, high-quality product readily available worldwide (see page 75). Caputo flour is easily recognized by its iconic blue bags (they color-code their bags based on flour type). This has been a significant part of the marketing success of the company; we frequently hear pizzaioli refer to “Caputo blue” rather than “Caputo Pizzeria 00 Flour.” These color-coded bags also make it easy to keep track of inventory if you use multiple types of their flour. Other mills have followed suit and now use a similar color coding system. In addition to their classic flours such as Pizzeria 00 or Manitoba 0 flours, they have also developed a gluten-free flour blend and two versions of their Nuvola flour. The latter is being embraced by a new generation of Neapolitan pizzaioli who swear by its ability to make super airy cornicione (see page 135).

Because pizzaioli everywhere swear by Caputo flour, we wanted to put it to the test. We ordered dozens of flours from around the world and did blind triangle taste tests as well as extensograph tests to see how the flours behaved when used in our different master doughs. These tests led

to the recommendations on page 283 and brought us to the conclusion that you don't *have* to use Caputo flour. That said, Caputo flour will give you solid results, especially when it comes to Neapolitan-style pizzas.



DEMYSTIFYING FLOUR LABELS

The label on a bag of flour can include a lot of terms, some more familiar than others. Here we've categorized them by flour type (think bread flour, all-purpose flour, etc.) and other terminology (such as added ingredients and marketing terms).

Types of Flour

These categories will give you a rough approximation of a flour's protein count—and we do mean rough. The protein content can vary wildly from brand to brand, so be sure to check the label.

00 FLOUR ①

Using 00 flour for pizza is popular, and we recommend it for our Neapolitan pizza. This Italian classification system establishes a minimum protein content for each grade:

- Tipo 00: ≥9%
- Tipo 0: ≥11%
- Tipo 1: ≥12%
- Tipo 2: ≥12%
- Integrale: ≥12%



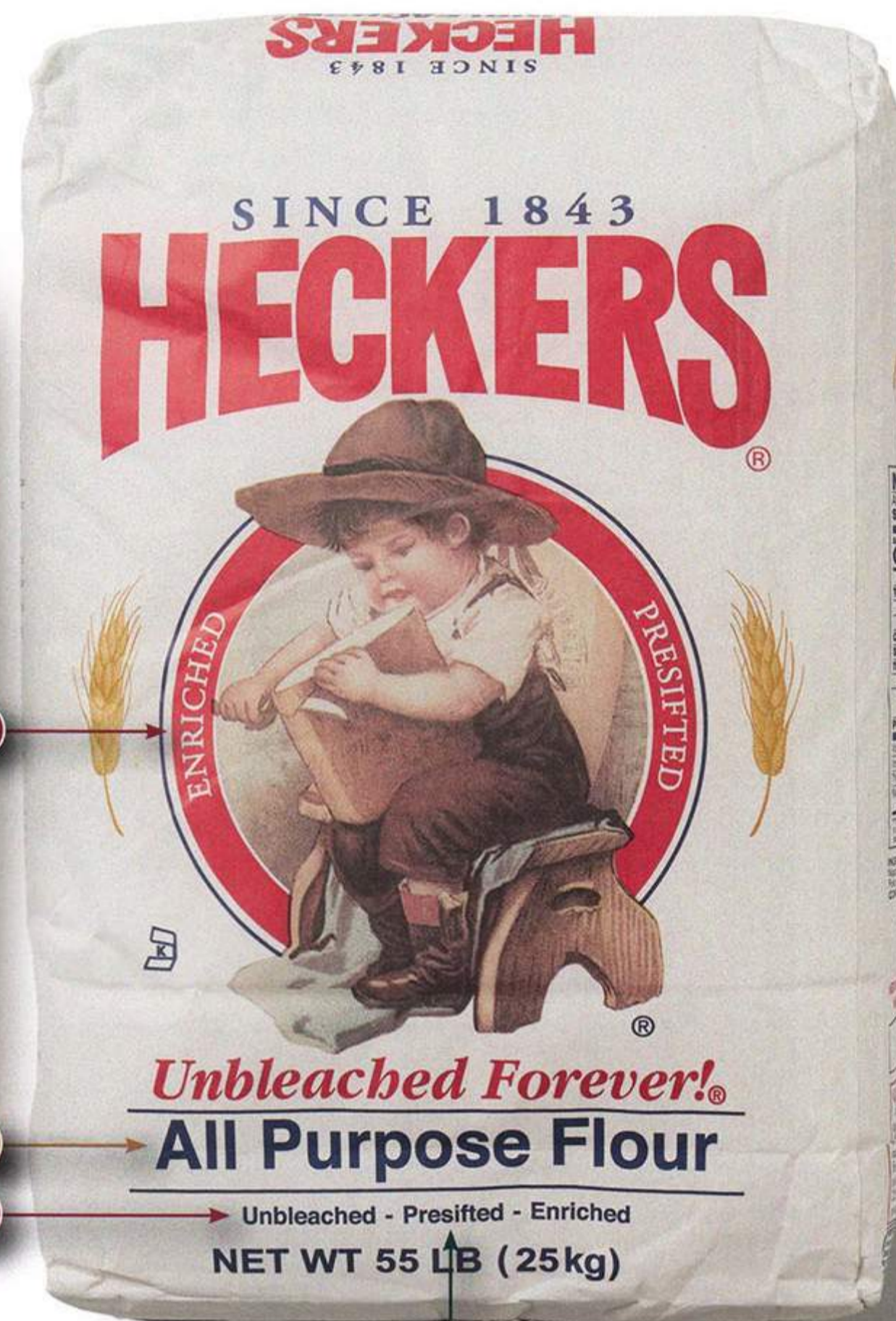
SINCE 1843
HECKERS

④

②

③

⑧



HIGH-GLUTEN BREAD FLOUR

With 13% protein or more, this will make an even stronger dough than bread flour. It's particularly good for doughs mostly leavened with commercial yeast—like pizza dough.

ALL-PURPOSE FLOUR ②

The protein content of all-purpose flour can vary from brand to brand; generally it's 10%–11%. It's not necessarily good for all purposes.

PASTRY FLOUR

As its name states, this flour is intended for pastry preparations, in which a low gluten percentage is desired—for example, cookies, muffins, and pound cakes in which a short crumb versus a chewy crumb is the goal. We use it in combination with strong flours to make dough softer and easier to use (stretch and shape). Its protein content is around 9%.

BREAD FLOUR

The bread flours we typically use have 11%–13% protein, which will develop a good structure and produce volume in the finished pizza.

CAKE FLOUR

At or under 9% protein, cake flour is most commonly used in very delicate baked good preparations, such as sponge cakes. We found blending cake flour with bread flour works well for some of our thin-crust doughs.

BLEACHED / UNBLEACHED ②

For thousands of years, most consumers wanted their flour to be as white as possible. Flour can whiten naturally as it ages, but millers often use chemicals to hasten the process. Harder wheat flours, such as bread flour, are frequently treated with benzoyl peroxide for this purpose. Flours labeled "unbleached" have not undergone these procedures.

ENRICHED ④

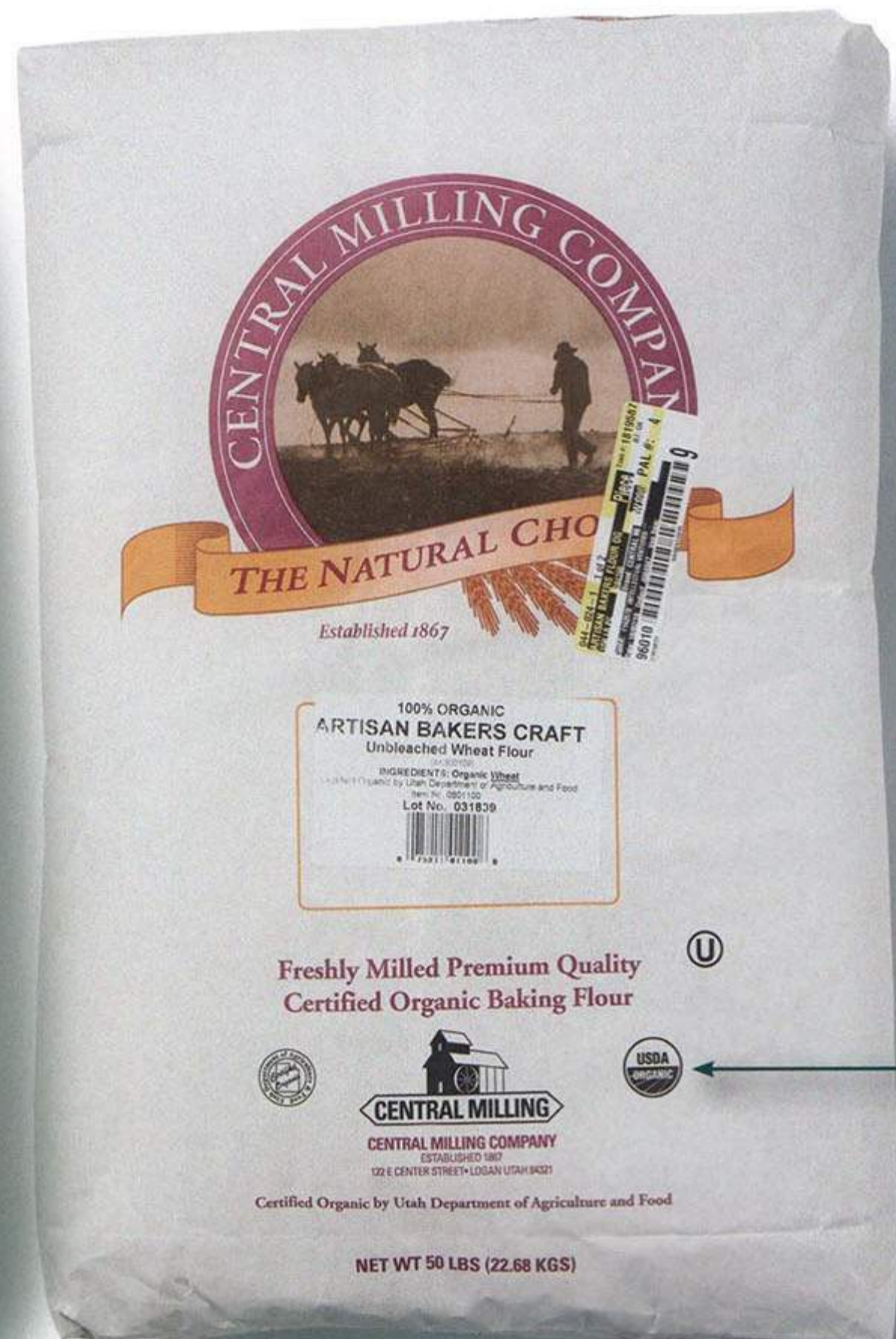
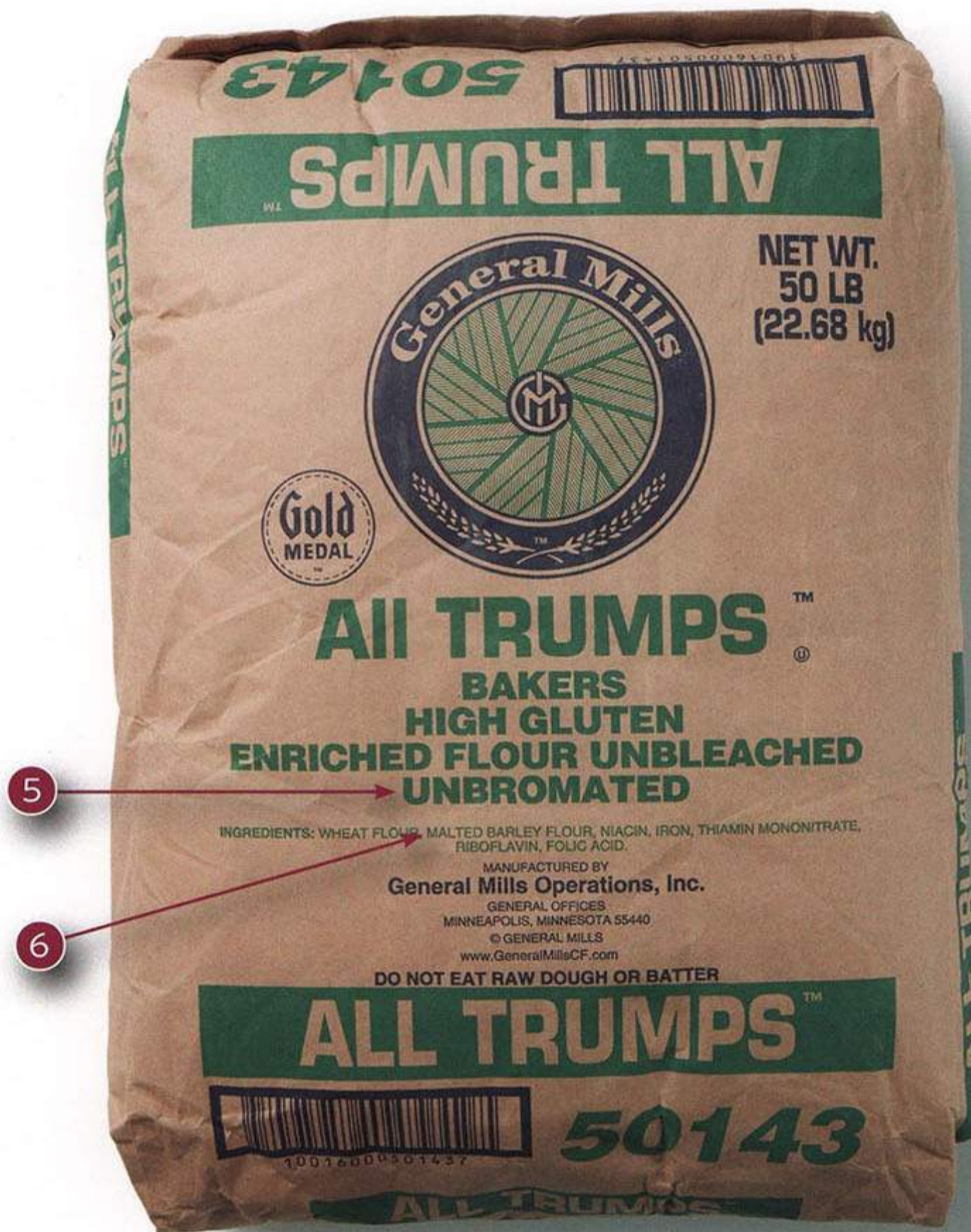
This is a term you may find on the labels of refined flours. Millers "enrich" their flour by restoring the iron and B vitamins (folic acid, riboflavin, niacin, and thiamin) that were removed with the bran and germ.

Added Ingredients and Processing

Added ingredients typically won't affect your pizza, and some of the labels indicate the type of processing the flour has undergone.

Marketing Terms

Some of the labels on flour bags are little more than marketing terms.



BROMATED / NONBROMATED 5

Potassium bromate is added to some flours to improve its strength. It is considered a potential human carcinogen, however, and has been banned in some countries (though not the United States). Nonbromated flour does not have this chemical added.

ORGANIC 7

This label refers to flour that has been milled from grain grown to meet the USDA's Organic Standards regulations. The grain can be refined into white flour or whole wheat flour.

PRESIFTED 8

Presifted flour has been treated so it will not compact so readily. But if the package says "presifted" that doesn't mean you shouldn't still sift it. Over time the flour in the bag will end up compacting, so if a recipe calls for sifting, you'll need to do it yourself before adding it.

MALTED FLOUR 6

To malt a flour is to sprout, or germinate, the grain under controlled conditions so that it produces various enzymes. Malted flour is different from sprouted-grain flour in that it takes longer to sprout. Malted flour has an enhanced amylase count, which means there's more sugar available for the yeasts. Barley, which has a husk that protects the malted seed from damage, is the most common type of malted flour, and malted barley is sometimes added to wheat flour. Malted barley products can also be added to dough to produce a pleasing deep-amber-colored crust.

FORTIFIED

Fortified flour also has nutrients added, but these are nutrients that aren't inherent to the grain, or they've been added in amounts that exceed what naturally occurs in the grain. Often flour is fortified with calcium or additional folic acid.

ASCORBIC ACID

Some manufacturers add ascorbic acid (vitamin C) to improve the strength of the flour; in fact, we include it as an ingredient in some of our recipes for the same reason (see page 2:43).

100% STONE-GROUND

Any grain can be milled with stone grinders (and until the 19th century, this was the standard milling process). A stone mill crushes and shears the whole grain; today's industrial roller mills shear it, which allows the bran and germ to be more easily removed. If you want pure-white baked goods, stone-ground flour isn't for you, but some consumers love the flecks of fragrant bran and germ.

FLOUR BY THE NUMBERS

The following table shows the numbers that we consider very important for the flours we tested during our recipe development. The dry and wet gluten numbers are not generally found on the label of a bag of flour, but they give you an idea of the gluten potential and the relative water-binding ability when you subtract the dry value from the wet value. These numbers are based on flour with 14% moisture. We have two W numbers (see page 278) for each flour where possible—the number from the

flour's mill spec sheet and the result of our own independent testing. We have also included the ash content where available. This information will help you see a clearer picture of the most common types of pizza flours. If you have any questions about how a flour is graded, look for its spec sheet, which is often posted on the mill's website. You can also contact the mill directly for more information. Ultimately, however, the way the flour behaves in your dough is the most important test.

Flour type	Wet gluten	Dry gluten	W number from mill spec sheet	Our W number	Ash content
Pizza flour					
Caputo Americana 00 Flour/Manitoba 0 Flour	29.6	10.3	360–380	360	0.55%
Caputo Biologica 0 Flour	25.6	10	250–270	287	n/a
Caputo Nuvola 00 Flour	34.8	12	260–280	342	n/a
Caputo Pizza a Metro 00 Flour	29.7	11.1	290–320	320	0.55%
Caputo Pizzeria 00 Flour	30.7	10.8	280–300	332	0.5%
Caputo Tipo 1 Flour	33.7	11.9	250–270	231	0.8%
Central Milling Organic Type 00 Normal Flour	29.2	10	n/a	274	0.6%
Le 5 Stagioni Pizza Napoletana 00 Flour	30.1	10.6	n/a	299	0.55%
Polselli Classica 00 Flour	32.3	11.7	360	376	0.55%
Tony Gemignani California Artisan Type 00 Flour Blend	46.7	15.2	n/a	386	0.65%
Bread flour					
Central Milling Organic Artisan Bakers Craft Bread Flour	32	10.6	n/a	240	0.6%
Central Milling Organic High Mountain Flour	37.8	13.1	n/a	377	0.6%
Ceresota/Heckers Unbleached All-Purpose Flour	30.4	10.2	n/a	328	0.46%–0.52%
General Mills All Trumps Bakers High Gluten Enriched Flour	38.9	13.4	n/a	355	n/a
General Mills Gold Medal Harvest King/Better for Bread Flour	28.2	9.8	n/a	298	n/a
Giusto's High Performer High Protein Unbleached Flour	34.6	11.8	n/a	360	0.52–0.58%
King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour	29.4	10	n/a	322	0.5%
King Arthur Sir Lancelot Flour/High Gluten Flour	36.9	12.8	n/a	333	0.58%
King Arthur Special Patent Flour/Unbleached Bread Flour	35	12.3	n/a	456	0.5%
Other flour					
Anaconda Farinha de Trigo, Tipo 1	22.7	7.8	n/a	268	0.45%

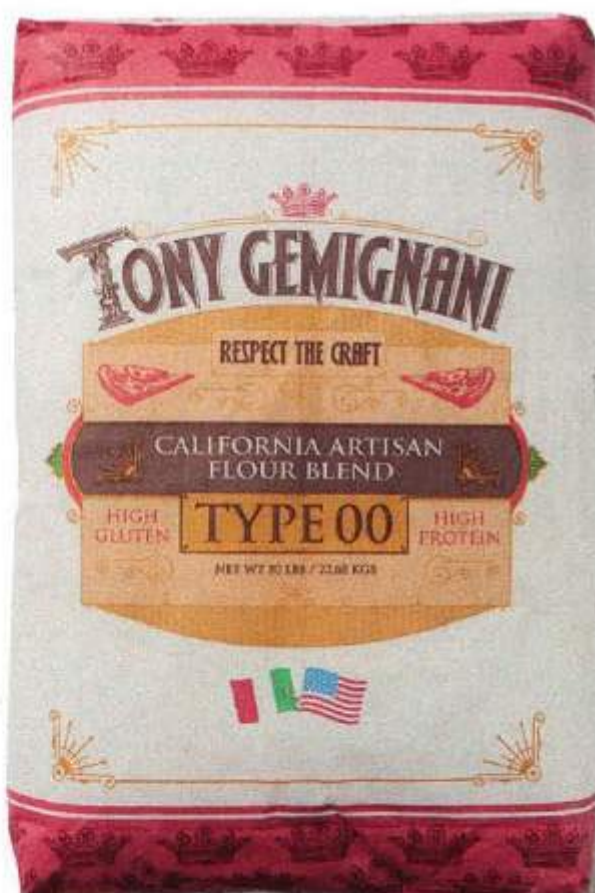


OUR RECOMMENDED FLOURS

The words “bread flour” and “all-purpose flour” are used pretty loosely when labeling flours. Not all bread flours are interchangeable, and the term “all-purpose flour” is so all encompassing that it is very hard to define its precise and best use. We tested a number of different flours, including common consumer brands and professional brands. Ultimately, we chose a few that would work well for each category of pizza.

We made these decisions based not only on the final flavor and texture of the pizza but also on how the dough behaved during mixing, shaping, and proofing. The substitutions that we list below may vary in protein content from the recommended flour by 1% or 2%, but our tests showed that they will still produce great pizza.

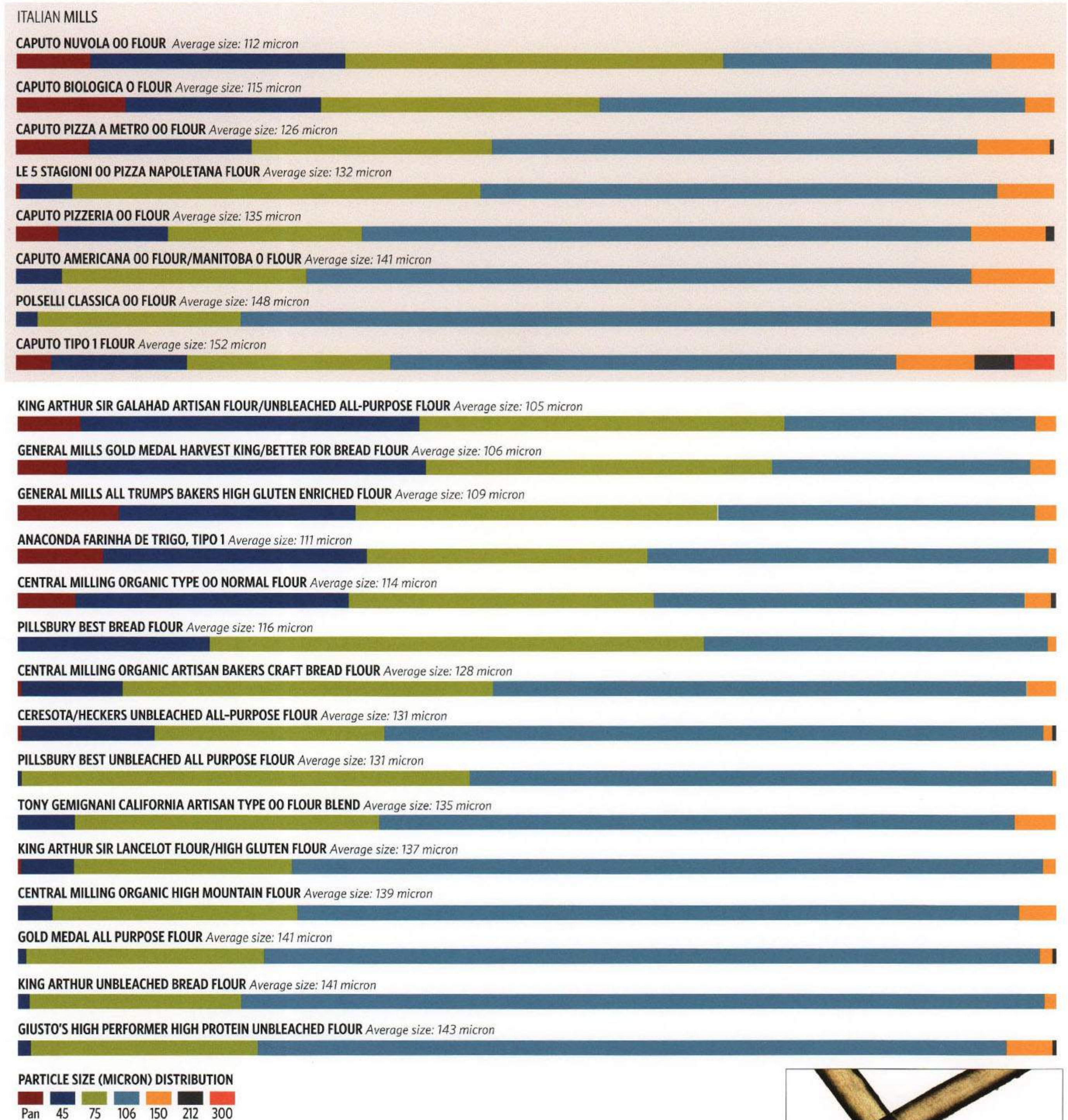
Pizza style	Recommended flour(s)	Other good substitutes
Thin-Crust Pizza Dough see page 2:110	Ceresota/Heckers Unbleached All-Purpose Flour	Giusto’s High Performer High Protein Unbleached Flour King Arthur Special Patent Flour/Unbleached Bread Flour King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour
Brazilian Thin-Crust Pizza Dough see page 2:114	Central Milling Organic Artisan Bakers Craft Bread Flour (40%) any cake flour (60%)	any combination of bread flour and cake flour
Deep-Dish Pizza Dough see page 2:118	Ceresota/Heckers Unbleached All-Purpose Flour	Giusto’s High Performer High Protein Unbleached Flour King Arthur Special Patent Flour/Unbleached Bread Flour King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour
Neapolitan Pizza Dough see page 2:124	Le 5 Stagioni Pizza Napoletana 00 Flour Caputo Pizzeria 00 Flour Polselli Classica 00 Flour	Central Milling Organic Artisan Bakers Craft Bread Flour Caputo Nuvola 00 Flour
New York Pizza Dough see page 2:132	Tony Gemignani California Artisan Type 00 Flour Blend	General Mills All Trumps Bakers High Gluten Enriched Flour Bouncer Premium High Gluten Flour Pillsbury Balancer Hi Gluten Flour Grain Craft Power High Gluten Flour King Arthur Special Patent Flour/Unbleached Bread Flour General Mills Gold Medal Harvest King/Better for Bread Flour Caputo Americana 00 Flour/Manitoba 0 Flour
Artisan Pizza Dough see page 2:142	Giusto’s High Performer High Protein Unbleached Flour	Tony Gemignani California Artisan Type 00 Flour Blend Central Milling Organic Type 00 Normal Flour King Arthur Special Patent Flour/Unbleached Bread Flour King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour Le 5 Stagioni Pizza & Tradizione Flour
Focaccia Dough see page 2:148	General Mills All Trumps Bakers High Gluten Enriched Flour	King Arthur Sir Lancelot Flour/High Gluten Flour King Arthur Special Patent Flour/Unbleached Bread Flour Pillsbury Best Unbleached All Purpose Flour
New York Square Pizza Dough see page 2:152	General Mills All Trumps Bakers High Gluten Enriched Flour	King Arthur Sir Lancelot Flour/High Gluten Flour General Mills Gold Medal Harvest King/Better for Bread Flour
High-Hydration al Taglio Pizza Dough see page 2:158	Polselli Super 00 Flour	General Mills All Trumps Bakers High Gluten Enriched Flour Le 5 Stagioni Ciabatta Romana Flour Pillsbury Best Bread Flour Caputo Nuvola 00 Flour
Detroit-Style Pizza Dough see page 2:166	Central Milling Organic Artisan Bakers Craft Bread Flour (85%) any semolina flour (15%)	Ceresota/Heckers Unbleached All-Purpose Flour King Arthur Sir Galahad Artisan Flour/Unbleached All-Purpose Flour



FLOUR PARTICLE SIZE

Many pizzaioli ascribe the success of their pizza to the fineness of their flour (especially when talking about the misperception of the small size of 00 flour). Particle size determines absorption; the smaller the flour granule, the more water it'll soak up. We wanted to learn more about the particle sizes of the various flours that we tested for our master pizza doughs, so we sent samples out to a lab for testing. We found that the

particle size can vary a great deal between flours that fall in the same category (bread flour, all-purpose flour, and high-gluten flour, as illustrated in the bar chart below). And the smallest average particle size isn't even found in the 00 flour category, casting doubt on the notion that 00 flour works the best for certain styles because it is the most finely ground flour.



A single strand of human hair, magnified here, is about 100 micron.



Whole Wheat Flour

In the United States, federal regulations say that for flour to be labeled “whole wheat,” it must contain the three component parts of the wheat kernel—the bran, germ, and endosperm—in the same proportions as they exist in the kernel (the bran makes up about 14.5% of the seed, the germ is up to 2.5%, and the rest is endosperm). These components are separated and milled individually and then mixed back together.

In other countries, the rules are different. In Canada, products can be labeled “whole wheat” even if up to 70% of the germ has been removed from the grain. There, if you want flour that contains the whole grain, look for “whole grain whole wheat” on the label. The rules for labeling flour vary across the European Union as well (see 00 Flour on page 278).

Whole wheat flour behaves differently from refined flour; the bran and germ can negatively affect volume and interfere with gluten development except when using our specialized technique (see page 2:42). Pizza makers who want the complex flavor and rustic texture of those brown flecks of bran and germ in their crust typically use the flour in tandem with a bread flour or high-gluten bread flour (or both) to compensate. Most “whole wheat” crusts contain only a small percentage (10%–20%) of whole wheat flour. If you mill your own whole wheat flour, the germ contains oils that can go rancid, so the flour should be stored in the refrigerator or freezer to prolong its shelf life. The germ in store-bought whole wheat flour has been heat treated, which keeps it from going bad.

Whole grain product labeling includes nutritional information about vitamins and minerals, as well as claims that whole grains are healthier because they decrease the risk of illnesses like cancer or heart disease. We reviewed US government data and a sampling of studies and concluded that whole grains are not more nutritious or healthier. This isn't to say whole grains are bad for you! But for now, we lack the scientific evidence to back up these claims.



You'll find lots of talk about “whole grains,” but the truth is that only 6% of the flour made in the United States is made from the entire wheat kernel, including the germ, bran (shown under a scanning electron microscope in the photo at left), and endosperm. The germ and bran are typically diverted for animal feed.

“WHOLE GRAIN” AND “WHOLE WHEAT” LABELS

You'll commonly see the terms “whole grain” and “whole wheat” on product labels, used to signal to the consumer that the product is healthy—that it contains the entire grain, including the bran and germ. In truth, grain nutrition is more nuanced than that.

Since the 19th century, the commercial milling process for wheat flour separates the kernel into its three component parts—bran, germ, and endosperm (see page 273)—and those parts are processed in three different streams. The bran and germ can be sold separately or mixed back in with the endosperm to varying degrees. Most flour products (including all-purpose, bread, and cake flours) are composed solely of the endosperm. In the United States, flour, bread, rolls, and buns can be labeled “whole wheat” only if they contain bran, germ, and endosperm in the same proportions they exist in the kernel. What about pizza? Bagels? Muffins? Tortillas? The “whole wheat” standards don't apply to them. So, if you see refrigerated pizza dough labeled “whole wheat,” remember that's a marketing term, not a guarantee.

What about the term “whole grain”? In the United States, it has no legally binding definition. The Food and Drug Administration issued “guidance” in 2006 recommending that products labeled “whole grain” should actually contain the whole grain. More than a decade later, those recommendations are still in draft form. The upshot is that “whole grain” doesn't have a clear regulated definition.

Then there's the “made with” problem, as in products labeled “made with whole wheat” or “made with whole grains.” Again, these are

marketing terms, and in all likelihood such products contain only a tiny fraction of the germ and bran.

In the European Union, there is similar confusion about these labels, compounded by the fact that different EU countries handle it differently. A committee has been working on a unified set of definitions since 2010 and has promised to release guidelines soon. The long and short of it is product labels are not a reliable source of information and should be viewed with a critical eye.



USING RYE FLOUR IN PIZZA

Rye and wheat are so closely related that they can form a hybrid, triticale. Like wheat, rye contains protein, starch, water, and enzymes. In rye, however, the proteins are called secalins, and they differ from wheat's gluten-forming proteins (glutenin and gliadin) in significant ways. Wheat's proteins form a gluten webbing that helps bread rise and hold its structure, whereas the secalins in rye do not.

Rye does have the capacity to create structure in dough, but to a lesser degree and in an entirely different way than wheat flour. Rye contains two polysaccharides, pentosan and beta-glucan (β -glucan). Pentosans are large, complex sugar molecules present in both rye and wheat flours, but rye contains a lot more of them by weight (7%, compared with 1%–2% for wheat). Pentosans excel at water absorption, taking in from 5 to as much as 16 times their own weight in water. This is why rye doughs require more water and are notoriously sticky and slack. When the dough is baked, the pentosans cling to the water they absorbed. They then thicken to form a mucilaginous liquid. The carbon dioxide that's produced by the yeast is trapped inside this viscous liquid and is what ultimately determines the consistency of the crumb. Without the inclusion of wheat flour or gluten, the crumb in doughs that are more than 30% rye would be markedly dense. For that reason, rye is

frequently mixed with wheat flour, with wheat doing the heavy lifting of providing structure and rye bringing its distinctive flavor. This is how we use it in our country-style pizza crusts (see page 2:180). In our 100% Rye Neapolitan Pizza Dough (see page 2:129), we add 11.28% gluten to mimic wheat flour and provide structure in the finished pizza (as seen in the photo below).



GLUTEN-FREE FLOURS

The biggest challenge with gluten-free baked goods, especially bread-like ones, is to replicate the pleasing chewiness and stretch of breads and pizzas with gluten. Some flours, like glutinous rice flour, provide some of these characteristics but have to be used in large enough quantities to influence the dough, at which point the rice flour can overpower the flavor. We solved this problem by combining different flours to make our Gluten-Free Flour Blend (see page 2:199).

Additives, such as xanthan gum and egg whites, can also help. We recently started working with an ingredient called psyllium husk. It is the outer husk of the psyllium plant, which is very high in soluble fiber and, when mixed into gluten-free doughs, has properties similar to xanthan gum when used in small quantities. Both form a mucilaginous gel that helps provide structure to the dough.

The flours we explore here can be roughly divided into the following categories: pseudocereals, seed and nut flours, legume-based flours, starches, and grains (other than wheat and rye). We give an overview of the reasons a pizza maker might choose one versus another, but in many cases, these flours are interchangeable.

Pseudocereals

Pseudocereals, including buckwheat, amaranth, and quinoa, come from different plant families and are not grasses. They are, however, often ground into

flour and used in similar ways as true grains. Pizza makers might choose to use these pseudocereals because they're gluten-free, because of their flavor, or because of their nutritional profiles.

Seed and Nut Flours

Technically, “nut” is a botanical term. Here, we use the terms “nuts” and “seeds” more generically to refer to the things consumers usually think of as nuts, including almonds, peanuts (botanically a legume but gastronomically considered a nut), and chestnuts. Both seeds and nuts contain a lot of fat and are a source of protein. The fat component complicates milling them. When milled, nuts make coarse-textured meal, rather than finely milled flour. Some, like peanuts, will turn into a paste unless they first have their fat removed. Nut flours add a “meaty” richness, whether you're making dough with or without gluten. For a deeper flavor, nut flours can be toasted prior to mixing.

Seed and nut flours are also used for low-carbohydrate doughs and are a staple for those following a Paleo diet, which eschews starchy grains.

Legume Flours (Beans, Peas, and Lentils)

“Legume” is a botanical name that includes what most of us call beans, such as fava beans, soybeans, and chickpeas (also known as garbanzo beans). In farming, legumes are planted to help restore nitrogen to a field. That nitrogen-fixing ability also means legumes are high in protein. Baking with legume flours will increase the protein content of



noticed that many pizzerias, from which we collected menus, offered gluten-free pizzas. Some pizzerias went as far as having a separate oven to bake gluten-free pizzas, and a handful even had a room to the side of the kitchen with its own oven and prep area for gluten-free pizzas.

your dough and whiten the crumb. Chickpea flour, in particular, has several specialized uses, such as in pancakes, called socca, that are served in the south of France, and panisse, which is a sort of chickpea-flour polenta that's cut into fingers. It is also the main ingredient in fainá, the round chickpea pancake served in Argentinean pizzerias as a side dish or to eat on top of a slice of cheesy pizza (see page 201).

Starches and Hydrocolloids

There are numerous other powders that we use in baking, like potato starch, xanthan gum, and tapioca flour. These powders are used in small amounts for very specific purposes in dough. Many of them act as thickeners and help trap gases, playing a role that's similar to pentosans in rye (see previous page). Tapioca starch, derived from the root of the cassava plant, has a neutral flavor and contributes to chewy gluten-free baked pizza doughs. Xanthan gum is used to bind ingredients and keep them in place.

Other Grain Flours

The term “grain” encompasses a wide world of plants—grasses, to be specific—that have been used for as many as 100,000 years to make flour.

There are many flour-like products on the market made from corn, and much of the difference between them has to do with the fineness of the grind. Corn flour is used in gluten-free dough and

batter recipes. Cornmeal can also help keep dough from sticking to a work surface. Millet can be used as a soaked grain or dry as a dough inclusion. Because of its high lipid level, we recommend refrigerating or freezing millet flour to extend its shelf life.

The first flour that we know of was made from wild sorghum, and we think the first bread was made from it, too. Today, sorghum is a common staple in Africa and India. In North and South America, it's used mostly for livestock feed. Oats are higher in proteins and fats than many other cereals. Those fats mean that oat flour should be refrigerated or frozen to extend its shelf life. Teff flour is the main ingredient in the Ethiopian flatbread injera. It's the world's smallest grain, about one-hundredth the size of a wheat kernel. It's so small that when it's cooked whole, it has the texture of farina or polenta, both of which are made with ground grains. This flour can be added to any bread for flavor and texture. Rice flour is widely used to make gluten-free breads. Brown rice flour contains the whole grain (in other words, it's the rice version of whole wheat flour), whereas white rice flour contains only the endosperm (just like refined flour). Despite its name, glutinous, or sweet, rice flour doesn't contain gluten and isn't sweet. This sticky-textured rice is used to make rice-noodles and mochi, the chewy Japanese rice-dough treat often filled with sweet red-bean paste or ice cream.

Some of the gluten-free recipes we developed for this book work for a group of pizzas; for example, we use the same recipe for focaccia, al taglio pizza, and New York square pizza, adjusting only the weight and shape for each type of pizza.

We use a variety of ingredients to create our two gluten-free flour blends on pages 2:197 and 2:199. Each contributes in a different way to produce a pizza crust that is similar to pizzas made with wheat flour.



WATER

Interestingly, we found that many pizzaioli in Naples base their recipes on the amount of water in the dough while most other pizza makers formulate their dough based on the flour amount (see Understanding Baker's Percentage, page 2:18). Many recipes that we found in Naples used a liter of water as the starting point.

It may seem odd to think of water as a functional ingredient, but it is. Water even supersedes flour in terms of its dynamic effect on pizza dough. Water molecules never rest, from mixing through to baking, because water has unique chemical properties.

Water is crucial to the very beginning of the pizza-making process. Gluten forms when the gliadin and glutenin in wheat flour are hydrated (see page 274). And when the enzymes in flour come into contact with water, they break down the damaged starch granules into sugars that will feed the yeast in the dough and begin fermentation (see page 292).

Water also has a role to play when the crust goes in the oven. As the dough heats up, so does the water it contains, and at a certain point it converts to steam. The process of mixing the dough creates millions of tiny bubbles, and the hot vapor (steam), along with carbon dioxide produced by the yeast, expands those bubbles, helping to create the interior crumb of the crust. Doughs with different hydration percentages will bake differently. Generally, the higher the hydration, the more open the crumb and the greater

the volume of the crust. The upper limits of hydration are determined by the flour's capacity to absorb water and the baker's ability to manipulate a slacker, stickier high-hydration dough.

There are many myths surrounding the importance of the type and/or source of the water used for particular dough preparations. While the generally accepted wisdom is that hard water (containing lots of minerals) will toughen doughs and that heavily chlorinated water will kill most of the yeast, we found that doughs made with these types of water were virtually indistinguishable from those made with filtered water (and dough made with chlorinated water had increased volume in some cases; see the next page). And while yeast proved to be resilient in many different water environments, if you are still not sure about using the water you have access to for making dough, the easiest way to assess the water quality is this: if you would drink it, it is fine for making dough. If the water is clear, if it is odorless and tasteless and not slimy, then it will be just fine for making dough.



For more on how bubbles form, see page 2:28.

EXPERIMENT

DETERMINING THE HYDRATION LEVELS IN OUR MASTER DOUGHS

When formulating our master doughs, we were aiming for hydration levels that we had determined through recipe research and then trial and error. We decided to test the hydration for each master dough with up to $\pm 10\%$ of the targeted amount and compare the results with the original recipe (our control) to make sure that we were recommending the best percentage.

We started with our medium-crust pizzas. For Neapolitan pizza, lowering the hydration to 55% made for a dough that was difficult to shape and felt like modeling clay. We were able to push the hydration up to 70% before the dough lost its elasticity. We didn't want to give up on a high-hydration Neapolitan pizza dough, though, and after talking with a few pizza makers, we decided to make a Neapolitan dough with pregelatinized flour using our method from *Modernist Bread*. We were able to increase the hydration to almost 82% and have a dough that handled just like the master Neapolitan pizza dough. The Modernist High-Hydration Neapolitan Pizza Dough on page 2:127 is easy to mix, handle, and shape. It also gives us a slightly higher volume than the master with a rim crust that is similar to canotto-style pizza.

Varying the hydration by 5% worked for New York pizza dough, but changing the hydration by 10% produced pizzas that were hard to shape and, once shaped properly, didn't hold their shape well. The artisan pizza dough was more forgiving in terms of handling when we decreased the hydration by 5% or 10%, but this affected the flavor in ways we didn't like. Increasing the hydration beyond the 72% in the master dough made for a dough that demanded considerable effort to shape.

We then moved on to the thin-crust pizzas. Increasing the hydration of our master Brazilian thin-crust pizza from 50.41% hydration to 55% delivered a pizza that was very similar to the master. Upping the hydration in the thin-crust master dough produced our best results; all the

pizzas tested had great appearance, flavor, and mouthfeel. We don't recommend going higher than 80% hydration, however, because shaping the dough becomes very difficult.

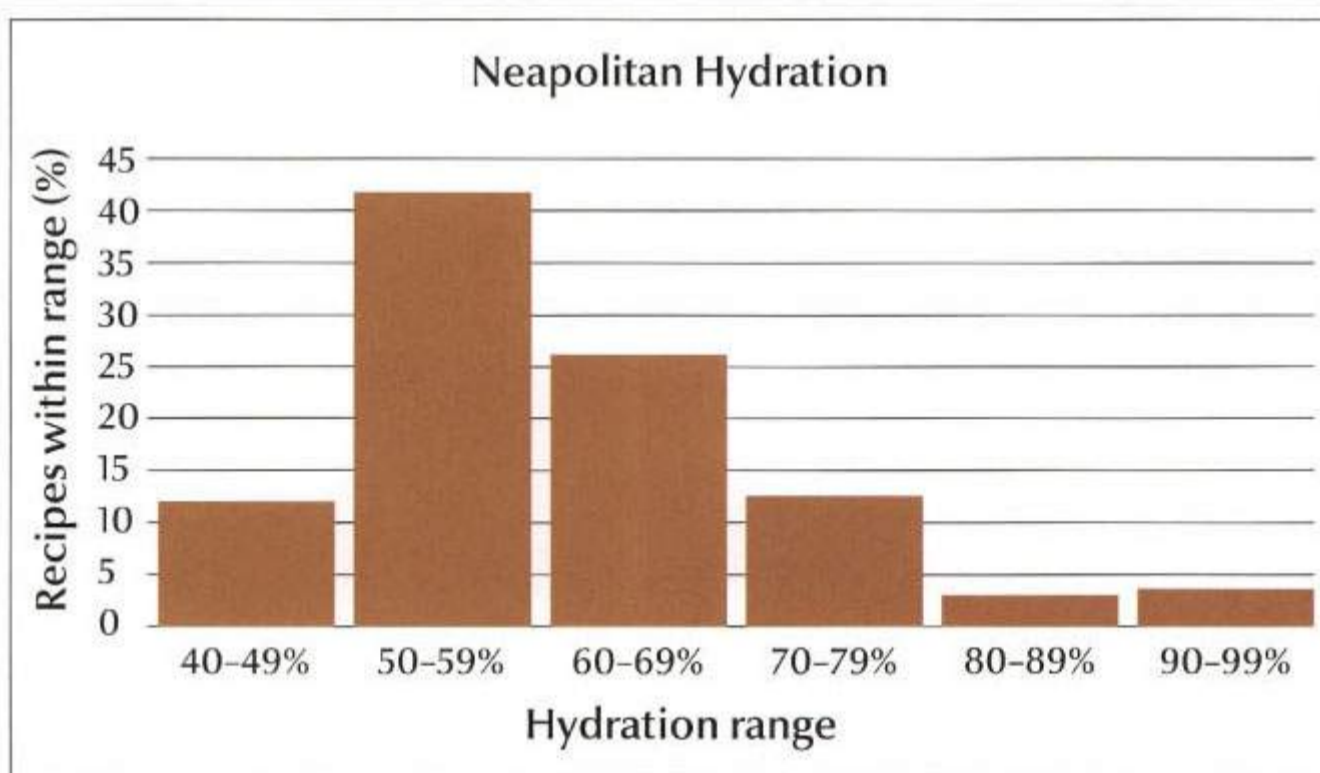
For bread-like pizzas, increasing the hydration is a common way to increase their volume, which should result in a more open crumb. We conducted a separate experiment to determine whether the variability of bread-like doughs was statistically significant (see page 2:396). Our master focaccia is 86.87% hydration; we tested $\pm 10\%$ water without seeing meaningful differences in the dough. As far as taste, hydrations that matched our master dough or higher were all delicious.

We decided to investigate focaccia's hydration further to see if we could trigger a marked change in volume. When we tested 100% and 110%, we were able to see a significant change in volume—for the worse. Similarly, in the case of New York square pizza, we observed statistically significant decreases in volume for the 65% hydration pizza (the master recipe has 74.68% hydration). The dough also felt stiff and hard to extend for 65% and 70% hydrations. Higher hydrations in the al taglio pizza tasted bland and chewy and had an uneven crumb, although going down to 70% and 75% produced positive results with crispiness and overall flavor and could be used as alternatives. For our Detroit-style master, hydration levels within 5% yielded well-balanced pizzas that were comparable to the control. After our extensive experiments, we are confident that the hydration percentages in our master doughs are optimal for getting the best results.

For more on how we were able to increase volume in focaccia, see page 325.



Modernist high-hydration Neapolitan pizza dough



While the type of water doesn't matter, the hydration does. We analyzed the hydration of different styles of pizza (Neapolitan pizza is shown here) from published recipes and compared them to what we saw in our travels when we were developing our recipes.



Neapolitan pizza dough at 75% hydration



Neapolitan pizza dough at 55% hydration



Don't fetishize water. There's just one "secret" to choosing water. If you can drink it, you can use it in your dough. If it looks murky or smells weird, don't make your dough with it.

WATER QUALITY AND PURITY

Pure water is an excellent solvent—indeed, it's sometimes called the universal solvent because it dissolves more substances than any other liquid, including strong acids. This is due in part to water's polarized structure, in part to its hydrogen bonds, and in part to the reactivity of oxygen. Add a little carbon dioxide from the atmosphere, and water becomes an even better solvent because some of the CO_2 dissolves in water to form carbonic acid, which augments water's native abilities.

Because water dissolves things so well, it's often full of minerals collected from its surroundings—particularly calcium and magnesium, but also iron, copper, aluminum, manganese, bicarbonates, and sulfates, depending on the geographical location. "Hard water" is the term for water that contains a substantial concentration of dissolved minerals.

Recipes often call for a specific kind of flour and sometimes even a particular variety of salt. But recipes pretty much never specify what kind of water to use; "normal" tap water is assumed. We found that water quality doesn't make a difference in dough making (see next page), but it does matter in other situations in the kitchen.

Some vegetables become tough when boiled in hard water. The minerals in the water combine with the natural pectin in the plant to stiffen the cell walls. Other gelling and thickening agents besides pectin can be affected by hard water as well, and the dissolved minerals can leave troublesome deposits, called scale, in the boilers of your espresso machines and combi ovens. Because scale conducts heat poorly, it can interfere with the operation of these devices.

In addition to minerals, municipal tap water in most parts of the world contains a form of chlorine to kill parasites, plus a fluoride compound to prevent tooth decay. These additives can subtly alter the taste and texture of certain cooked foods.

It's not hard to test the quality of your water supply. Hardware stores and online vendors sell simple electronic devices called TDS meters that measure the electrical conductivity of water and thereby estimate the concentration in it of total dissolved solids (the "TDS" in the device name). Very hard water, which gives high readings on a TDS meter, can have an off-flavor.

Inexpensive gadgets or kits are also available to test your water's acidity or alkalinity, which is

measured on the 14-point pH scale. The pH is a measure of the concentration of hydrogen ions in the substance, expressed in units of moles per liter. Pure water has a neutral pH of 7; a pH value lower than that is acidic, and a higher value indicates alkaline water. The pH scale is logarithmic, meaning that a one-unit difference in pH corresponds to a 10-fold change in acidity, a two-unit difference represents a 100-fold change, and so on. To get a detailed listing of all the substances in your water, you can either ask your water provider for a complete analysis or send a sample to a lab for testing.

If the quality of your water is a problem, you can choose from among several purification technologies. An ion-exchange filter, often referred to simply as a water softener, uses special resins to capture dissolved minerals. These filters produce deionized water, which works best for cooking vegetables and making gels and thickened sauces. A distillation purifier boils the water, leaving the impurities (including dissolved CO_2) behind, and then condenses the steam in a separate container. When the water is boiled, the CO_2 is expelled as gas and the water that is condensed is CO_2 -free. If no further steps are taken, however, the CO_2 from the atmosphere will again put carbon dioxide into the water. Reverse osmosis passes water through a membrane that screens out contaminants. Although it is cheaper than distillation, reverse osmosis doesn't remove chlorine or other dissolved gases. Carbon filtration, on the other hand, is the best way to remove chlorine and dissolved organic compounds, which can pose health risks in some areas. But filtration doesn't soften water, so many household treatment systems combine carbon filters with reverse-osmosis membranes and also with ultraviolet light, which kills any lingering microbes.

If you feel overwhelmed by these options or don't want to spring for your own water purification system, you can always buy bottled water for critical cooking applications: filtered, deionized, or distilled water is widely available. A word of caution, however. Although very pure water may be appropriate for combining with food in cooking and even baking (see next page), it doesn't taste very good on its own. We're used to water flavored by dissolved gases and minerals; without them, the water tastes flat. Some of these substances contribute essential nutrients as well.

EXPERIMENT

DOES PURE WATER MAKE FOR BETTER PIZZA?

Some pizzaioli claim that their pizza tastes better when the dough is made using high-quality water, which usually means filtered, distilled, or deionized water that contains very few dissolved solids. We put this idea to the test by using different kinds of water in each of our master Neapolitan, New York, artisan, high-hydration al taglio, Detroit-style, focaccia, and New York square doughs (over 100 pizzas were baked during this experiment).

Our starting point was ordinary municipal tap water—the default source of water for nearly all pizzerias. When tap water emerges from the faucet, it typically contains low concentrations of chlorine and fluoride, both of which are antimicrobials and could, in principle, suppress the growth of yeasts and lactic acid bacteria. On the other hand, dissolved chlorine and fluoride vaporize readily on contact with air, so it is also plausible that too little would remain after mixing the dough to have any perceptible effect on the microbes. Moreover, the fact that pizzaioli routinely use tap water means that the strains of microbes that dominate most starters and commercial yeasts have been selected to tolerate these additives.

In addition to tap water, we used distilled water, filtered water, and hard mineral water (Gerolsteiner brand) with a total dissolved solids content of 2,488 parts per million (ppm). Moreover, to validate the hypothesis above that chlorine in tap water is actually not detrimental to dough,

we chlorinated deionized water to the maximum FDA legal limit for tap water—4 ppm—and made pizzas with it.

The final results matched up with the water experiment that was performed in *Modernist Bread*. We consistently preferred tap water over the other types of water. Only subtle differences were found across the board in terms of taste and volumes, allowing us to conclude that the water type doesn't make for a better pizza. Unless your water supply has a foul odor or some other major contaminant, buying filtered or distilled water is not worth the investment. The exception was that hard mineral water consistently delivered lower volumes in bread-like pizzas compared to other waters, resulting in a denser crumb and chew.

What about the pizzas with water containing the upper legal limit of chlorine (which is expected to kill yeast cells)? In our experiment, no disparity in dough behavior was observed, allowing us to conclude that if chlorinated water kills yeast cells, it is not enough to make a difference. After baking, no chlorinating agent remains in the dough since it decomposes in the oven. Interestingly, the Neapolitan pizza with chlorinated water had excellent volume, leoparding, and an added crispiness that is not normally observed in traditional Neapolitan pizzas.

In the images below, there may appear to be differences in the crusts from the types of water we tested, but these are just cross sections. In our calculated statistical determination, we found only slight differences.



High-hydration al taglio pizza dough made with tap water



High-hydration al taglio pizza dough made with chlorinated water



High-hydration al taglio pizza dough made with hard mineral water



YEAST

Yeast is a powerhouse of an ingredient. Yeast cells are living single-celled fungi that behave like minuscule factories pumping out carbon dioxide (CO₂) and ethanol (ethyl alcohol) as their waste. Bakers have been harnessing yeast effluent to inflate their doughs for thousands of years. Yeasts use two different metabolic processes to break down and make use of the nutrients they need to live: respiration and fermentation. When making dough, respiration primarily takes place right after mixing and continues as long as oxygen is in ample supply (the oxygen depletes fairly quickly). But if oxygen becomes scarce or if fermentable sugars (such as glucose, fructose, sucrose, and maltose) are available, the cells ramp down respiration and ramp up fermentation, which produces ethanol as well as carbon dioxide. When conditions are suitable, yeast can respire and ferment at the same time.

During bulk fermentation (see page 2:48) and proofing (see page 2:65), the yeast swings back and forth between these two modes each time the environment changes. As a pizza maker folds and degasses the pizza dough, more oxygen flows into it, so the yeast can respire for a while. As more fermentable sugars become available, causing the oxygen level to dwindle and the carbon dioxide to increase, the yeast switches back to fermenting.

The carbon dioxide produced by the yeast dissolves into the aqueous phase of the dough, as in a carbonated drink, and then migrates to join the air bubbles in the dough formed during mixing (see page 2:28). As fermentation proceeds, the bubbles grow. This production of carbon dioxide, along with the conversion of the water-ethanol mixture in the dough to vapor in the oven, is what causes oven

spring (see page 2:392). Baking causes the bubbles to inflate more, until they eventually rupture and set (become rigid) into one mostly continuous pore.

The ethanol can be broken down into acetic acid by the dough's lactic acid bacteria; a variety of acids and other flavor molecules are responsible for pizza dough's complex flavor. These lactic acid bacteria also secrete enzymes that break down starch into simple sugars that the yeasts can consume. The longer the period of fermentation, the more pronounced the yeast flavors become because the microbes have more time to produce aromatic compounds.

There are three ways to incorporate yeast into a dough: adding commercial yeast directly to the dough (known as the direct or straight dough method), using a preferment (see page 298), or using a combination of the two. As a living organism (at least until the dough temperature reaches 50–60° C / 122–140° F in the oven), yeast has far more factors to manage than the average ingredient. While guidelines are simple for working with, say, a chicken breast or an egg, yeast is unusual in that it must be nurtured as well as controlled, coaxed into thriving but not allowed to run amok.

Bakers employ many tactics for controlling yeast, but temperature is used most often; yeast favors warmth over cold, as most living things do. Salt is the second most common, and more preemptive, method for controlling yeast activity—though, of course, it affects taste as well as fermentation speed. The goal is to provide enough salt to slow down fermentation without stopping it; a lack of salt can move fermentation along too fast, while very high percentages can inhibit the yeast.



When doughs are left to proof at room temperature, as in our Neapolitan Pizza Dough (see page 2:124), minuscule amounts of yeast are added (think 0.01%–0.08%). Conversely, doughs that are fermented for long periods of time in refrigeration, such as our master New York pizza dough or artisan dough, require higher amounts of yeast (0.25%–0.5%) to make it through such a long period of time in a cold environment.

The type of yeast you choose depends on your personal preferences, scheduling restrictions, and product availability. The amount of yeast added to a recipe can be adjusted as long as proofing times are also recalculated. You can vary the type of preferment you use so that you can make a pizza that fits into your schedule. The temperature of the room where you're making the dough will directly affect fermentation. The warmer the room, the faster the dough will ferment; the colder the room, the slower it will ferment. The point is to make the process and schedule work for you instead of the other way around. In this section, we cover your options for fermentation and show you how to select and manage the methods that are best for you.

COMMERCIAL YEAST

Yeast can be purchased in several different forms. Nearly all contain the species *Saccharomyces cerevisiae*, but the strains vary. Baking yeast has been optimized to perform better in dough, so don't use a strain developed for brewing beer or for winemaking. The cakes and packets of yeast that you buy start life in a laboratory as a seed yeast in a culture flask. Yeast technicians use a series of production steps to encourage the culture to grow (that is, to reproduce over and over) until the population fills enormous tanks. The yeast cells, still living, are then processed and packaged into the different forms of baker's yeast, which include fresh, active dry, and instant.

Fresh Yeast

Fresh yeast is the oldest commercial form of yeast. It was originally sold as a cream of yeast, mixed with a mash that served as a growth medium. Today it is more commonly sold in blocks of compressed or cake yeast, and resembles crumbly, cream-colored modeling clay. Each gram of compressed yeast contains roughly six billion active yeast cells. Fresh yeast has the highest moisture content of any form of commercial yeast, but also the shortest shelf life. It requires refrigeration and lasts for only 2–3 weeks after opening. Fresh yeast is highly perishable because live yeast eventually self-destruct through a process called autolysis—the yeast cells essentially

cannibalize themselves at temperatures over 45°C / 113°F. The carnage begins when temperature-activated enzymes in the yeast cells begin to digest the proteins in the yeast cells. This process is a considerable drawback, one that sparked the next wave of yeast innovation: dried yeast.

Compressed yeast is made from liquid yeast grown in a fermentation vat. The yeast is spun rapidly in centrifuges to separate the yeast solids from the liquid. Emulsifiers and cutting oils, such as soybean and cottonseed oils, are then added to the solids. The oils give the blocks their creamy color and prevent water spots from forming. The shaped blocks are washed in a sugar solution before they are wrapped to give them a limited food supply in transit. Fresh yeast is traditional in Neapolitan pizza (see page 3:43), and many of the pizzerias we visited in Italy and throughout Europe still use it.

Active Dry Yeast

Fleischmann's developed a dried form of yeast during World War II so that field infantrymen could bake fresh bread in their camps. Its trademarked brand of active dry yeast later became popular with home bakers. Dried yeast begins in a lab culture just like fresh yeast but, after the expansion of the population, water is removed from the yeast cells, reducing the moisture content from around 82% to 8%. The desiccation sends the cells into a state of dormancy. The particles of dormant yeast are coated with a protective layer of dead yeast cells (up to 25% of the weight of active dry yeast is dead cells) to form tiny granules, which are then packaged for sale. Unlike fresh yeast, unopened packages of dormant dried yeast can be frozen for months.

The dormant cells must be reactivated before use, which can be done by stirring the granules in lukewarm (40–43°C / 104–109°F) water, a process known as blooming (see page 296). Water that is too hot or too cold can damage the cells, reducing the fermentation power of the yeast. When the yeast is soaked in cold water, glutathione, a reducing agent that relaxes dough, is able to leak out from the damaged cells, making the dough sticky and slack.

Even when active dry yeast is properly hydrated, it doesn't develop the leavening power, gram for gram, of compressed fresh yeast. (Around 25% of yeast cells are killed during the production process, so there are fewer live yeast cells per gram.)

Instant Yeast

Instant yeast, also called quick-rise or rapid-rise yeast, was developed in the 1970s by the French manufacturer Lesaffre. Like active dry yeast, instant

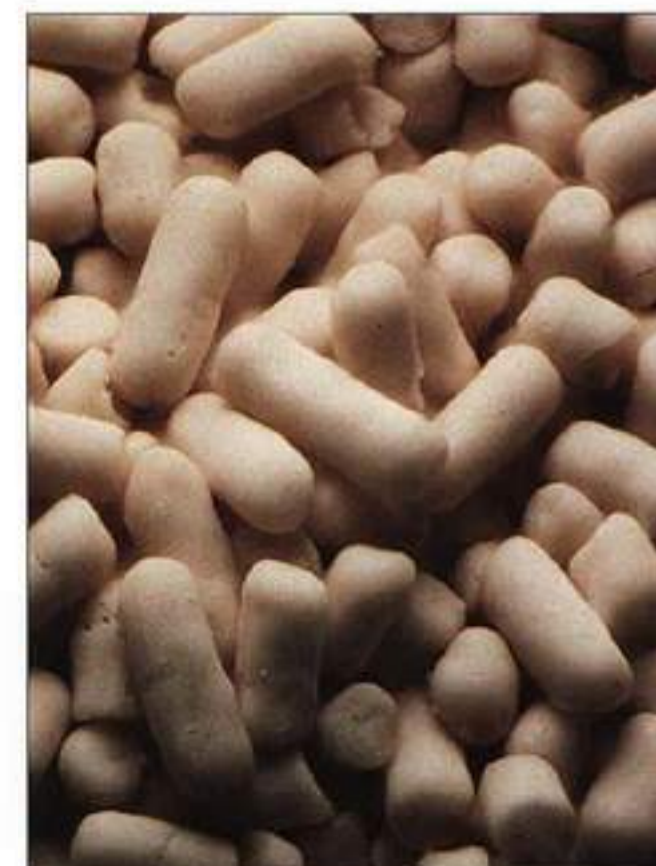
Commercial yeast provides not only consistent leavening results but also a neutral flavor to dough. Prior to commercial yeast, bakers had to rely on levain or barm to leaven their dough, each of which imparts a specific flavor (sour in the case of levain and bitter in the case of barm).



Fresh yeast



Active dry yeast



Instant yeast

Pizzaioli in Naples use very little yeast and ferment their dough at room temperature whereas pizzaioli outside of Naples cold-proof their dough for more control over their fermentation process. We experimented with both methods to see which produced the best pizza (see page 2:88). In general, we prefer to control fermentation as much as we can and recommend cold-proofing your dough if it's proofing for longer than 24 hours.

yeast is sold as desiccated granules. Instant yeast is made with a fast-acting strain of *S. cerevisiae*, and the granules are finer than those of active dry yeast. The surface layer of dead cells is more porous than that of active dry yeast, which allows the granules to rehydrate more rapidly. During production, instant yeast is quick-dried, a process used to preserve the leavening power of the yeast so that it more closely resembles that of fresh yeast. Manufacturers add salts of fatty acids to the yeast to control rehydration and boost the yeast's gassing power, which is greater than that of active dry yeast. The moisture content is lower than active dry yeast (about 5%), which increases its shelf life to 2 years, and even longer when refrigerated. Once the package is opened and exposed to oxygen, instant yeast still remains active for a year if it's refrigerated.

Instant yeast has another advantage for bakers: special yeast blends are formulated for specific

doughs and equipment. You'll find yeast formulated to improve specific qualities of dough; for example, Red Star Platinum Superior Baking Yeast was developed to increase oven spring. Other types of instant yeast are made with specialized strains of yeast that can survive or ferment in specific environments. You'll find freezer-tolerant yeast for frozen doughs and osmotolerant yeast for sweet doughs, both of which can be ordered from commercial yeast companies. Osmotolerant instant yeast requires less water than the instant yeast used in doughs without sugar and can thrive in conditions that have an abundance of sugar. Some yeasts are not gluten-free, so be sure to look at what you are using so that you can accurately answer questions from people with celiac disease. Instant yeast is what we use in our recipes for both breads and pizza doughs.



Fresh yeast



Active dry yeast



Instant yeast

THE FORMS OF COMMERCIAL YEAST

The following table compares the most common forms of commercial yeast and includes our recommendations for working with each.

Type of yeast	Form and unit	Moisture content (%)	Storage	Dispersion and hydration
fresh	50 g / 1.75 oz, 500 g / 1.1 lb, and 1 kg / 2.2 lb blocks	72	unopened, 2–3 weeks from date of manufacture; after opening, 1 week, depending on kitchen conditions; store refrigerated	dissolved into water portion of recipe
active dry	7 g / 0.25 oz, 21 g / 0.75 oz, 50 g / 1.75 oz, and 113 g / 4 oz packets for home use; 125 g / 4.41 oz boxes to 25 kg / 55.12 lb bags for commercial use	8	unopened, 1–2 years, in a cool, dry place; after opening, 4 months refrigerated or 6 months frozen*	dissolved in lukewarm water portion of recipe
instant	5–500 g / 0.18 oz–1.1 lb packets for home use; 5–25 kg / 11.02–55.12 lb bags for commercial use	5	unopened, 2 years, in a cool, dry place; after opening, 1 year refrigerated	dissolved in room-temperature water; mixed into flour portion of dough

*Yeast will lose some viability when frozen. If you store your yeast in the freezer, we recommend increasing the amount a recipe calls for by 25% to ensure an adequate number of viable cells.

In addition to various instant yeast brands available throughout Europe, there are also dehydrated levain products that are added to flour to boost leavening and flavor.



CONVERTING WEIGHTS FOR DIFFERENT TYPES OF YEAST

Use the following table to convert measurements of one type of yeast into another if you prefer to or have to use a different type of yeast.

Our recipes are based on instant yeast, so if you don't have that on hand, use the conversions in the top row to figure out how much yeast to use.

Original yeast type	For instant, multiply weight by	For active dry, multiply weight by	For fresh, multiply weight by
instant	n/a	1.33	3
active dry	0.75	n/a	2.28
fresh	0.33	0.44	n/a

Calculating the Water Difference

The difference in the water contents of fresh and dry yeast is so nominal in small batches that it will have little or no effect on the pizza. However, for the sake of precision, here is a calculation you can use. When converting either instant yeast or active dry yeast to fresh yeast, subtract the dry yeast amount from the fresh yeast amount to obtain the amount of water to subtract from the recipe. When converting fresh yeast to instant

yeast, multiply the weight of the original fresh yeast by 0.67 to figure out how much water to add back into the dough. For active dry yeast, multiply the weight of the original fresh yeast by 0.56 to figure out how much water to add back into the dough. In most cases, though, it is such a small amount of water that it might not be worth the trouble. You don't need to factor in the water for our recipes.

STRATEGIES FOR INCORPORATING COMMERCIAL YEAST

The most important goal when mixing yeast of any kind into a dough is to evenly disperse (bloom) it in water (the water you are already using in the recipe; this is not additional water) so that it can achieve its full fermenting power. Even distribution means that there's an equal amount of food (sugar) for each and every yeast cell. The second objective is to fully hydrate the yeast cells. Fresh yeast appears to have an advantage

Instant Yeast

You can simply add instant yeast directly to the flour in the dough, but we like to bloom it in room-temperature (19–21°C / 66–70°F) water for better dispersal.

To bloom instant yeast, pour the water into the bowl you'll use to mix the dough; the water should be the correct temperature. Sprinkle the yeast over the water's surface, and dissolve the yeast using an immersion blender or whisk. Mix until no clumps are visible. You can then proceed with the recipe.

over instant and active dry yeast in this case because the cells are already hydrated; for the best dispersal, dissolve it in the dough's water, or a part of it, before it's mixed with the other ingredients. Active dry yeast must be reactivated by combining it with warm water; while this step isn't necessary for instant yeast, we recommend blooming it for better dispersal and provide recommended water temperatures in each of our dough recipes.

The term "bloom" is also used for hydrating gelatin (and to quantify its gelling strength). As an aside, the terms "fat bloom" and "sugar bloom" are used to describe when cocoa butter or sugar separates from chocolate.

If you decide to skip blooming your instant yeast, know that your proofing time will likely be 20–30 minutes longer. If you are using it in low-hydration doughs (55% and below), there is a chance there isn't enough water in the dough to fully bloom the yeast. You may see some undissolved granules throughout the just-mixed dough, but the yeast will dissolve as the dough ferments.



While here you can clearly see how we recommend mixing yeast and water using a whisk, this is purely for illustration purposes. Bloom the yeast in the water you'll be using in the recipe, not in additional water. You can also choose to mix the yeast into a small portion of the total water to add to the dough.

Active Dry Yeast

Blooming is required for active dry yeast, which needs warm liquid to slough the layer of dead yeast cells surrounding the living ones. Bloom the yeast in water at 43°C / 110°F. Put the flour on top of the water and hydrated yeast, and mix. Since the water will be warm to begin with, the dough will ferment more rapidly, so keep an eye on it as it is proofing. You may need to adjust the suggested proofing times in our recipes.

Fresh Yeast

Weigh out the water portion of the recipe, and bring it up to the desired temperature (typically room temperature), if necessary. Add the yeast to the water and dissolve it completely by stirring it with your fingers or a whisk. Add the flour and other ingredients, then mix until they are evenly dispersed.

THE BEST YEAST FOR MAKING PIZZA DOUGH

Your main choices for leaveners are commercial yeast or levain (sour-dough starter). We found that pizzerias around the globe overwhelmingly use commercial yeast. It's easy to see why. Commercial yeast is simple, reliable, and the flavor differences you would get from using a levain (see page 302) are often dominated by the toppings anyway.

If you use commercial yeast, it comes in multiple forms (instant, active dry, and fresh). In our *Modernist Bread* book and again in *Modernist Pizza*, we did extensive experiments to see which type of yeast would perform the best in our doughs. In all of our testing, the clear favorite was instant yeast. It mixes into the dough better than active dry yeast and has more active yeast cells (frankly, it mystifies us that active dry yeast stays on the market).

Fresh yeast is the other option. In Naples, northern Italy, São Paulo, and Buenos Aires, most pizzaioli utilize fresh yeast, with a handful using instant or active dry yeast. As we mention on page 293, there are a number of downsides to using fresh yeast. To begin with, many fresh yeast manufacturers do not print a “made on,” “packaged on,” or “expires on” date on the block of yeast. It's hard to know exactly how old your yeast is, so it might have the same, less, or more leavening power than the yeast from the same manufacturer that you used last week. It's a leavening lottery ticket. If you have a busy pizzeria and you always use it up in a timely manner, then it's fine, but you would have done just as well with instant yeast. There isn't a difference in the resulting pizza.

Regardless of this and other downsides, plenty of pizzaioli still use fresh yeast. Part of the reason they make successful doughs is because most pizzas, especially thin- and medium-crust ones, utilize minuscule quantities of yeast, and with a long fermentation time you will always get the yeast to do some work, unless it is completely dead. Even then, you still have a shot if you leave the dough out long enough (see Do

You Need to Add Yeast to Pizza Dough? below). And you aren't looking for a high volume in these thin-crust or medium-crust pizzas. Even the bread-like pizzas will never be as thick as even the thinnest of sour-doughs or baguettes. In short, fresh yeast doesn't have as much work to do in pizza dough.

We also spoke with pizzaioli who favor using large amounts of commercial yeast to yield a dough that will be ready to bake within hours of being mixed. If you are baking a very thin pizza such as a Brazilian thin-crust pizza or a thick Argentinean pizza that is going to be smothered in a significant amount of cheese, then using a lot of yeast makes sense—in the thin-crust pizza, you are more concerned about flavor than volume, and in the bread-like pizza, you can get a lighter, more open crumb. If, however, you favor a very long cold fermentation, we recommend using very low percentages of yeast (0.25%–0.5%), and even lower if you do not cold ferment your dough (0.01%–0.08%) to avoid the risk of overproofing.

Despite all the differing opinions, we can assure you of this: yeast is yeast. We choose to use instant yeast rather than fresh yeast or active dry yeast. Reading our explanations of the differences between the three forms on page 293 will better equip you to make your own choices. Often the preference of using one type of yeast over the other is more habit than conscious choice. If it is something you have always used and it has always worked for you, it can be hard to make a change. If, however, you are frequently struggling to achieve consistency in fermentation, take a look at the type of yeast you are using. If you have always used fresh yeast, we strongly suggest you make the switch to instant yeast, our preferred type of commercial yeast, which has a long shelf life, is vastly more consistent than fresh yeast, and takes up much less storage space.

EXPERIMENT

DO YOU NEED TO ADD YEAST TO PIZZA DOUGH?

There is a shared belief among many Italian pizzaioli and foodies that yeast causes pizza to be “indigestible.” This is untrue (see page 133), but the idea has driven pizzaioli to use extremely low amounts of yeast or, in some cases, to say they make a pizza “without yeast.” Because there is wild yeast in flour as well as in the environment around you, they must mean that there is no *added* yeast in their dough. We decided to see what kind of pizza we would get using this method.

Our approach was similar to how you start a levain (see page 304), which is to simply mix water and flour and wait for fermentation to happen. Two factors had to be adjusted: we lowered the hydration from 100% to 60% and added salt to make it more like a typical pizza dough (we also added ascorbic acid to help mitigate oxidation over the long

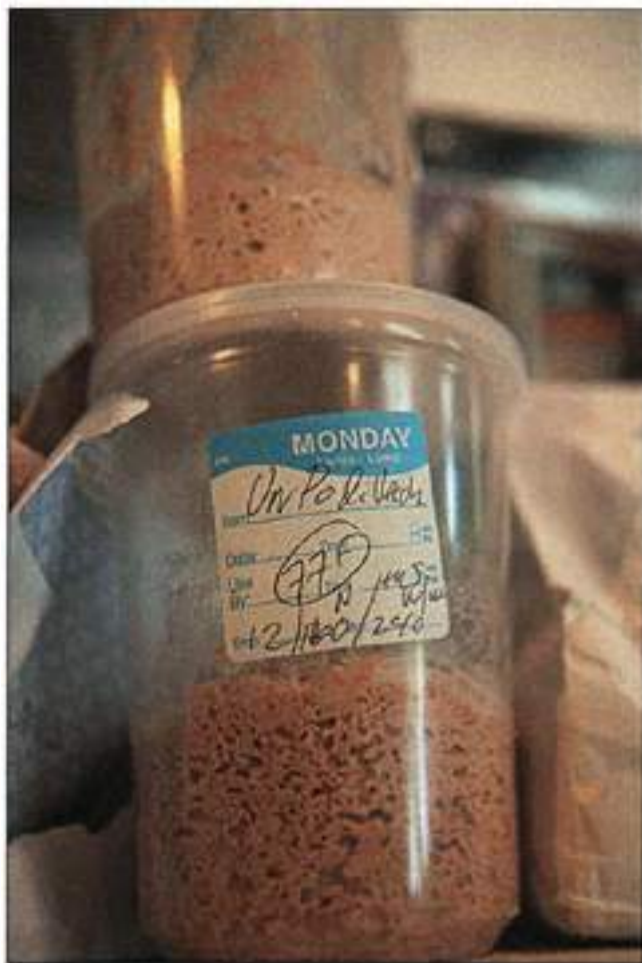
fermentation period). Once we had mixed the ingredients to full gluten development, we placed the resulting dough, covered, in a lightly oiled tub at room temperature. Around the second day we started to see carbon dioxide bubbles, and by the third day it looked like a ripe levain. We balled the dough, cold-proofed it for 2 days, and then successfully baked it into a pizza (see photo below).

The yeast spores that are already in the flour will do an adequate but not great job of fermenting your dough, so we don't recommend it. If you do use this method, keep an eye on your dough; some of the doughs we had made for testing started to grow mold on their surface after the fourth day.



Pizza with no added yeast

PREFERMENTS



During our travels, we encountered many pizzerias that use different types of flour to make their preferments as well as a combination of preferments in their doughs. We use both levain and poolish in our Focaccia Dough on page 2:148 and a mix of instant yeast and poolish in several of our other doughs. The one thing that we don't recommend is using stiff preferments because they are difficult to incorporate into your dough.

A preferment is a portion of the dough that's made in advance; it gives the final dough a head start because the yeast activity within it is already in full swing, as is gluten development. And since the flour in a preferment is already fully hydrated, its addition to a dough will shorten mixing time.

Using a preferment is very different from making a direct dough. Generally, when you make a direct dough, you use a larger amount of yeast, although there are exceptions (see No-Knead Variations on page 2:182 and Your Daily Pizza Variations on page 2:184). The direct method produces an oven-ready pizza crust more quickly (our emergency pizza doughs in the Pizza Dough Recipes chapter starting on page 2:81 take only 2½–3½ hours), but it doesn't allow much time for flavors to develop in the dough. Arguably, this is not a huge problem if you are going to pile sauce and cheese on top of it.

With a preferment, the process takes longer, anywhere from an additional 3 hours to several days. But with that extra time comes extra flavor, from the acids produced during the extended fermentation time. The increased acidity also accelerates gluten development, improving the dough's structure. So,

while it seems like using a preferment would extend production time, doing so in some instances can result in a net reduction of work time; because the preferment is already fermented, its inclusion can shorten the final proof time of a dough.

Preferments can be divided into two categories; the first are those made with commercial yeast. Different recipes and baking traditions have varying names and methods for such preferments; in this book, we will be using only poolish (see page 299). The second type of preferment is what many bakers call a sourdough starter; we refer to it as a levain, and it is started with wild yeast and lactic acid bacteria (LAB). See the table on page 305 for its characteristics, composition, and uses.

Other popular types of preferments are biga and sponges. A biga is like a poolish but stiffer; this lower hydration translates into slower fermentation and, because of its firmer texture, it takes a bit longer to mix into a dough. A sponge is much less frequently used. It is composed of flour and yeast plus one or a combination of the following enriching ingredients: eggs, butter, sugar, milk. We do not use either of these preferments in this book.

FERMENTED FLOUR

"Fermented flour" is a baker's term that refers to the amount of flour in a preferment. This ingredient is important to bakers because the amount of fermented flour in a dough affects flavor, fermentation time, and more. The lower the percentage of fermented flour in your dough, the less you will get of the preferment's attributes.

Our Focaccia Dough on page 2:148 is 32% poolish and 15% levain. That means that almost half of the dough is made from fermented flour. This flour has been fully hydrated and will impart its flavor into the

dough. This also means you'll have reduced mixing time. In our recipe, the yeast in the preferments is boosted with the addition of yeast to the dough, which will help it move faster.

In general, the more fermented flour in your dough, the faster it's going to move. You don't want to keep adding more and more preferments, though. Going overboard on preferments can make your pizza crust overly sour. Besides, you want to bake a pizza, not a preferment with a little flour added.

Both poolish and levain contribute fermented flour to our Modernist Focaccia Dough on page 2:151.



CHOOSING YOUR FERMENTATION METHOD

You can incorporate yeast directly into a dough (called the direct or straight dough method). You can also use a preferment that is mixed 12–18 hours before mixing the dough (or you can use a combination of the two). Adding commercial yeast to a dough is a fast and efficient way to make dough. When you use a preferment in the dough, you inoculate a portion of the ingredients with commercial yeast or let wild yeast and other bacteria naturally establish a culture in a mixture of water and flour, then leave the preferment to ripen over a period of hours or days before mixing it into the dough. This is not as quick as adding commercial yeast directly to the dough, but the final product does have a more developed flavor.

Combination fermentation uses commercial yeast and a commercial yeast–based preferment or levain (in some recipes, all three are used). When commercial yeast is used with a levain, it is often referred to as a levain de pâte, and is done because the commercial yeast accelerates the fermentation time while the levain contributes flavor and additional leavening power.

Using a levain is considered to be the very definition of fermentation by one set of pizza bakers who dismiss commercial yeast as not producing “real” fermentation. We reject that purist view; fermentation is fermentation, whether it involves a levain or commercial yeast. One method is not more legitimate than the other.

The fermentation method you choose depends on your schedule, ability to plan ahead, and yeast preference. Knowing the characteristics of each fermentation method will help you determine the approach that’s right for you. For example, from a time-saving standpoint, you might be inclined to opt for commercial yeast. If time is not an issue, however, and you want deep flavors and aromas, try using a preferment—it will deliver on flavor and aroma and often will reduce the final proof time (see page 2:65). If you want the best of both worlds, you might use a combination and anticipate a few trade-offs. It will take a bit longer than a direct dough and might not have the complexity of a fully cold-proofed dough; it will, however, have a more pronounced flavor than a quickly proofed dough—and you won’t have to wait as long for it. Every type of fermentation has pros and cons; it’s up to you to weigh them and make the choice that works best for you.

POOLISH

Poolish is a high-hydration (100%) preferment made from flour, water, and instant yeast. It is ready to use in 3 to 18 hours, depending on how much yeast you add to the mixture, which is a great boon to the baker trying to fit it into their schedule. One of the most common types of preferment, poolish is widely used by professional pizza makers in North America (though rarely by Italian pizzaioli, who generally prefer to make direct doughs). Because it is based on commercially manufactured yeast, it does not have the tangy flavor of a levain.

Some bakers have the fermented flour broken out in the recipe. Once you’re familiar with the composition of your preferments, you’ll know how much fermented flour is going into your dough. That’s part of why we keep our preferments standard.

The three main ways that we leaven pizza dough are with poolish (left), instant yeast (center), and levain (right). These can be used separately or in combination, such as in our High-Hydration al Taglio Pizza Dough on page 2:158.



WHY USE A POOLISH?

- It's uncomplicated, requiring no maintenance.
- It can be mixed and fully fermented at room temperature in as few as 3 hours or as many as 18 hours, depending on the amount of yeast added. Our standard time for the recipes in the book is 12–16 hours.
- The wet, fully hydrated mixture is easy to incorporate; add it directly to the water component of the dough.
- It makes timing more flexible—you can adjust the percentage of yeast as needed so it is ready when you are.
- Its addition to a dough results in a shorter mix time and less dough development, producing a more visually appealing crumb.

STRATEGIES FOR USING POOLISH

Use the following table to determine how much yeast to add to your poolish so that it is fully fermented by the time you plan to use it. You can adjust the percentage of yeast in a poolish based on your needs.

It can be ready any time between 3 and 18 hours, though an older poolish will contribute more positive effects to the dough—a better structure and more pronounced fermentation flavors—than a younger one.

Start the poolish before mixing into the dough	🍷 of instant yeast to add	Storage temperature	Add the poolish to the dough
3 h	0.4–0.5	21–24°C / 70–75°F	with the water and the flour(s); if mixing by hand, we recommend “dissolving” the poolish with the water first before adding the flour; if mixing by machine, you can combine the water, poolish, yeast, and flour, then slowly mix on low speed to incorporate all the ingredients
8 h	0.23–0.33		
12–16 h	0.1–0.2		
17–18 h	0.01–0.09		

HOW TO Make a Poolish

Plan ahead for when you need the ripe poolish. When a poolish has run its course (which means the yeast have run out of food), you have to start

over again. The exact mixing method you use is not important so long as the ingredients are evenly dispersed.



- 1 Combine the yeast with the water. Dissolve the yeast with your hands, a whisk, or an immersion blender (for large batches).



- 2 Add the flour and mix until the ingredients come to a homogeneous mass.



- 3 Transfer to a container, and cover with an airtight lid.
- 4 Allow the poolish to ripen at 21–24°C / 70–75°F for the allotted time.

Neapolitan pizza dough with poolish





Young poolish



Ripe poolish



Overripe poolish

HOW DO YOU KNOW WHEN THE POOLISH IS READY?

- When we talk about a poolish being ready, we indicate that it's "ripe." That means the yeast has done as much fermenting as possible with the food available to it; if more time transpires, the yeast will become inactive.
- Temperature is a determining factor for achieving ripeness: a warm room will accelerate fermentation, and a cold one will slow it down.
- You can also tell if a poolish is ripe by its aroma, which is somewhat different from that of a levain; the scent is almost sweet, with a hint of fresh milk.
- The most important cue for determining ripeness is visual. The photos above show a young poolish that is not mature enough to use, a ripe poolish that is ready for final mixing, and an overripe poolish. Note the carbon dioxide bubbles and the elevated height of the ripe poolish. One indicator of ripeness is that when you gently move the container, the bubbles begin to rupture. The volume of a dying poolish will have decreased because nearly all its bubbles have ruptured.
- Perform the float test (see below).
- Don't discard an overripe poolish. Its leavening power is diminished, but additional flavors have developed. You can use the overripe poolish and add 0.5% commercial yeast to the dough, or you can freeze it and use it later (see page 310). An overripe poolish can also be turned into a levain if you feed it as a levain and maintain it according to the schedule on page 304.

FLOAT TEST

The float test is a simple way to tell when your preferment is ripe. As a preferment ripens, the yeast cells expand bubbles of carbon dioxide. Simply drop a spoonful of preferment into water: if it has enough carbon dioxide in it to float, it has enough to leaven your dough. This method works best with high-hydration preferments such as a poolish or levain. To test it, we recommend pouring the water for the dough into the mixing bowl first, then dropping in the preferment prior to adding the flour. This not only saves time (and an extra bowl) but also provides a quick double check that the preferment is ready to use.

The float test can clearly identify when your preferment is so inactive that it doesn't produce sufficient gas to float. Contrast the sinking preferment (right) with the floating preferment (far right).



The word “lactic” comes from the Latin word for milk. There is no dairy present in a levain, but lactic acid is secreted by lactic acid bacteria (LAB), which can also be found in dairy products (e.g., yogurt, cheese) and other foods, including fermented and pickled vegetables—even your muscles produce lactic acid during intense physical exercise. While dairy products do contain LAB, there’s only a slight connection between those bacteria and the ones found in a levain. Different strains are associated with different foods. The same cultures used to convert milk into yogurt, for instance, are unlikely to do well converting a levain’s starches into glucose. Dairy foods have plenty of admirable qualities, but they won’t do anything to jump-start your preferment.

This Levain-Raised Neapolitan Pizza Dough (see page 2:172) provides a slightly tangy flavor to the baked pizza crust, which offsets rich ingredients like smoked salmon and roe atop the pizza pictured below.

LEVAIN

Myths and legends surround this popular preferment (also known as sourdough starter), and many of them date far back in the long history of yeast and bread making. Before it was possible to observe fermentation through a microscope, no one could have imagined—much less explained—how dough could leaven itself, as if by divine intervention.

The fundamental difference between a commercial yeast-based preferment and a flour-and-water levain is that the latter relies on wild yeast and lactic acid bacteria (LAB) for its fermentation. Most commercial yeasts are a single strain within the species *Saccharomyces cerevisiae*; the yeasts in levain are varied, containing not only *S. cerevisiae* but also other species and genres, such as *S. exiguus*, *Hansenula anomala*, and *Candida tropicalis*. The particular mix of yeasts in any given levain, in combination with LAB, is what makes the flavor unique.

The LAB mix significantly affects flavor as well as the strength of the gluten network in the dough because the acids secreted by these bacteria strengthen the gluten bonds. There are two types of LAB: homofermentative and heterofermentative. Homofermentative LAB secrete lactic acid during fermentation, while heterofermentative LAB secrete lactic acid, acetic acid, and some carbon dioxide, contributing to the rise of the dough. Lactic acid has a mellow acidic flavor, similar to that of buttermilk or sour cream (the term “lactic” signals a connection to milk or dairy), whereas acetic acid is much more

acidic and harsh. (Acetic acid is the second largest component of vinegar, after water.) Whichever types of LAB exist in a levain, it is the combination of acids that makes the dough’s flavor truly special. The acidity also impacts the gluten structure. Striking the right balance of both bacteria in a levain can be tricky. Homofermentative bacteria enjoy warmer temperatures, while heterofermentative bacteria prefer cold. When ripening a levain, some bakers split its time between warm temperatures and cold temperatures.

How this fermentation begins depends on the method used for inoculation, which can take several days. “Backslopped” levains are made by mixing water and flour and allowing enough time for opportunistic yeast and LAB to take hold. A portion of the culture is then removed from the mixture and replaced with an equal amount of water and flour; this backslopping step provides fresh food for the microbes and is repeated daily until the levain is used or for however long the baker chooses to maintain it.

Levains can also be started using a premade commercial culture or a combination of backslopping and a levain culture. In a sense, using a culture to get fermentation rolling is not much different from making a poolish with commercial yeast; you can even start a levain with a poolish, so long as you backslop it. Commercial levain cultures, however, are more complex than commercial yeast. They contain more strains of yeast and a number of different LAB,



producing a pizza dough that has the characteristics of a sourdough bread but with a greatly shortened inoculation period that doesn't require daily feeding.

There are pros and cons for both methods. Some pizzaioli are less enthusiastic about the commercial levain culture option because the idea of using a ready-made addition goes against the long-and-slow process that levain-raised doughs are known for. Still, it's hard to argue against the consistency and reliability that a levain culture provides. The most widely used levain cultures in Europe include Sekowa Spezial-Backferment and Florapan, a line made by Lallemand (its cultures are also available in the United States). Both offer numerous varieties of cultures, as do other companies like Italy-based Sacco System, which makes a product called Lyoflora, and Puratos in Belgium (see Resources, page 3:377). There are a few Italian mills that produce a dehydrated levain that some pizzaioli add to their flour mix in addition to commercial yeast for flavor and leavening. The Grandi Molini Italiani company makes a product called Lievito Naturale, which is precisely that. It is typically added in small quantities to the flour (about 3%–5%).

Commercial yeast is the preferred ingredient used by pizzaioli in Naples, including those who are newer and those with a century of making pizza history in that city. Commercial yeast is a rather new product, however, and levain was certainly the original option for fermenting pizza doughs. For a food so bound by tradition in Naples, commercial yeast was quickly embraced and is now the status quo. You can spark a heated debate by bringing up the use of levain in Neapolitan pizza dough. In an interesting

turn of events, the one frozen pizza manufacturer we met in Naples was the only one in that city utilizing levain. The Associazione Verace Pizza Napoletana has also only recently accepted the use of levain to ferment a dough for certification (see page 3:43).

Why use a levain? Levains produce doughs that have a depth of flavor that commercial yeast-based doughs don't. We love the depth of flavor that it brings to our Levain-Raised Variations on page 2:172. The increase in fermentation time also affords more wiggle room in your schedule than with commercial yeast because levain is more forgiving. Some of the flour is already fermented before the dough is even mixed, which can shorten proofing time. And levain-based pizza is a terrific marketing tool. "All-natural-yeast-raised pizzas" has a better ring than "commercial-yeast-raised pizzas"; add "organic," "sprouted," "local," "sustainable," "whole grains," "country," or "Old World," and you will have people lining up around the block to buy your pizza.

But detractors have practical objections to their use, such as the maintenance required to sustain a healthy levain (see page 305). The levain requires a dedicated area to "live" in, potentially occupying valuable kitchen space. Others maintain that whatever flavors and aromas it may develop in the dough will be overwhelmed by the even more flavorful and aromatic toppings on the pizza. You may end up with too much leftover levain (which can still be used; see page 310) or not enough to make last-minute batches of dough. You can't just whip up a batch of levain. It takes time—several days, in fact. There are many reasons to use a levain, but commercial yeast certainly has its place in the pizzeria.



Florapan and other commercial starter cultures are mixtures of freeze-dried flour, yeast, and lactic acid bacteria that can be mixed with water and ripen into a mature culture within 24 hours.

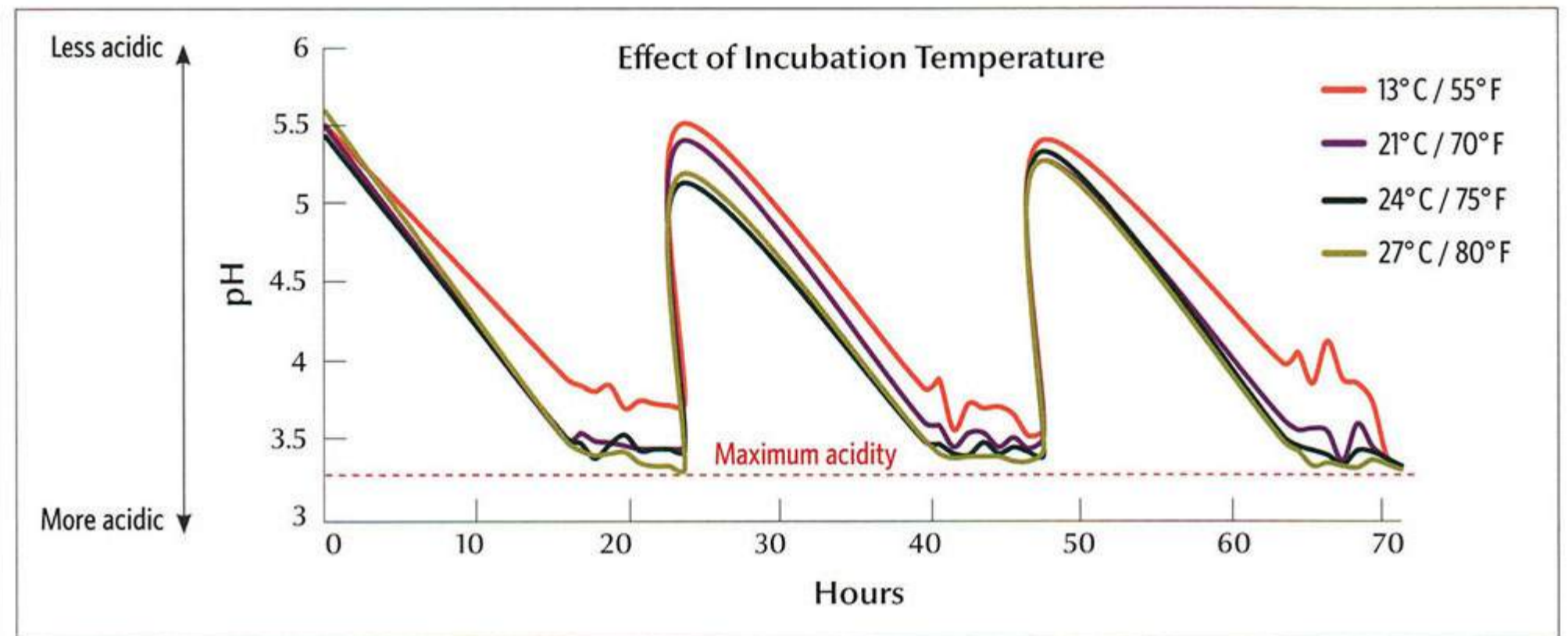
STRATEGIES FOR MAKING A LEVAIN

Type of levain	Average inoculation time	Key advantages	Key disadvantages
liquid levain	4–5 d	requires only basic ingredients; is a biological expression of its environment; economical	requires maintenance and temperature-controlled environment; creates excess levain
commercial yeast/poolish-started levain	3–4 d	shorter inoculation period than for liquid levain	requires maintenance; takes longer to develop levain flavors through feeding
Florapan	18 h at 28°C / 82°F or 24 h at 21°C / 70°F	can be made fresh daily; takes less than a day to produce pronounced sour notes	flavors aren't as complex as liquid levain

Basic Levains

The method for making a basic levain is based on creating a friendly environment attractive to yeast and LAB so they can multiply and thrive. A levain must be maintained by feeding and regulating temperature on a daily basis or else the yeast and bacteria will die off. The storage temperature makes a difference because as more time passes, the yeast and LAB will continue to feed and produce even more CO₂, along with lactic and acetic acids, increasing not only the volume of the levain but also

its sour taste (see the graph below, which shows how levain, when fed every 24 hours, changes in acidity when stored at different temperatures). Levain stored at a higher temperature reaches a lower pH, which lends a noticeable acidity to the flavor of baked pizza. Since we prefer a milder tang, we like to store our levain in a wine fridge at 13°C / 55°F (see next page). Starting a levain isn't difficult, but it does require attention and patience. Our recipes use liquid levain, which is made with equal parts flour and water.



HOW TO Start a Liquid Levain

While we have found that bread flour, whole wheat flour, and light, medium, or dark rye flour work the best for building a levain, you should use whatever flour you are already using in your doughs. If you feed the levain regularly, it will develop more lactic and acetic acid flavors over time, which you'll start to taste in your pizza crusts. The souring process levels off after around 10 days. Feed the levain twice a day if you want to

produce a stronger metabolism (more microbial activity results in more depth of flavor), if it's summer or you live in a very warm climate and have no climate control, or if you work in a very warm space, regardless of the weather outside. For home bakers maintaining a levain, you need to make only enough levain to both make your dough and feed the levain each day.

Yield: 200 g

INGREDIENTS	WEIGHT	VOLUME	
Bread flour, 11.5%–12% protein	100 g	¾ cup*	100
Water	100 g	¼ cup + 3 Tbsp	100

*The volume will vary depending on the type of flour used. It could range from ¾ cup to 1 cup.



- 1 Combine the flour and water; see Tips for Levain Maintenance on the next page for water temperature.
- 2 Mix with your fingers, a whisk, or a rubber spatula until homogeneous.
- 3 Cover with an airtight lid, and reserve in an area where the ambient temperature is at or close to 21°C / 70°F.

- 4 Wait 48 h. You'll start to see some activity in the batter in the form of carbon dioxide bubbles.
- 5 Remove and discard 75% of the culture. Add an equal amount of flour and water (or up to 120% water) at 24°C / 75°F to replace the amount you removed and mix until homogeneous.

- 6 Within 24 h, repeat step 5, and continue to repeat step 5 on a daily basis. Try to do it at approximately the same time (within an hour either way) every day. After day 4, the levain that you remove should be either immediately used for baking or frozen for Second-Chance Levain (see page 310).

BEST BETS FOR LEVAINS

Type of levain	Composition	Feed	Storage temperature	Time (h) after feeding and degree of sourness	Long-term storage
liquid levain	100% bread flour 100% water 25% liquid levain	daily: once a day in cool months/cool environments; twice a day in hot months/hot environments	13°C / 55°F*	10–12: young levain; mellow sour flavor	2–3 d
			21–24°C / 70–75°F	14–16: mature levain; increased sour taste 18–20: ripe levain; pronounced sour taste 25–27: levain no longer usable for leavening dough	<ul style="list-style-type: none"> • feed, then refrigerate • feed, then keep in a cool environment, 10°C / 50°F • feed with reduced hydration to 60%, add 2% salt, and leave at room temperature
frozen levain	100% inactive levain (100% bread flour and 100% water)	not fed because it is used while inactive	–10°C / 14°F	8–10: young levain; mellow sour flavor	beyond 3 d
				12–14: mature levain; increased sour taste	<ul style="list-style-type: none"> • feed, then freeze up to 2 mo or dehydrate for longer-term storage
				16–18: ripe levain; pronounced sour taste	
				23–25: levain no longer usable for leavening dough	
				not fed; very sour; thaw before using; requires addition of 0.4%–0.5% instant yeast (see page 310)	freeze up to 2 mo

*This is our recommended storage temperature for levain, and we suggest using a wine fridge.



The constant temperature of a wine refrigerator will help keep the microbial ecosystem of your levain consistent as long as you feed it at the same time each day.

TIPS FOR LEVAIN MAINTENANCE

- Wash the storage tub or glass jar you plan to store the levain in with a mild soap (we suggest hand soap). Do not use a sanitizing solution because it could adversely affect the yeast and LAB.
- When you feed the levain, there is no need to empty and clean its container (in fact, we seldom clean our levain tubs); simply scrape down the sides with a rubber spatula after feeding.
- If you cannot maintain a consistent ambient temperature, we recommend using 15.5°C / 60°F water during hot-weather months, 21°C / 70°F water during mild-weather months, and 24°C / 75°F water during the colder months.
- If you cannot maintain a consistent ambient temperature, feed your levain twice a day during hot-weather months.
- Keep your levain in a wine refrigerator set to 13°C / 55°F, if possible. This will extend its usable fermentation time and allow it to develop heterofermentative LAB flavors. The constant temperature provided by the wine refrigerator helps maintain a consistent levain if the kitchen has temperature fluctuations day to day and throughout the year. It is important to note that we only recommend the 13°C / 55°F temperature for storing your levain preferment, not for proofing your levain-based doughs.

STAGES OF A LEVAIN

There is no one “correct” stage of ripeness for levain once it has been established. Depending on the desired result, a levain can be used at any of the stages below (even overripe levain, in any of the Second-Chance pizza dough recipes; see page 2:173). As a general rule of thumb, levain that has ripened for only 8–10 hours after its last feeding has a much milder acidic taste than one that has been allowed to ripen longer, so if you are looking for a less acidic flavor profile, use a young levain.

How do you know when your levain is ready to use? Use your senses. A mature levain should be very bubbly. If its effervescence shows signs of receding, that’s a warning signal that the yeast and LAB have run out of food. Smell and taste the levain regularly so that you can differentiate the subtly sweet but tangy flavor of a ripe culture versus the vinegar and alcohol notes of a levain that is over the hill. You can also perform a float test by dropping a spoonful of levain into water (see page 301). A mature levain will have enough carbon dioxide in it to float in liquid. If it can float, it can leaven your dough.



YOUNG LEVAIN

8–10 hours at 21°C/70°F
10–12 hours at 13°C/55°F

Sour flavors are subtle, but yeast activity is in full swing (you will see a significant increase in volume as soon as 8 hours after you feed it, and there will be carbon dioxide bubbles throughout the entire levain). Use the levain at this time if you prefer less acidic flavors in your dough. Once the dough is shaped, you will have to proof it (2–3 hours) and bake it, as opposed to cold-proofing it in the refrigerator overnight.



MATURE LEVAIN (above)

12–16 hours at 21°C/70°F
14–18 hours at 13°C/55°F

The sour tastes are present, and yeast activity is close to peaking. You will see abundant bubbling throughout the entire levain. This is the most common fermentation time used by bakers.

RIPE LEVAIN

17–18 hours at 21°C/70°F
19–20 hours at 13°C/55°F

Yeast activity has plateaued, and the levain will now start to decline if not fed. The sour flavors are very pronounced, which might be what you want in the baked pizza. This is not a common fermentation time, but it’s possible to use the levain at this stage and still get good results.



OVERRIDE LEVAIN

19–25 hours at 21°C/70°F
21–27 hours at 13°C/55°F

The levain looks deflated. The yeast cells are becoming inactive, and the levain has largely lost its leavening power. If you want to maintain the levain, it’s crucial to feed it at this point. So long as it hasn’t developed any off-flavors or off-odors, you can still use it for its flavoring (with wonderful results), but you’ll need to supplement it with instant yeast for leavening; for more details, see Second-Chance Levain, page 310.

Feeding and Using Your Levain

The growth of yeast and LAB depends on three factors: availability of nutrients, acidity, and temperature. Because growth can happen exceptionally fast, species and strains that aren't adapted to a particular environment can quickly be overwhelmed and die out. Your culture can also be affected by contamination or invasion by dust particles, spores, and the like.

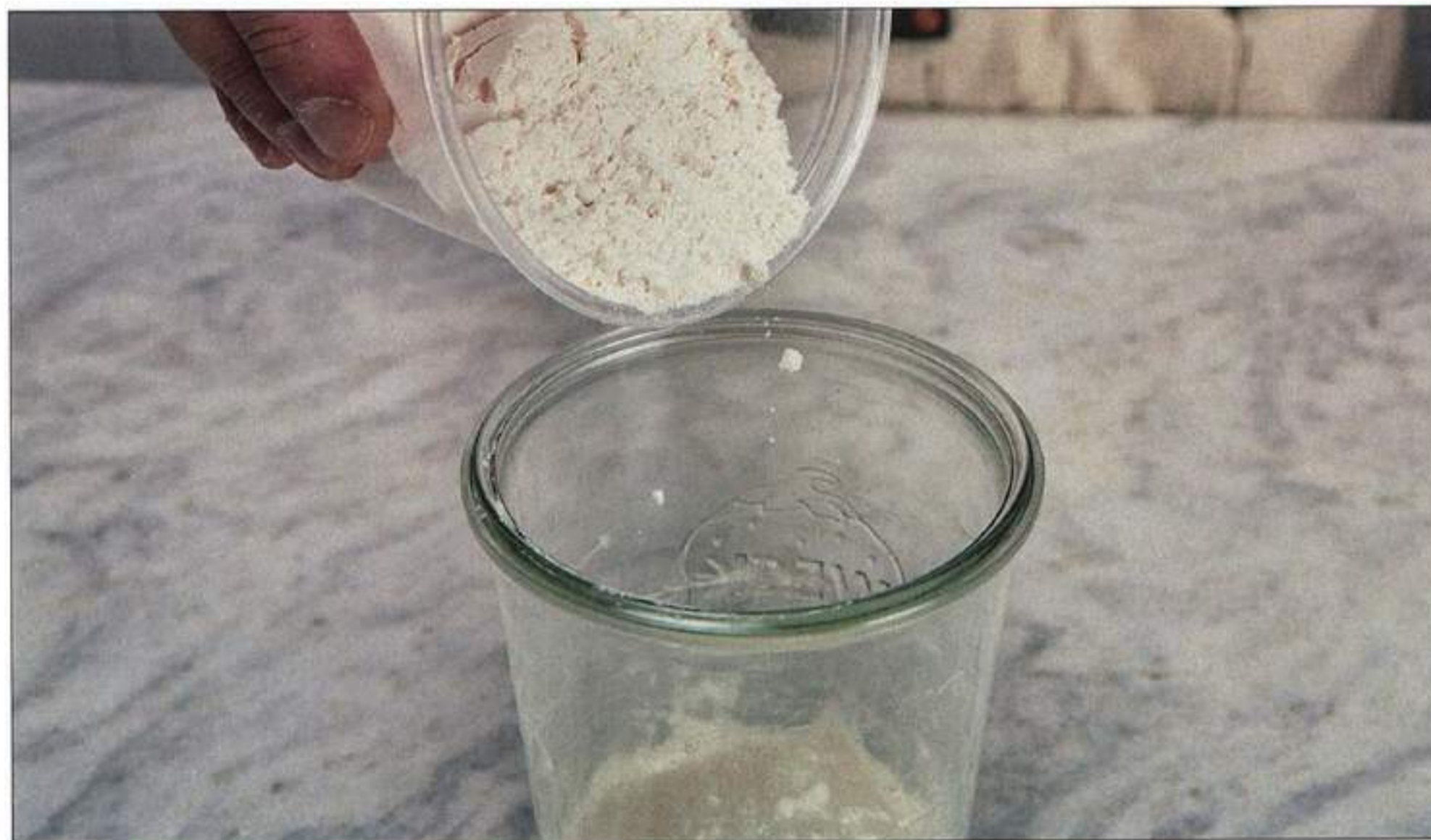
Many bakers swear by their particular starter. But from a microbiology standpoint, the makeup of their levain will change if the feeding schedule and/or temperature are inconsistently maintained. If you don't watch out, on day 20 (or even day 2), your special starter may have a very different composition than it did on day 1. And different levains can create surprises, which isn't a good thing if you're trying to produce a consistent dough.

The point is that consistency is crucial when starting and maintaining a levain because it is a living thing and thus reactive to its surroundings. Consider that both the yeast and LAB are feeding on the same material, creating a competition for the fermentable sugars. Altering the conditions could change which group wins out. We have found that feeding a levain at the same time every day gives the most consistent results. The more often you feed your starter, the lower its acidity will be; conversely, the longer the interval between feedings, the higher its acidity. The higher the ambient temperature, the faster the rate of fermentation will be; this means your levain will need more food. (Levains can starve if they get too hot.) Many bakers adjust to the seasons by feeding their starter once a day in the winter and twice a day in the summer if there is no climate control. This

may work for you, but we find it rather imprecise. We feel that the better option is to keep the temperature consistent.

For consistency in flavor, use your levain at about the same time each day. The longer you wait to use the levain after its last feeding, the more acidic it will be. Some people enjoy that acidity, while others prefer using a more mildly acidic levain that has ripened for only 8–10 hours. If a levain becomes too acidic for your taste and you are ready to make your dough, just use less of it and add a small amount of commercial yeast (0.3%–0.4%). If you wait more than about 18 hours after feeding to use your levain, its leavening power will decline. At this point, you should not use it to make pizza dough, but you can freeze it and use it in our Second-Chance Levain method (see page 310). Feed it after it has been fermenting for 24 hours so you can use it to ferment your doughs once it begins to ripen again.

The most common way to mix levain into a dough is to add it to the water component of the dough. Some bakers take it a step further and “dissolve” (disperse) it in the water by stirring it, either with their hands or a whisk, until it is evenly mixed into the water; they then add the flour on top and mix all the components together. We tested both methods in various doughs, and our recommendation is to pour the liquid levain on top of the water; it is a quick and easy way to see if the levain is usable. If it floats, it's good to go; if it sinks, then it's either not ready to use yet (too young) or is overripe (too old). We have also found that if you are mixing the dough by hand, it helps to dissolve the levain in the water first so that it is mixed in more uniformly.



If you don't feed your levain at the same time each day or maintain a consistent storage temperature, the acidity of your preferment can shift, creating inconsistent results in your pizza.

EXPERIMENT

WEIRD STUFF IN STARTERS

Some bakers swear that the addition of raisins, pineapple juice, or yogurt can accelerate a levain's development. On its surface, the idea sounds plausible. After all, yeasts occur naturally on many fruits, especially grapes, because the microbes thrive wherever there's sugar.

Examined empirically, however, the theory falls apart. Our experiments show it doesn't save time: in every case, it took at least 5 days for the levain to ripen. From what we know about yeast and sugar, we can see why.



Sugar Gives a False Start

Your best bet is to begin a starter using the same food that the yeast will eat over the long term because not all sugars are the same. If you want your levain to eat the sugar components of starch, it's best to start by feeding it just flour. While it's true that an addition of

sugar will enliven a levain (evidenced by increased volume), it's little more than a quick sugar fix. That initial uptick in activity isn't relevant to the levain's ability to sustain itself and produce carbon dioxide in your dough.



Yeast and Lactobacilli from Other Sources

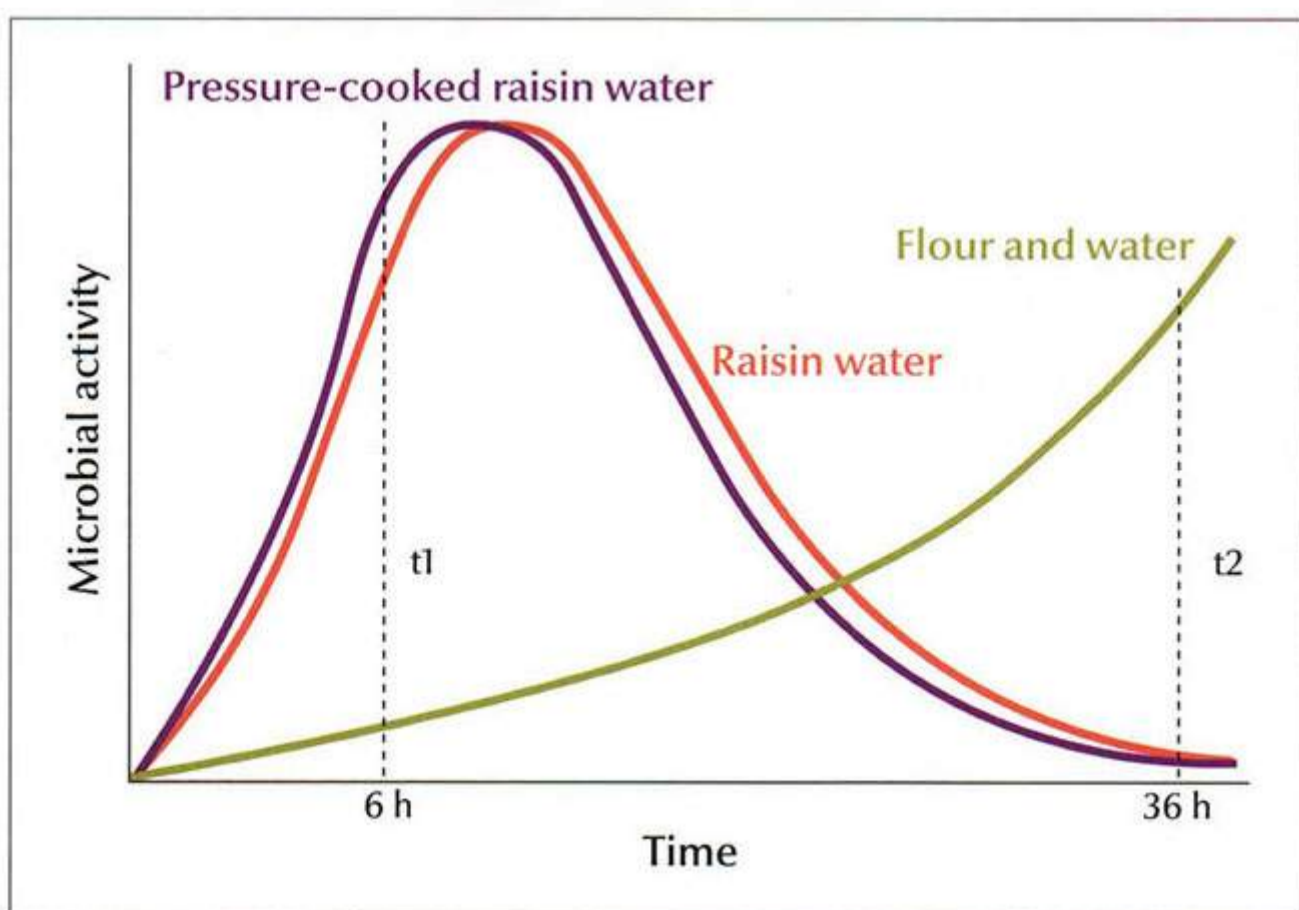
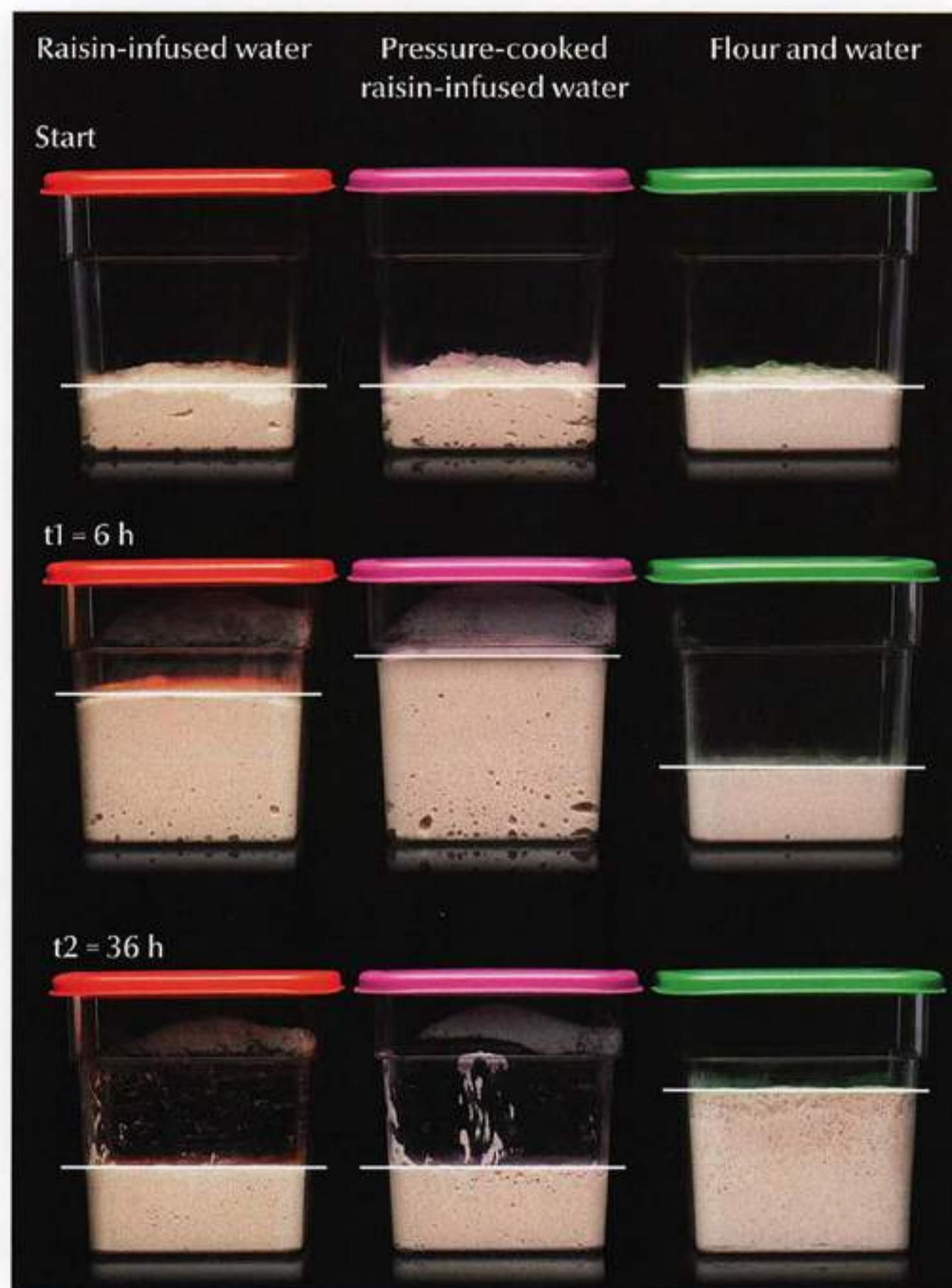
When people use fruits in a levain, they assume that the wild yeasts on the fruits—the powdery blush on grapes, for instance—will benefit the starter, not realizing that these are different strains of yeast. The yeasts that colonize grapes are better suited to making a cuvée sauvage wine than a levain.

The same is true of the lactobacilli in yogurt; they are bred as a monoculture to feed on lactose (the sugar in milk) and are not well suited for fermenting dough. The yeasts that exist in grain and are already in your flour are best for making levain.

You Don't Need to Inoculate Your Culture

We tested several types of inoculated water to see if they helped levain develop more quickly. We even pressure-cooked raisins to sterilize them before inoculating the water to see if it was the microbes or the sugar that made the levain ferment. The levains made with raisin water bubbled sooner and higher. (In fact, the batch made with sterilized raisin water peaked first, proving that the microbes from the raisins weren't a factor. Instead, the microbes in the flour were eating the raisin sugars.) But it's a mistake to think that fast bubbling makes for a fast levain. All our test levains reached maturity at about the same time regardless of adding plain raisins, pressure-cooked raisins (which contain sugar but no living microbes), a combination of glucose and fructose, or nothing at all.

Also contrary to conventional wisdom, we found no evidence that you can reduce starter development to just 2 days by swapping out tap water for infused water in which fruit has steeped. This method works only if the fruit has been first soaked in water for 3 days beforehand, so the total process still takes 5 days.



Storing Levain

Once you have built your levain, what do you do if you need to be away for a few days? We found two short-term storage options that will work for 2–3 days, both with the same objective: to slow down the activity of the yeast and bacteria. The first is to reduce the water content, and the second is to refrigerate the levain.

To use hydration to slow down fermentation, feed the levain right before you leave, and make it stiff. That is, instead of mixing 100% water into the levain, add only 50%–60% water. Feed the levain as you

normally would as soon as you get home, then feed it again 12 hours later. By the following day, your levain should be back to normal.

The other option is to pop the levain in the fridge (4°C / 39°F); the yeast won't be happy, but it won't die. When you get home, transfer the levain to a room at 21°C / 70°F, which will warm and wake up the yeast and bacteria. Wait at least 12 hours before feeding it, then wait another 12 hours, and feed it again. For longer-term storage, you can use our Second-Chance Levain method (see page 310) or freeze or dehydrate the levain (see below).

HOW TO Dehydrate a Levain

Yeasts and LAB are naturally equipped to survive in environments that have little water or nutrients, meaning that dehydration is another good long-term storage method for levain. A dehydrator accomplishes this by pulling water out of the levain before the yeasts and LAB know what hit them, and the final product is easy to work with, store, and rehydrate. This process is similar to the way dry yeast is commercially produced, which involves drying yeast with hot air in bed dryers on a large scale; doing so on a much smaller scale is vastly easier to control. The key is to use low, gentle heat so

that it doesn't kill the microorganisms but renders them dormant, meaning that the leavening power of the levain is intact and no additional commercial yeast is required. If you don't already own a dehydrator, you can get a good-quality one for less than the cost of a stand mixer. It's best to dehydrate the levain when it's ripe and the yeast activity is at its peak. We recommend dehydrating the levain at least 1½ hours and up to 16–18 hours after feeding it. You should rehydrate enough levain to make your dough plus an additional 25% to perpetuate your levain.



1 Spread the levain on a nonstick mat as thinly and evenly as possible.

2 Set the dehydrator to 30°C / 86°F (or the lowest setting you can get). Place the mat with the levain in the dehydrator.



3 Allow the water to evaporate for at least 24 h.



4 Once the levain has dried, grind it in a coffee or spice grinder. Very small particles rehydrate quickly; chips take much longer.

5 Store in an airtight container or zip-top bag in the refrigerator for up to a year.



6 To revive the levain, combine the levain powder with 100% water. Allow it to hydrate at room temperature for 48 h. Feed it with 100% flour and 100% water. Within 24 h, the levain should be awake and active again.



EXPERIMENT

SECOND-CHANCE LEVAIN

Unused portions of levain, such as those removed for a feeding, are often just thrown out. Sometimes a levain is forgotten or ignored for too long, and the entire batch loses its leavening power and becomes useless. Over time, the amount of discarded levain can add up. We wanted to see if we could save this levain for later by freezing it. We stored frozen batches of levain for up to 4 weeks and thawed them at different points, baking them in a side-by-side comparison with a fresh levain that had been fed the day before. After 2 weeks in the freezer, there was noticeable deterioration in the leavening power of the frozen preferment and volume of the resulting pizza.

Freezing levain for longer than 2 weeks will kill the yeast and LAB. It strips the levain of its leavening power but leaves the wonderful levain

flavor intact. Defrost it, add it to the dough along with 0.4%–0.5% instant yeast, and you have a shortcut to levain pizza. This technique is used in the Second-Chance Levain Variations on page 2:173.

To freeze leftover levain, portion it into an ice cube tray and use an offset spatula to even out the tops of the cubes. Once it has frozen into cubes, remove them from the tray, put them in a zip-top bag, and return them to the freezer. You can also forgo the ice cube tray and freeze the levain directly in zip-top bags. Just portion it into whatever weight you would typically use for a specific dough, but add a little extra—say, 10 g—because some will stubbornly cling to the bag. The levain will keep in the freezer for up to 2 months.



Second-chance Detroit-style pizza dough



Second-chance artisan pizza dough

HOW TO Use Second-Chance Levain

When you use an inactive levain in your dough, it will provide only flavor and some hydrated flour. It will not supply any leavening, so you must add instant yeast to the recipe. When you are thawing the levain,

make sure the bag is airtight so none of the levain seeps out. The inactive levain should also never get above 60°C / 140°F, or the starch will gelatinize and render it unusable.



1 Pull the inactive levain out of the freezer 2–3 h before you need it, and submerge the bag in 29°C / 85°F water. (Or, if you froze the inactive levain into cubes, weigh out how many you need for the recipe. Put them in a bowl, cover them with plastic wrap, and allow them to thaw at room temperature for at least 18 h.)



2 Cut a corner off the zip-top bag, and pour the inactive levain into a bowl with the amount of water the recipe calls for. Cutting the bag allows you to use it cleanly, like a piping bag. (Or add the thawed cubes to the bowl of water.)



3 Add 0.4%–0.5% instant yeast to the water. Dissolve the yeast and inactive levain in the water.

4 Add the mixture in place of the levain called for in the recipe.

COMMON LEVAIN PROBLEMS

Levain is a living, breathing thing—until it's not. Sometimes, a levain goes inactive for obvious reasons (you forgot to feed it or it got overheated, for example). Sometimes, you've tended and fed your levain diligently, but it's still lifeless or smells funny. This can be distressing to bakers and pizzaioli, many of whom get very attached to their levains. There are a number of approaches you can take if you have a levain that's problematic.

LEVAIN THAT WON'T START AT ALL

It's usually not too hard to get a levain started, but if it is, it's best to simply throw it out and begin again. Make sure that you're feeding it on a regular schedule and that the temperature is stable. If it's warm, you may need to feed it more often (see page 307).

LEVAIN THAT SEEMS LIFELESS OR INERT

Address any obvious problems, such as temperature and feeding, and try again. But if it still doesn't kick into action, your levain is likely beyond revival. You can still use it, though, as a flavoring agent (see page 310).

LEVAIN THAT BECOMES SLUGGISH

Your levain was doing great for a while but seems to have lost its mojo. Start by fixing obvious problems, such as fluctuating temperatures. Insulated coolers help keep the temperature on an even keel. Some people use heating blankets on a low setting during cold spells. If it's warm out, use cold water during feedings, or store the levain in a wine refrigerator. Your levain may also need more food if the temperature is elevated. Not sure what's going on? Use a min/max thermometer to see if its temperature is spiking, and address the problem accordingly. Then give the levain another try, feeding it on schedule, and see what happens.

But also remember this: you can always start a new one. Flour and water are cheap. There isn't anything inherently magical about any particular levain. And if you have to do too much to your levain to revive it, there's a good chance you've made a levain with a different composition of yeasts and bacteria anyway.

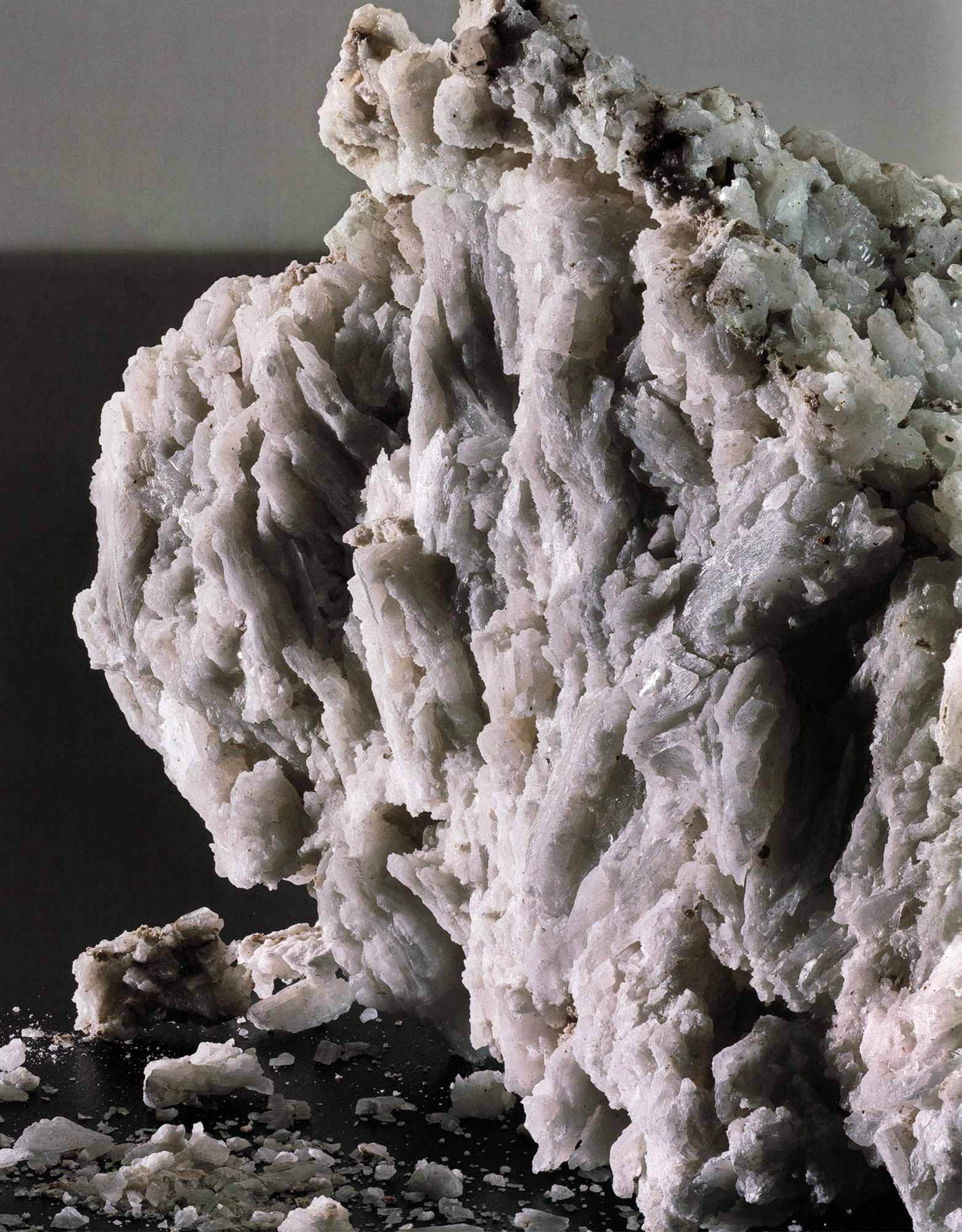
LEVAIN THAT DOESN'T SMELL RIGHT

Sometimes a levain can get colonized by unwanted bacteria. There is no sense in wasting your time trying to save it. Throw it out and start fresh.

OTHER SUGGESTIONS

Some bakers recommend reviving a sluggish levain with diastatic malt powder (0.5%), instant yeast (0.05%), or chickpea or rye flour (10%–20%); adjust the amount of the bread flour to account for the addition of this flour).





SALT

Among pizzaioli, salt has a reputation as a yeast killer, and there is some truth to that. Salt can either benefit or inhibit the chemical reactions that occur during the dough making and proofing process. Whether it's helpful or harmful depends largely on its concentration in the recipe.

Salt performs several functions, the primary one being to enhance flavor. But even without tasting it, you can literally see the effects of omitting salt soon after mixing: saltless dough is slack and sticky. Reasonable amounts of salt (2%–2.5%) can increase the volume of pizza dough and also make it taste good. On the other hand, oversalted pizza dough is unpleasant, and that heavy-handedness also has dire consequences for yeast and fermentation.

Sodium chloride is an ionic compound composed of positive sodium (Na⁺) and negative chloride (Cl⁻) ions. Water molecules easily separate the ions when salt dissolves, as it does during mixing. The separated ions then act like free agents in the dough and are drawn toward other molecules, including flour proteins. Gluten proteins naturally repel one another; the chloride ions help them overcome that repulsion and stick together. Gluten chains grow increasingly complex as more connections form among the proteins. The result is a strong bubble wall that can retain lots of gas.

Sodium chloride is also hygroscopic, which means that it attracts moisture. Added at the start of mixing, it interferes with the hydration of the gluten proteins even as it helps them stick together. That said, a small amount of salt helps regulate both hydration and fermentation. It slows down fermentation by putting osmotic pressure on the yeast cells, making it harder for them to grow. As with cold-proofing (see page 2:70), you'll find that this slowing down results in benefits such as richer flavors and darker crusts. Without the presence of salt, yeast cells would partake in an epic feeding frenzy that would ferment the dough too quickly and compromise its structure. That's also why unsalted dough bakes into a relatively pale crust—in the wake of the yeasts gorging on the sugar in the dough, there isn't enough left over to brown in the oven. However, when the salt concentration in dough exceeds 3%, fermentation is slowed to a detrimental degree because the yeast cells are unable to get sufficient nourishment.

SOURCING SALT

Culinary salt has several properties, but in general its texture is what matters most. Case in point: coarse salt sprinkled on food creates crunchy pockets and

explosions of saltiness in a way that fine salt cannot. This delicious effect is very clear when you bite into a salted pretzel. But when that coarse salt is dissolved, it tastes the same as other salts.

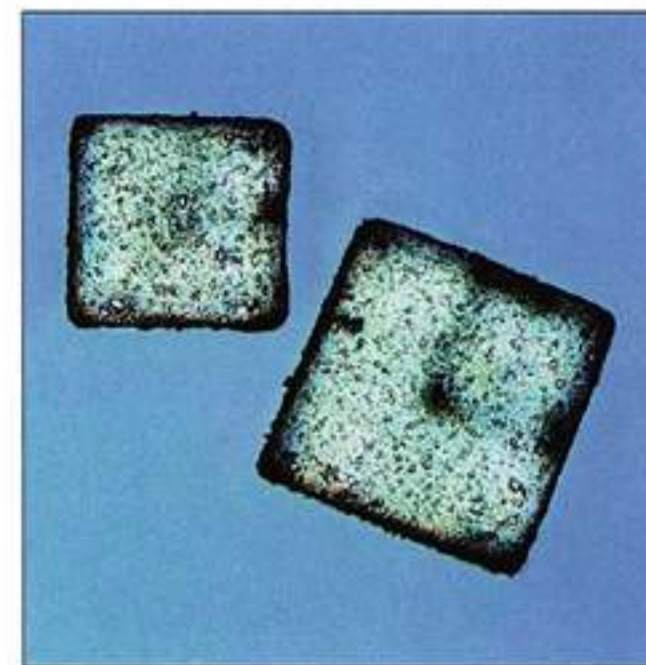
Appearance is another property—some salts differ in color because of the trace minerals they contain. Colorful salts like black salt and Himalayan pink salt have become popular. The minerals do add flavor in some cases, but it's quite subtle. You might notice it when the salt is sprinkled over your pizza at the last minute, but it is virtually impossible to perceive in a baked pizza crust.

Although the terroir of salt may not matter when it comes to saltiness, the size and shape of the crystals certainly do. The degree of saltiness isn't determined by the region a particular salt is mined from but by the ratio of surface area to volume: microgram for microgram, a flatter flake exposes more surface to the tongue than a cubic grain does, so we perceive the flake as being saltier.

When it comes to dough, the most important thing is for the salt to be completely dissolved and evenly distributed throughout the dough—if you do not properly dissolve the salt, concentrated pockets will form, which adversely affect the yeasts. It's also unpleasant to find these pockets as you chew.

Salt that dissolves easily is best for dough, which is why we recommend fine salt. If you use kosher or other large-grain salts, you must stir them like crazy in the water so that they fully dissolve. Using hot or cold water does not matter—hot water helps many substances dissolve, but not salt.

If you choose to use large-grain salt instead of fine salt, it's important to adjust the quantity appropriately (see Salt Conversions, page 314). The size and shape of the crystals determine how (and how much) salt packs into a given measuring tool, so this is an important consideration if you choose to measure by volume rather than weight: fine cubic crystals nestle tightly into a tablespoon like well-played Tetris pieces, whereas the irregularly shaped grains of coarse salt trap tiny air pockets. The difference between the two is like packing a moving truck full of boxes versus sofas. This is one reason we strongly recommend weighing your salt rather than measuring it by volume. Another is that the actual size of measuring spoons can vary from brand to brand, thus further affecting your measurements.



Look closely at table salt under the microscope, and you'll see that each fleck is a tiny cube. Depending on the crystallization process, other types of salt may end up as flat flakes or, in the case of Maldon salt, as miniature pyramids.

Fresh sea salt might sound like the best salt to use but naturally formed sea salt contains mud and sediment. This one is from an evaporation pond on the beautiful Caribbean island of Bonaire, which is known for its pink salt. We are told that the primary use of Bonaire salt is road salt, not for the table.

SALT CONVERSIONS

All culinary salts are functionally the same. Rare or expensive salt won't improve how your pizza bakes—but the way you measure it might. The real secret to salt is to weigh it using an accurate, precise scale. Measuring by volume is less consistent because salts pack into measuring tools differently depending on the crystal's size and shape. Kosher salt's volume

is very different from that of other salts because of the size of its crystals. Use the table below to convert volume measurements into weights for common brands of salt—or to adjust weights when substituting one kind of salt for another. All the recipes in this book use fine salt unless otherwise specified.



Kosher salt

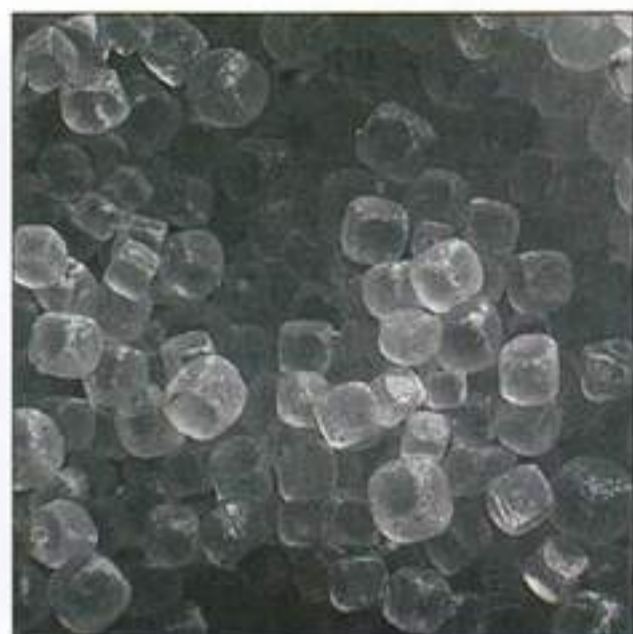


Table salt

Salt type	Weight per 1 Tbsp	Weight per 1 tsp
Diamond Crystal kosher salt	9.6 g	2.9 g
La Baleine sea salt (coarse)	18.74 g	5.57 g
La Baleine sea salt (fine)	16.63 g	5.13 g
Morton kosher salt (coarse)	17.63 g	5.33 g
Morton sea salt (coarse)	17.63 g	5.33 g
Morton Mediterranean sea salt (fine)	16.33 g	5.07 g
Morton table salt (iodized)	18.23 g	5.57 g
Morton table salt (plain)	19.5 g	5.67 g

HOW MUCH SALT SHOULD YOU ADD TO PIZZA DOUGH?

The short answer, which is often the best, is 2%, though not everyone will agree. During the more than four years of research we conducted for *Modernist Bread*, 2% was the number we kept coming back to. Indeed, many of the recipes in that book (and in this one) are at or around that percentage. With our research into pizza making, however, we observed that this number varies with greater frequency. In Naples, pizzaioli go as low as 1.5% and as high as 3.5%. The reasons given for the fluctuations also vary. In some instances, it's simply the way they have always made their dough. For others, the higher salt percentage compensates for their choice to use unsalted sauce and unsalted cheese. Still other pizzaioli said they vary the salt percentage with the seasons; when it's hot they add more salt, and when it's cold they add less, all with the purpose of controlling the rate of fermentation (more salt = less activity; less salt = more activity).

That made us ask: Why not adjust the amount of yeast? If you increase or decrease the salt, it will have a significant effect on the dough rheology and its fermentation time. Also, it means that the crust will taste one way in the winter and another way in the summer. Why put yourself and your customers through this flavor roller coaster? Just use less yeast in the summer and more yeast in the winter.

There are also pizzaioli who add salt to taste. This one we can't really wrap our heads around because it means eating raw dough, and it also assumes that the salt you've just added evenly disperses and dissolves in a matter of seconds.

Your biggest takeaway from this should be: 2%–2.5% salt is just the right amount for seasoning pizza dough. If you need to control fermentation, do so by adjusting the amount of yeast in the dough or the temperature of the dough. Some of our least favorite pizzas eaten during our travels for this book were the ones with chronically undersalted dough (see page 236).



SUGAR

What does sugar do? Most people offer two answers: it makes food yummier, and it makes people fatter. But sugar does much more. Sugars work through chemical reactions to change the texture and appearance of dough, which would not look nearly as appealing otherwise. And sugars, indirectly, make dough rise—they are yeast's source of energy. So you could say that sugar gives dough life, too.

All organisms need sugar to survive, but yeast cells might have the biggest sweet tooth of all—it's the only food they eat. Enzymes turn the starch in flour into an all-you-can-eat buffet of sugars, which the yeast cells metabolize into energy, alcohol, carbon dioxide, and the other by-products of fermentation. The meal is a slow crawl that lasts for hours—the concentration of sugar in the dough is limited by the pace of the enzymes.

But too much sugar can be poison for yeasts and other microbes. Like salt, sugar is a hygroscopic compound: it draws water to itself, which puts osmotic pressure on any microbial cells nearby. At sugar concentrations above 6% or so, the pull is so intense that the cells dehydrate. Growth and fermentation slow dramatically. In the case of honey, the high concentration of sugar makes it an inhospitable environment for microbes, which is why it can keep for years at room temperature. In fact, pots of unspoiled honey are often recovered when archaeologists excavate ancient Egyptian tombs.

You can see the hygroscopic properties of sugar and salt in an easy kitchen experiment. Sprinkle a pinch of either on the freshly cut surface of a strawberry or tomato, and wait a few minutes. Moisture droplets will bead up on the surface as the water leaches out from the fruit's cells. If you pack fruits in enough salt or sugar, they will dehydrate and shrivel up—exactly what happens to yeast cells.

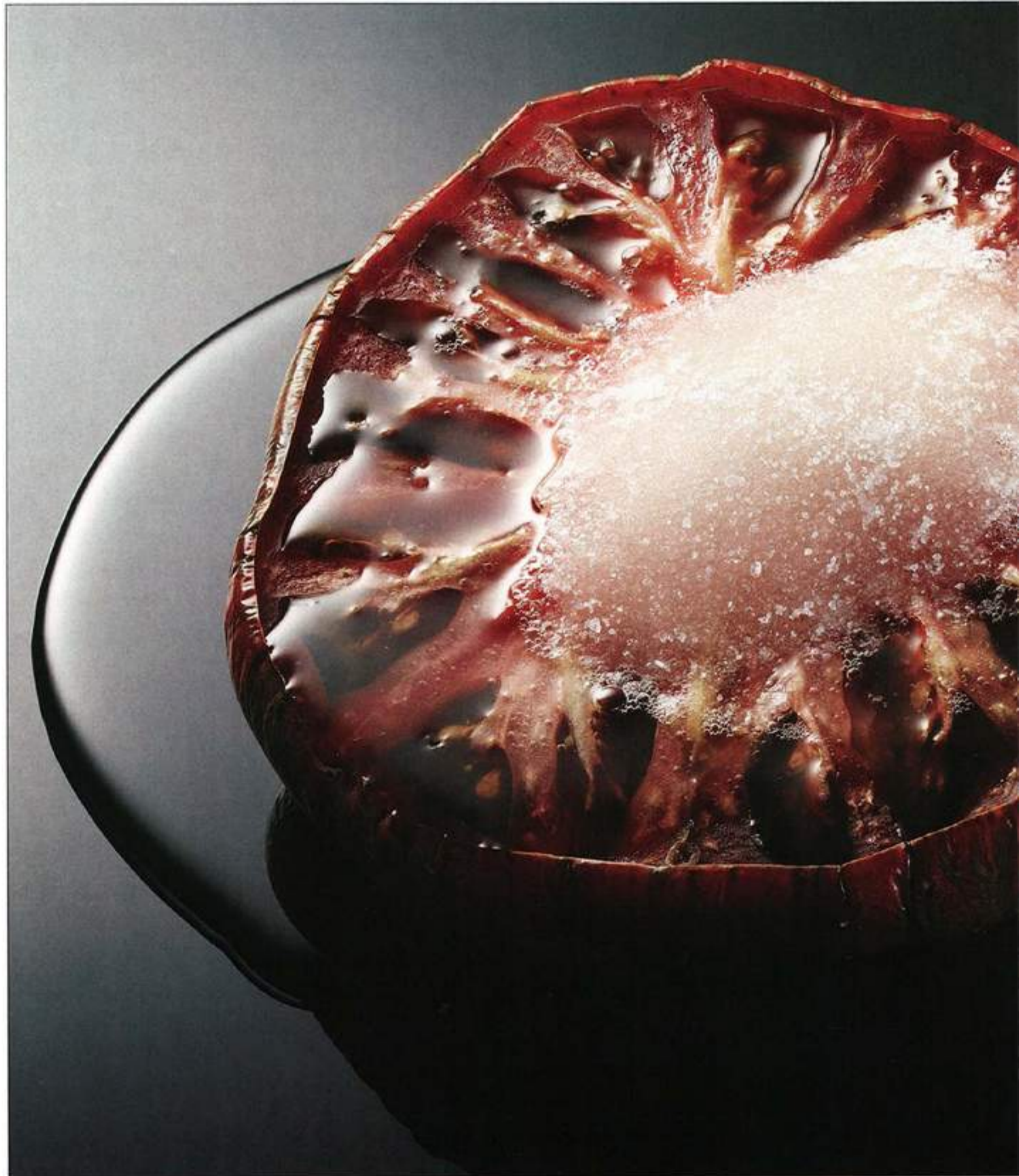
When amino acids are present along with sugars, Maillard reactions occur instead of or in addition to caramelization. People often speak of caramelization and Maillard reactions as if they were interchangeable, which is understandable because they are similar. But whereas caramelization is a reaction that involves a single compound—sugar—Maillard reactions are much more complex, involving proteins, peptides, and amino acids, which react with a set of sugars to create thousands of new flavor compounds. It's why the crust of pizza gourmet, which is often steamed and then baked, tastes and looks different

from that of a crispy New York pizza crust. Caramelization is like a tuning fork, while Maillard reactions are like a symphony orchestra.

The hygroscopic properties of sugar allow it to play a third useful role in baking as a humectant, or moisture-retention agent. Sugar molecules grab water vapor and hold on to it, which helps make the crumb tender. The chemical attraction of sugar to water also slows dehydration, so breads with sugar in the dough stay softer for longer.

During long fermentations, yeasts consume large amounts of simple sugars. If nothing is done to compensate for the depletion of the sugar, the baked pizza crust may have a dull color; there's just not enough residual sugar in the dough to ensure proper browning. To avoid this, pizzaioli often add diastatic malt powder to the dough (see page 324 for details).

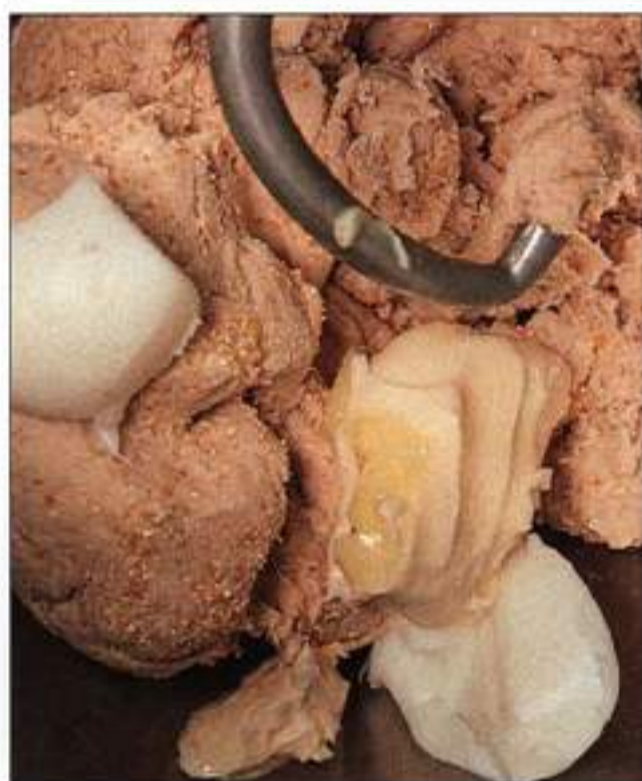
We add malted barley syrup, a sweetener, to our Quad Cities pizza because it aids in browning and produces a version of the pizza that we feel is improved (see page 2:140).



Sprinkle sugar on a cut tomato and watch how a puddle of syrup collects on the surface and underneath it. The high amount of sugar outside the tomato's cells, combined with sugar's ability to attract water, causes the water to leach out.

FATS AND OILS

We use extra-virgin olive oil in some of our doughs. We like the flavor, and the crumb of the crusts doesn't reach temperatures that will break down the volatile compounds in extra-virgin olive oil. You can substitute pure olive oil if you'd like.



Our Deep-Dish Pizza Dough (see page 2:118) uses a combination of lard and butter to make up the nearly 9% fat in the dough.

Fat and emulsifiers called surfactants are adept at stabilizing gas cells. They protect the bubble wall from becoming thin by keeping water molecules and gas in place.

In the world of breads, there are lean breads that have no fat, like a French baguette or an Italian filone. Then there are breads that famously contain a high percentage of fat; the French brioche is a classic example, as is panettone. But there's also significant oil in most recipes for focaccia.

Within bread, the characteristics of lean breads and enriched breads are pretty well known. Lean doughs tend to have hard, crispy crusts while enriched doughs have a softer crust and generally a softer crumb. We found that even tiny amounts of solid fat (up to 5%) could dramatically improve the volume of an otherwise lean bread.

Within pizza, AVPN pizza dough (see page 3:43) contains no fat but we found a number of "Neapolitan" dough recipes in books that do. We tried these doughs and understand why they include fat. Small amounts increased the volume in the baked pizza (we included about 1% olive oil our recipe for Neapolitan pizza dough in *Modernist Bread*). It's also typical for New York pizza doughs to have a tiny amount of oil. When researching this book, we were surprised to find certain pizzas that were made with doughs quite high in fat, including some versions of deep-dish pizza. Our conjecture is that these were adapted from recipes for pie dough (see page 64).

Through experimentation, we developed thin cracker-like crusts with a wide diversity of fat percentages, ranging from 0% (such as in our master Thin-Crust Pizza Dough on page 2:110) to up to 30% (like in the case of the high-fat Brazilian thin-crust pizza dough on page 2:117). In the latter case,

it frankly astonished us that you could get a crispy, crunchy result with that much fat. Part of the reason that it's successful is that the dough combines low hydration with a high fat content, similar to what you find in many popular crackers, including Ritz or Club (our high-fat Brazilian thin-crust dough was inspired by these buttery crackers, not by the high-fat pizzas that we found in Brazil).

We found that pizza is remarkably forgiving with respect to the addition of fat. Adding fat to pizza dough will change its textures, handling properties, and flavors. But within a reasonable range, you'll get a pizza that some might prefer. The decision to add fats and oils to your dough is up to you. The master dough recipes contain our recommended fat percentages, but you can add more or less as you see fit (see the table below). Also, many of the pizza doughs that contain fat work well in place of doughs that contain no fat (see our cross-crusting recommendations on pages 2:96–99). Our focaccia dough, for example, made for a beautiful Neapolitan pizza. The question of adding fats and oil is really an aesthetic and creative question for the pizzaiolo rather than a hard and fast rule.

Butters, oils, and other fats add their own distinct flavor compounds to the many compounds already present in a dough. They also help distribute fat-soluble flavors from other ingredients throughout the dough. When you chew high fat-enriched breads such as brioche, fat particles interact with your saliva and can give the crumb a creamy, greasy, or silky feel, making the bread seem extra moist.

FAT PERCENTAGES IN OUR MASTER DOUGHS

The snapshot below offers a glimpse at the different fat percentages for our master doughs. We have more details about our recommended types of fat for each dough on pages 318–319. Except as noted, you can use either crystalline fat or oil, but the effects are very different. Note that

the master Detroit-style dough doesn't have fat mixed into the dough, but some oil gets incorporated after it rests and as the fat renders out of the rim of cheese during baking.

Pizza dough	Minimum recommended fat%	Fat% in the master recipe	Maximum recommended fat%
Thin-Crust Pizza Dough see page 2:110	0	0	2–5
Neapolitan Pizza Dough see page 2:124	0	0	10
Detroit-Style Pizza Dough see page 2:166	0	0	5*
Artisan Pizza Dough see page 2:142	0	3.2	10
New York Pizza Dough see page 2:132	0	3.39	10
New York Square Pizza Dough see page 2:152	0	3.39	10
High-Hydration al Tagio Pizza Dough see page 2:158	0	3.92	10
Focaccia Dough see page 2:148	0	4.04	10
Deep-Dish Pizza Dough see page 2:118	5	8.68	15
Brazilian Thin-Crust Pizza Dough see page 2:114	5	9.76	30**

*Be sure to use oil, not lard.

**We were able to make a pizza with 30% fat as long as we used solid (crystalline) fat. Ghee had better flavor than butter and the extra moisture in butter made the pizza less crispy.

Beyond adding flavor, lipids—a broad category that includes all forms of fat and oil as well as compounds such as diglycerides—change how dough behaves. Fats and oils keep gluten proteins from sticking to one another. They do this by coating the gluten molecules, setting up a barrier that impedes the growth of long gluten fibers.

Pizzas that contain some oil do better when they are reheated than oil-free doughs, which tend to then taste drier. The little bit of oil helps keep the crumb and crust feeling moist. You can bet that most if not all pizzas that are sold by the slice contain some amount of oil, while those that are baked and served to eat right away are likely to be virtually fat-free (Neapolitan pizza being the clearest example). In very low-hydration doughs, like our Brazilian Thin-Crust Pizza Dough (see page 2:114), fat helps with the extensibility (stretchiness) of the dough and produces a crispier texture.

LIQUID FATS AND CRYSTALLINE FATS

Fats are classified based on whether or not they are solid or liquid at room temperature. For example, liquid fats are in fluid form at room temperature, like olive oil or peanut oil. Conversely, solid fats are in partially crystalline form at room temperature, like butter or shortening. For much of the history of cooking, the primary crystalline fat was animal fat such as lard, which was rendered from pork, or similar rendered fats from other animals. However, coconut oil and a number of other crystalline vegetable fats are used in what's now called vegetable shortening.

The solid state of crystalline fats is not permanent; they will melt when the dough begins to warm.

Some fats straddle the line between liquid and solid, as there are crystalline olive oils and liquid shortening. If you are using a solid fat in your dough, make sure that it is softened before mixing it in.

Oil is a multifunctional ingredient in pizza dough preparation. It affects both the crispiness and the flavor of the crust, as well as the way the dough handles during shaping. Oil acts by coating the gluten strands, which helps improve the rheology (and is responsible for the dough taking longer to mix for this reason). Oil makes the dough more extensible and easier to handle and shape by shortening the strands of gluten and weakening the bonds that hold them together. In higher-hydration doughs, such as our master thin-crust pizza dough (>70% hydration), these benefits are diminished because the dough is too wet and slack to make a difference. Handling dough on the peel becomes tricky as well.

Depending on the consistency of the fat, it will have different effects on dough. Crystalline fats allow bubbles to more easily expand during baking, which produces a crust with higher volume. This is because their fat crystals adsorb at the surface of the gas bubble while the dough is being mixed and fermented. Oil and unemulsified fats have the opposite effect: they thin the walls of the bubbles and cause them to rupture. Because the solid fat crystals are attached to the bubble, they will stay put just until the dough starts baking and then eventually melt. But in the meantime, while they slowly melt, they allow the bubble to expand without rupturing, which creates a higher volume. With a small addition of solid fat (1%–5%), thin-crust and medium-crust doughs become stretchier and easier to handle.



When we made our Neapolitan pizza dough with 15% fat (bottom), the outside of the pizza browned too quickly and the dough in the rim crust was still raw. You can go up to 10% if you'd like, but the dough doesn't need fat and our master Neapolitan pizza dough (top) doesn't include any.



We provide recipes for flavored oils in our Toppings chapter on page 2:382. You can use any of these oils to flavor pizza doughs.

In adsorbtion, the fat crystals adhere to the surface of the gas bubble. This is different from absorption, which is when a fluid permeates or is dissolved by a liquid or solid.



Our thin-crust, New York, and artisan pizza doughs were the most successful when we added fat to them. When we increased the amount of fat from 9.76% in our master Brazilian thin-crust pizza dough (left) to 30% fat (right), the crust became crispier and browner.

EXPERIMENT

VARYING THE FAT TYPES AND PERCENTAGES IN OUR MASTER PIZZA DOUGHS

We tested all of our master doughs with 0%, 5%, 15%, and up to 30% fat, using both olive oil (as a liquid fat) and butter, lard, ghee, or shortening (as crystalline fats at room temperature). We tried other crystalline fats in our experiments but they weren't as successful. For example, using cocoa butter produced a very firm dough that would crack on the edges during shaping, and it also had an off-flavor. We were able to successfully

incorporate ghee (clarified butter) instead of butter and bake pizzas with up to 30% fat in the dough. Ghee removes the milk solids that are present in butter, lessening the characteristic butter flavor and thus making a more neutral fat. Depending on the type of fat you use, keep in mind that it will affect both flavor and texture.

Brazilian Thin-Crust Pizza Dough

Our Brazilian thin-crust pizza dough already had nearly 10% fat, so we tried experimenting on both sides of that percentage and found that the master dough can go as low as 5% and as high as 15% oil or butter. The lower percentages of butter made a dough that was easier to extend and that didn't contract as much during shaping. Of the tests done at the

higher fat percentages, the 30% ghee trial provided our favorite baking and tasting attributes and resulted in the 30% Fat Brazilian Thin-Crust Pizza Dough on page 2:117. We did need to use high-gluten flour to strengthen the dough and added lecithin to make for more homogeneous fat incorporation.



Brazilian thin-crust pizza dough with 5% oil



Brazilian thin-crust pizza dough with 5% butter



Brazilian thin-crust pizza dough with 9.76% oil (master recipe)



Brazilian thin-crust pizza dough with 15% oil



Brazilian thin-crust pizza dough with 30% ghee

Neapolitan Pizza Dough

With Neapolitan dough, which typically doesn't contain oil, we noticed a decline in quality when the oil content increased above 5%. The pizzas with 10% and 15% oil browned before the dough was completely baked

through, and the cheese on top could not melt properly. If using oil, the optimal amount for this recipe is 2%, with 5% being the highest limit. Neapolitan dough doesn't really need oil to begin with, however.



Neapolitan pizza dough with 0% oil (master recipe)



Neapolitan pizza dough with 5% oil



Neapolitan pizza dough with 10% oil



Neapolitan pizza dough with 15% oil

Detroit-Style Pizza Dough

Although our Detroit-style pizza recipe is excellent without any fat, the addition of 5% oil or butter yielded a very good alternative. When we tried the same dough with 5% lard, we ended up with something that

had a great crispy texture but a flavor that was not to everyone's liking. Increasing the fat percentage beyond 5% resulted in a denser crumb.



Detroit-style pizza dough with 0% oil (master recipe)



Detroit-style pizza dough with 5% oil



Detroit-style pizza dough with 5% butter



Detroit-style pizza dough with 10% oil



Detroit-style pizza dough with 20% oil

Other Pizza Dough Styles

Our thin-crust, New York, artisan, focaccia, New York square, and high-hydration al taglio pizza doughs were all very forgiving with the addition of fat, whether it was liquid or solid. Up to 10% fat works well in any one of these doughs and is delicious. Using more than 10% fat will make the dough harder to mix and shape. Whether we chose not to use any oil or to use as much as 10%, the pizzas were delicious. Encouraged

by this result, we tested crystalline fats such as butter, shortening, and lard at the percentages for each master dough and concluded that these fats will also produce a high-quality pizza. Just don't use more than 10%. We provided a sampling of photos to show what happens to these pizzas when the fat content goes over that upper limit.

New York Pizza Dough



New York pizza dough with 0% oil



New York pizza dough with 3.39% oil (master recipe)



New York pizza dough with 3.77% shortening



New York pizza dough with 10% oil

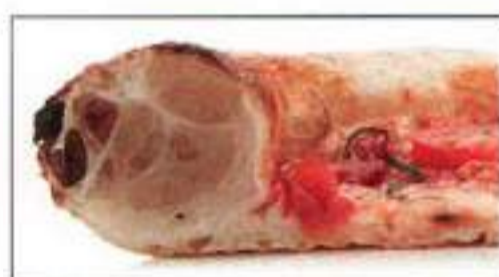


New York pizza dough with 20% oil

Artisan Pizza Dough



Artisan pizza dough with 0% oil



Artisan pizza dough with 3.2% oil (master recipe)



Artisan pizza dough with 10% oil

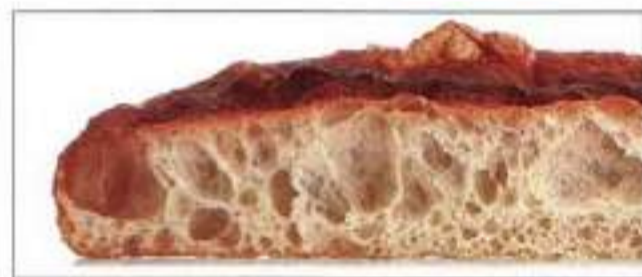


Artisan pizza dough with 20% oil



Artisan pizza dough with 30% oil

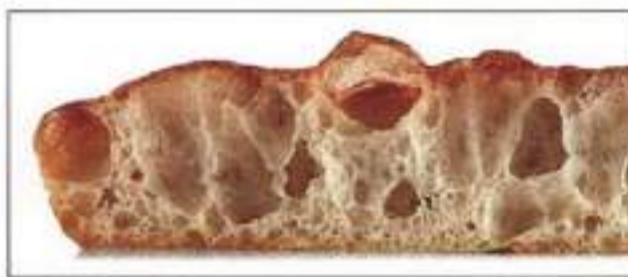
Focaccia Dough



Focaccia dough with 0% oil



Focaccia dough with 4.04% oil (master recipe)



Focaccia dough with 10% oil



Focaccia dough with 30% oil

New York Square Pizza Dough



New York square pizza dough with 0% oil



New York square pizza dough with 3.39% oil (master recipe)

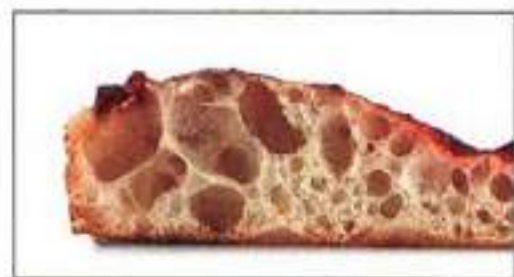


New York square pizza dough with 10% oil



New York square pizza dough with 30% oil

High-Hydration Al Taglio Pizza Dough



High-hydration al taglio pizza dough with 0% oil



High-hydration al taglio pizza dough with 3.92% lard



High-hydration al taglio pizza dough with 3.92% oil (master recipe)



High-hydration al taglio pizza dough with 10% oil



High-hydration al taglio pizza dough with 30% oil

Categorizing Pizza Recipes and Styles

Some pizza makers want to put a familiar name on their pizzas for customers so that they can fit into an existing niche, which is how wildly different types of pizza fall under the al taglio, Sicilian, or grandma-style pizza definitions. In some cases, people truly have different ideas about how a particular type of pizza should look or taste, and these are often the ones that we enjoyed the most when we visited pizzerias (see page 254).

When we were inputting the database recipes, we deferred to what the author called them and grouped them accordingly (we also recorded where the books came from). From there, we divided our database into four main sections: dough, sauce, cheese, and toppings.

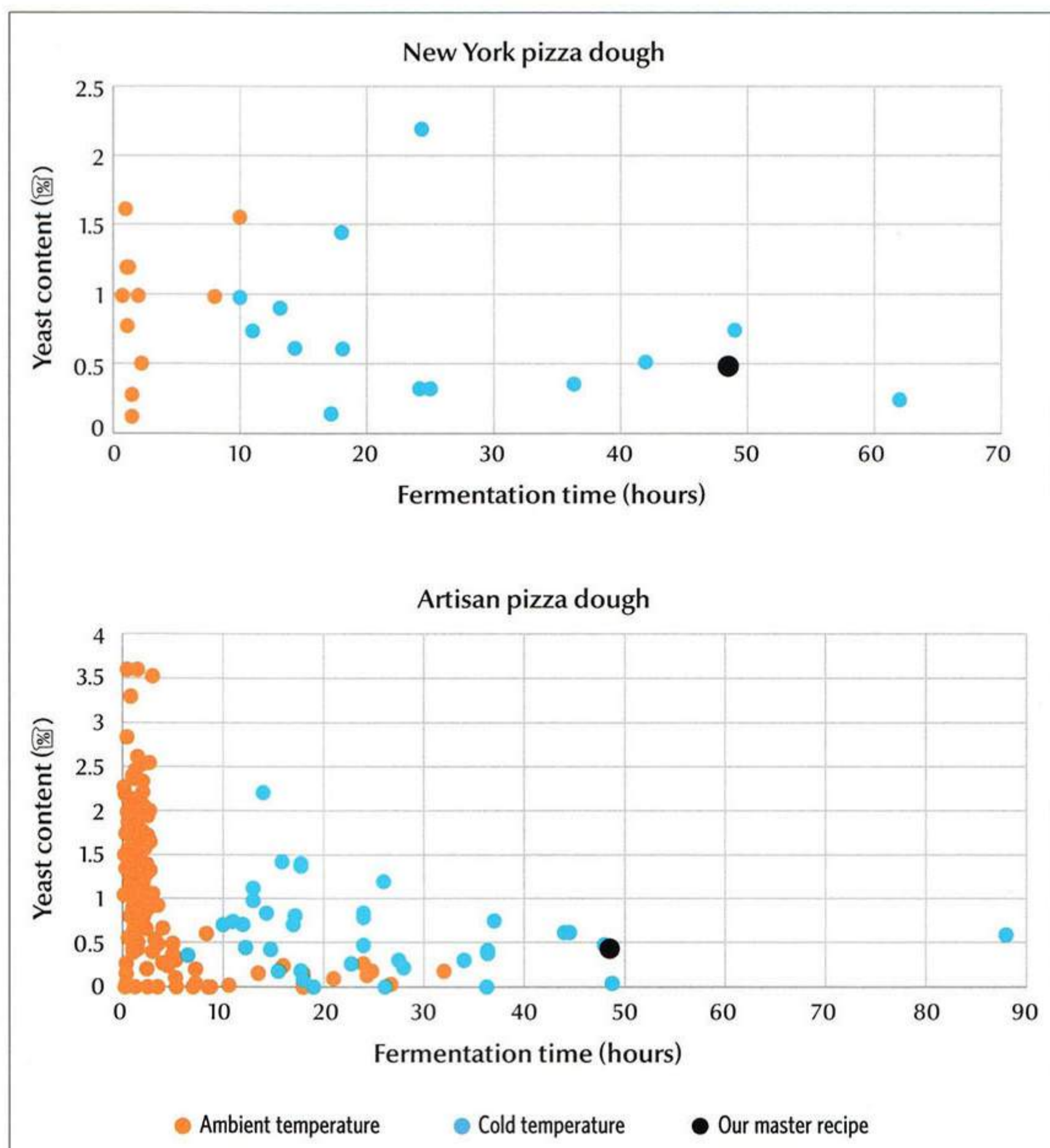
Each of these sections contains data relevant to their function in pizza making. For the dough section, we recorded fermentation, mixing, proofing, shaping, and baking information, as well as ingredient breakdowns. We recorded recipe ingredients in metric weights and baker's percentage to normalize all the recipes. This allowed us to explore relationships within and amongst dough types. Below are two graphs that give a snapshot of the types of comparisons that can be made within the data.

In sauce, we looked at the ingredients and sauce preparation to see how they compare. For both cheese and toppings, we observed the

types and amounts used on pizzas. We provide specific examples of these database findings in the respective chapters on Cheese (see page 2:297) and Toppings (see page 2:354). Our database findings for the dough section have been incorporated into our recipes when applicable (see page 2:81).

We found that many variations in pizza recipes can compensate for each other, such as when one pizza maker uses a much smaller amount of yeast than another but ferments the dough longer. Some recipes are different because their creators prioritize certain factors, such as using a lower hydration in their dough to avoid the difficulties of handling loose high-hydration pizza dough. A surprising number of printed recipes contained typos. Just because a recipe finds its way into print doesn't guarantee it's correct.

When we took a broad look at the data, we saw clear outlier recipes. After exploring these and testing them, that led to further experimentation and discovery. All of this investigation has led us to include our recipes throughout this book, which we believe make the best pizzas while also providing adaptations so that you can bake these standouts without compromising them.



The graphs above display the relationship between dough fermentation time and total yeast content for artisan and New York pizza dough recipes. You can see these cold-proofed doughs tend to have lower total yeast content but longer fermentation times. Doughs fermented at ambient temperature tend to have higher total yeast content and shorter fermentation times. The black points represent our master New York Pizza Dough (see page 2:132) and Artisan Pizza Dough (see page 2:142). Even though we consider our New York pizza and artisan pizza doughs to function similarly, you can see that there are a significantly higher number of outliers and variation in the New York pizza dough graph when compared to the artisan graph.



IMPROVING PIZZA DOUGH



Like stretching a balloon, the elasticity in dough allows it to stretch when pulled and then partially return to its original shape. This stretchiness is an indicator of gluten development.

Dough doesn't always do what you want it to do, particularly in terms of volume, stretch, crumb texture, and browning. When considering the question "How do I make better dough?" it's more useful to break the question into two parts: "What is the dough characteristic I'm trying to improve?" and "Why am I trying to improve it?" Some reasons might include wanting to make the dough easier to handle, to increase its stretchiness, to enhance browning, or to manipulate its texture.

Developing dough is a balancing act because, by nature, it is in two states at once. It's both a viscous liquid and an elastic solid—the technical term is "viscoelastic"—which means that dough can have some unique properties. Amp up the hydration, and it behaves more like a liquid; add more flour, and your dough becomes more of a solid.

Different physical properties—recoil, stretchiness, viscosity, and stickiness—allow dough to do pretty incredible things. Whether or not pizzaioli realize it, they exploit these properties every day. Dough acts a lot like a rubber balloon—it stretches around bubbles of carbon dioxide, just as a balloon stretches when carbon dioxide is blown into it. This analogy is also helpful in explaining some of the physical properties that make dough special. Before blowing up a balloon, many people will give it a quick stretch: we expect that the balloon will elongate, with some resistance, and then snap back into shape. We're testing the strength of the balloon and stretching it out to make it easier to blow up.

Pizza doughs have a tendency to pull back and shrink after you shape them, as shown in this time lapse of our Brazilian thin-crust pizza dough. You can make the dough easier to roll out and maintain its shape by adding dough relaxers (see page 327).



Dough has similar properties. Take a small ball of a lean dough like Neapolitan Pizza Dough (see page 2:124), and give it the balloon test. As you pull the ends away from one other, you should feel resistance even as it stretches. Let go, and it should partially draw back toward the center. This property is called recoil, or elasticity, which is the degree to which dough is able to return to its original shape. The stretchiness of dough, also referred to as extensibility, is how far you're able to pull the dough before it breaks. These properties are often positioned as opposites, but they actually work synergistically. Together, they determine how well a dough can trap and hold bubbles of gas, how easy it will be to shape, and how well it will expand in the oven.

Both elasticity and extensibility are largely a function of gluten development (see page 2:29); they signal in different ways how "strong" or developed the gluten structure is. Springy dough resists pulling and immediately snaps back nearly into its original shape. It has well-developed structure and gives pizza a satisfying, chewy texture. But gluten can be overworked to the point that the dough becomes too elastic; it will behave like a coiled spring, which makes shaping a challenge, and can develop a tough texture when baked that is unpleasant to chew.

Stretchy dough indicates that the gluten structure is slightly weaker. A more extensible dough can effortlessly expand as it rises and is easier to shape. Slack dough reveals that the gluten structure is underdeveloped and too weak to trap bubbles, so it bakes poorly. A slack dough typically contains too much water, is undermixed or overproofed, or is made from a weak flour.

Dough can also vary in viscosity. Viscous dough exhibits properties similar to a solid, including resistance. Sometimes called tenacity, this characteristic refers to the amount of force you have to exert to change the shape of the dough. Fluid doughs behave more like batters—they require little to no force to mold, whereas a highly viscous dough resists manipulation.

Dough is also defined by how sticky it is—a sticky texture affects how difficult or easy it is to work with a dough. The more water you add to a dough, the stickier it becomes (until it crosses the threshold to being a batter). Sticky doughs often yield a moist crust that won't crumble, though the extreme can produce a gummy texture instead. This is one reason why high-hydration doughs are notoriously difficult to handle. Pizzaioli often sprinkle a generous amount of flour on the surface of sticky dough to make it easier to shape.

Improving dough is often a matter of using techniques or ingredients to restore the balance when a dough has too much of one property or not enough of another. A pizza dough needs to be elastic and extensible so that it can trap and support bubbles, but it should also stretch without breaking as the bubbles expand with carbon dioxide and steam during baking. Making good pizza dough, however, is more difficult in practice, in part because the definition of what constitutes “good dough” varies wildly depending on the type of crust being made, as

well as the pizzaiola making it. The ideal consistency for focaccia dough, for example, is much looser than for a Brazilian thin-crust dough.

Through experimentation and science, commercial dough manufacturers have discovered ingredients that can improve the properties of dough, collectively known as dough conditioners or dough improvers. Pizza makers have available to them a host of useful ingredients to solve many different problems, which we will explore in greater detail.

Rheology is the study of how the application of force to matter affects its shape and how that matter flows (or fails to do so). Doughs are defined by two qualities: viscosity, a measure of how easily the dough flows, and elasticity, which quantifies how the dough stretches.

REASONS PIZZA MAKERS IMPROVE DOUGH

Pizzaioli and bakers use functional ingredients to change how dough behaves as well as the characteristics of their finished pizza. The table

below describes some of the most common reasons why bakers use certain ingredients and techniques.

Goal	Reason
improve volume	dough that is elastic and extensible translates to baked pizza dough that is fluffy and light; weak dough lacks the strength to retain air; overdeveloped dough can tear as it rises
make easier to shape	more extensible pizza dough is easier to roll out; this is important for doughs that have to be extended into a pan and fill it completely
make easier to handle	it can be scaled, divided, and shaped without sticking or significantly degassing
improve structure	structure is particularly an issue when working with weak flours or flours that are gluten-free
yield a crispy crust or improve browning	a firm, crunchy crust that shatters and flakes is the defining characteristic of some types of pizza crusts

PURIFIED INGREDIENTS

Some pizzaioli and bakers feel an instinctive revulsion of purified ingredients such as emulsifiers and hydrocolloids—or white powders, as some cooks call them. But these ingredients shouldn’t be any more off-putting (or intimidating) than flour, sugar, and salt—the purified white powders that bakers use happily every day, and have for centuries. No one balks at using baking soda or baking powder, but they are purified ingredients, too.

Emulsifiers, hydrocolloids, enzymes, and certain other purified compounds developed a negative connotation because they are frequently listed on the labels of low-quality, industrially made baked goods. Of course, every ingredient in even the simplest, most organic bread is a chemical, scientifically speaking—starting with water. But what people really mean when they object to “chemicals” in food is that they don’t recognize the name of the ingredient as natural.

There’s no reason to fear any ingredient simply because of its innate purity or unfamiliarity. Ascorbic acid and soy lecithin may not be as familiar as sugar (sucrose) or baking soda (sodium bicarbonate), but they and other purified ingredients are made essentially the same way: using large-scale recipes that transform natural ingredients into a form that is easy for bakers to use.

A distinction that does matter is the difference between purified ingredients and artificial flavorings. Purified ingredients have important functional properties, while artificial flavorings are simply cheaper or more convenient substitutes for natural, more complex sources of flavor. The latter almost always yield a better result. We recommend never using artificial flavors if you can procure the real thing. In almost all cases, our tongues and noses can easily detect the difference.

Ingredients that have been purified have a lot going for them. Their composition has been standardized. They have passed through rigorous quality controls. And they can enable the creation of baked products—such as gluten-free pizza doughs—that would be much more difficult or even impossible to make using only unprocessed ingredients.

Thanks to the steady progress of food science, bakers today can easily incorporate a wide range of purified compounds into their recipes. That means they have more creative options than their predecessors. And we think that’s a good reason to celebrate.



Pectin may come in the form of white powder, but it’s purified from different natural ingredient—like citrus peels.



This high-protein gluten ball is the result of separating the protein from the starch in flour. After drying, the powdered gluten, called vital wheat gluten, can then be used to strengthen dough. But before drying, it can also be used as a vegan meat substitute called seitan.

TURNING UP THE VOLUME

If you've decided to make a thick and bread-like pizza, rather than a thin-crust pizza, you have to decide if you want it to be dense or airy. This is where volume comes into play. "Volume" in this context means "airy"—the largest volume for the baked product using the same mass. If you want to make the lightest, fluffiest pizza dough possible, it's all about the bubbles—you should build the best structure to trap and retain more gas. So, how do you optimize volume? You can accomplish this with technique alone, but you can also add ingredients to boost the results. Producing a lighter, less dense crust is the biggest reason why some pizzaioli try improvers.

One strategy is to make sure that the yeast cells have enough to eat. If they are malnourished or otherwise distressed, yeast produce less gas, causing the volume of the dough to suffer. Although flour naturally contains the enzyme amylase, which breaks down starch into the sugars that yeast feed on, you can add an extra dose of it in the form of purified amylase (derived from microbes) or diastatic malt powder. The latter is made from sprouted grains (typically barley or wheat) that have been dehydrated and ground into a powder. The germination process activates dormant enzymes in the grain, which include amylases. Both purified amylase and diastatic malt powder will make more sugar available to the yeast, resulting in faster fermentation and a greater production of gas.

The other strategy for increasing volume is to develop a strong gluten network in the dough, one that is able to trap gas in the many bubbles of different sizes in the dough and support them from mixing through baking. That's easy to do in doughs made with hard wheat flour because of its high percentage of gluten proteins. But for doughs made with flours that contain a weaker or lesser percentage of gluten proteins, or none at all (like quinoa), this is a challenge. It can also be an issue for doughs made with whole wheat flour; yes, it contains plenty of gluten-forming proteins but it also contains bran, which interferes with gluten development. Bran's thirsty particles prevent the gluten-forming proteins

from fully hydrating, excrete compounds that weaken gluten, and can create microscopic holes in the bubble walls.

There are several kinds of dough conditioners that help strengthen gluten, and each does it in a different way. Ascorbic acid (vitamin C) strengthens gluten; it does this through a chemical reaction that mimics how flour changes as it ages, improving in its ability to absorb water and retain gas once mixed into a dough.

Vital wheat gluten strengthens dough in a more direct way, fortifying weak flours so that they behave like high-gluten bread flours. Vital wheat gluten is powdered protein that has been isolated from wheat flour. To make it, manufacturers mechanically separate flour's proteins from its starch; milled flour is mixed with water to make a soft dough, and the starch is then removed by kneading the dough continuously under a steady stream of cool water. What remains is a gluten ball that is about 75% protein. The gluten is then dried in a ring dryer at a very low temperature so that its functionality isn't affected.

Vital wheat gluten is so good at increasing volume that adding it can transform a recipe that would normally produce a dense crust into one that yields an open, airy crust with far more volume—without changing the amount of flour used. The extra protein increases the water absorption of the flour, which makes the crumb soft and more open. The logic of adding gluten is simple, yet it was a revelation to us when we added 11.28% vital wheat gluten to a 100% light rye flour dough. The dough behaved like a wheat-flour dough in almost every respect.

A less well-known volume-improving dough conditioner—and one that is more effective than any other strengthener we have tested—is the hydrocolloid GENU pectin. It is a high-methoxyl (HM) pectin that aids the gluten network in dough. We found that adding a bit of GENU pectin increased volume the most in our Focaccia dough (see next page). Pure pectin, or other ingredients that contain pectin—such as pumpkin powder, fruit puree, or fruit jam—also work well if you can't find GENU pectin.

Vital wheat gluten



INGREDIENTS THAT DECREASE VOLUME

Sometimes, increasing volume is as easy as understanding how it can be compromised by grains that are otherwise appealing. Some flours lack

enough gluten to help dough retain gas as it rises, and certain grains used as inclusions actually make the bubble wall weaker.

Ingredient	Reason for decrease
rye	doesn't contain gluten-forming proteins
germ/bran	chemically and physically weakens the bubble wall and absorbs lots of water
ancient grains/gluten-free flours	contain little or low-quality gluten

EXPERIMENT

IMPROVING VOLUME IN BREAD-LIKE PIZZAS

We have investigated a variety of dough improvers throughout our research on both pizza and bread. For the sake of improving dough volume, we know that hydrocolloids, and specifically pectin, are a safe bet. Pectin is most generally used to set jams and jellies, but in bread and pizza, pectin makes an impact on the swelling, gelatinization, and gelling properties of the dough as well as the retrogradation of the starch. This allows for greater bubble retention and a higher volume.

We decided to see if we could improve the volume of focaccia. High-methoxyl (HM) pectin is preferred because of its ability to establish hydrophobic interactions with gluten proteins, which in turn make a strong and robust dough. A brand we particularly liked for this study was GENU pectin—an HM pectin made from citrus peels and then

standardized by the addition of sucrose. (Note: this particular type of pectin can be difficult to acquire; however, CP Kelco also makes a basic HM pectin that can be requested through their website. You can request samples or order a large quantity; alternatively, you can just use store-bought pectin.)

We tested the brand-recommended dosage of 0.8% GENU pectin added to the master Focaccia Dough recipe (see page 2:148). In the photos below, you can see the significant difference in crumb volume from the original focaccia dough recipe versus the addition of GENU pectin. In our test, the flavor and crispiness of the focaccia was not affected by the addition of GENU pectin. The only drawback was a slightly gelatinous texture in the crumb.



Focaccia with 0.8% GENU pectin



Focaccia



Using a dough relaxer can make it easier to shape pan-baked pizzas because you can ensure that the dough is pressed in the corners of the pan, creating a sharp outer edge.

IMPROVING DOUGH HANDLING AND SHAPING

You want pizza dough to be supple so that you can easily shape it into a disc or stretch it to fit a pan. Some doughs tear or break so easily that they seem actively stubborn. To make dough stretchier, you have two options: increase hydration or use a conditioning ingredient that will make the dough more extensible. Both approaches weaken gluten, but each does so in a different way. Let's consider the hydration strategy first.

The more water you add to the recipe, the stronger the gluten network can become—to a point. Beyond that threshold, which varies with the gluten-forming protein content of the flour and other variables, excess moisture floods the proteins and interferes with the formation of long gluten chains. This is why very high-hydration doughs are far more relaxed than drier doughs. Adding water also comes with a big drawback: it can make dough very sticky and hard to handle. Working with high-hydration doughs that cling to the worktable and won't let go of your fingers is an irksome task.

The second option is to weaken your gluten to improve stretchiness. You can do this by adding eggs and other fats to the dough, which will limit the length of the gluten chains. Unfortunately, not many pizza doughs contain eggs (if at all), and those that contain fat typically use only very little, not enough to have this effect on the dough.

Dough relaxers (also known as reducing agents) can be helpful in many types of pizza doughs because they help the dough to relax and stretch. In our trials, purified ingredients like meat tenderizer proved

effective at improving the extensibility of dough, as did fruit protease enzymes like bromelain and papain (funnily enough, meat tenderizers work better for dough than for meat). They work like chemical cleavers to cut long strands of gluten into shorter pieces by breaking certain bonds between the protein molecules. That butchery work is transitory—the gluten fibers start to lengthen again once the agents have been exhausted—but the result is a more flexible network that facilitates the growth of bigger gas bubbles. Deactivated yeast is frequently used as a reducing agent as the deactivation process makes the cells' glutathione accessible. This also happens when yeast is frozen, which is why we prefer to freeze baked pizza rather than pizza dough (see Long-Term Storage, page 3:331).

Sourcing purified versions of protease enzymes can be a challenge for noncommercial dough makers. Fruit juices are wonderful alternatives, but there are drawbacks. First, some are so potent that they're practical only when you're making large batches of dough. Second, fruits are a product of nature and thus highly variable in quality and potency. Plants develop sugar at particular times of the year so that animals will be enticed to eat the ripe fruit and carry the mature seeds away. Enzymes work in the same way—a ripe kiwi contains more of the enzyme actinidin than an unripe kiwi does. But there's no way to know exactly how much of an enzyme a particular fruit contains, so using fruit as a delivery vehicle requires experimentation. And use only fresh juice; the protease enzymes are deactivated in canned and bottled juices. Because proteases are used in minuscule amounts, the juice from a chunk or two of fruit is usually sufficient.

The dough on the left is difficult to shape without tearing, but the dough on the right has been improved by adding a dough relaxer, which makes it stretchy and easier to work with.



EXPERIMENT

OUR FAVORITE DOUGH RELAXERS

One of the challenges of making pizza is stretching the dough into the desired shape and size. While round shapes are typically easier to form, rectangles or squares might be more difficult because it's hard to achieve a sharp corner. Small amounts of dough relaxers could help remediate this problem, but since they can make the dough slack, it is important to balance strength and flexibility. Our goal was to find the sweet spot where the dough was malleable enough to shape but strong enough to bake as pizza.

Relaxers can be divided into two types: natural or purified. Natural, or unpurified, can be inconsistent due to their origins. As a result, the amounts suggested below would be less precise for natural relaxers than for the purified ones. The amount of enzyme needed is really small; it's so small that you'll need to use a precision scale to measure it. If you're working with the juice form of the dough relaxer, it might be problematic because even one drop can be too much. It's easier to use the purified form. Some of these relaxers can be made at home, while others must be purchased in a dietary supplement store or

online. Relaxers are not recommended for rye and whole wheat pizza doughs.

We tested our master doughs with various dough relaxers to determine which doughs benefited from a dough relaxer and which relaxers worked best for a particular dough. The meat tenderizer made such a difference in the Neapolitan pizza dough that we included it in our master dough on page 2:124. Shaping Neapolitan pizza can be difficult, and adding this dough relaxer made it easier to get consistent results. Another dough that benefitted from a dough relaxer was the high-hydration al taglio dough. While it's usually tricky to extend to the sides of the pan, the dough cooperated nicely when we added a bit of bromelain, a proteolytic enzyme found in the pineapple plant and fruit. The dough relaxers had little influence on our New York, focaccia, and New York square pizzas, and the final baked results were similar to the original recipe (the control). For thin-crust pizzas and Detroit-style pizza, relaxing the dough is optional. Our deep-dish pizza dough rolls out easily without the need for relaxers, which is why it isn't included in the table below.

Pizza dough	Recommended	Not recommended	Notes
Modernist Thin-Crust Pizza Dough see page 2:112	all had comparable results	n/a	although all dough relaxers worked, relaxing the dough is not critical for this type of pizza
Modernist Brazilian Thin-Crust Pizza Dough see page 2:116	0.0005% bromelain or 0.01% meat tenderizer	papaya juice	relaxing the dough is not necessary for this type of pizza
Neapolitan Pizza Dough see page 2:124	0.01% meat tenderizer	papaya juice	the final crust had even crumb and leoparding
Modernist New York Pizza Dough see page 2:135	0.01% papain	bromelain	the dough performed like the control; papain is preferred based on appearance, flavor, and mouthfeel
Modernist Artisan Pizza Dough see page 2:145	0.0005% bromelain or 0.01% papain	all juices	the juice-based dough relaxers made this master dough far too slack and difficult to shape
Modernist Focaccia Dough see page 2:151	0.0005% bromelain	papaya juice	no dough relaxer really helped relax the dough; bromelain is favored based on the resulting appearance and flavor
Modernist New York Square Pizza Dough see page 2:155	0.03% papaya juice or 0.01% meat tenderizer	pineapple juice	although the dough was stickier than normal, the final baked product was like the control
Modernist High-Hydration al Taglio Pizza Dough see page 2:161	0.0005% bromelain	papaya juice	the dough relaxer helped extend the dough to the edges and corners of the pan
Modernist Detroit-Style Pizza Dough see page 2:169	0.08% kiwi juice or 0.03% papaya juice	pineapple juice	the dough relaxer helped shape this pan pizza, and the 14.78% semolina flour also makes it easier to handle out of the gate



Purified ingredients, such as these bromelain capsules and meat tenderizers, may look artificial but they are derived from natural ingredients, just like flour and sugar. We recommend using purified dough relaxers as they are easier to measure and thus more precise.

MODIFYING TEXTURE IN CRUMB AND CRUST

Using 5% pregelatinized masa harina flour is a very good alternative providing a crispier crust. You can follow the method on page 2:127 for pregelatinizing flour and replace the flour with masa harina.

Because proteases are used in minuscule amounts, the juice from a chunk or two of fruit is usually enough. It is not necessary to use an entire papaya or pineapple.

Most pizza crusts have already crisped up on the outside by the time you pull them out of the oven. The inside, however, is still a piping-hot gel of tangled starch and protein molecules. The interior crumb is so soft that it's too fragile to cut without mangling the pizza into a smashed mess. Thankfully, the crust immediately begins to cool enough to eat within a minute or two for a Neapolitan pizza and a little bit longer with thicker-crust pizzas like New York square or focaccia. At the molecular level, water vapor escapes through the crust, and the mass of gelatinized starch granules within begins to recrystallize (also called retrogradation; see page 274).

These processes alter the texture of the crumb, which will gradually become stale. Various crusts, like Neapolitan pizza, retain some of that initial softness; others do not. Dough modifiers, such as amylases, sugar, pregelatinized starch, and certain emulsifiers, contribute to a desirable texture and enhance pizza crusts in other ways, too. Sugar and other humectants attract water molecules that cling to moisture in the crust; migration is postponed, and the crumb's texture stays soft.

The interaction between amylases and starch is different. The added enzymes continue to break

down long starch molecules into shorter segments that recrystallize at a slower rate. It's important to note that not all amylases work well as softeners. When you purchase amylase, pay attention to its thermostability, which determines when the enzymes are active during the dough-making process.

Many amylases derived from fungi are heat sensitive—their activity declines at around 65°C / 155°F, just after gelatinization begins. Bacterial amylases are at the other end of the spectrum and remain active after gelatinization. If their thermostability is too high, however, the enzymes dismantle too much of the starch, which will make the crumb gummy. For crumb softening, look for amylases with intermediate stability, meaning they remain active during a portion of gelatinization but stop working at around 80°C / 176°F.

Some bread bakers use fava or soy bean flour to produce a softer crumb. These, and other legume flours, contain active lipoxygenase enzymes that break down lipids in flour. Known for its bleaching effect, lipoxygenase breaks down several pigments that can give flour a yellowy tinge. Although the exact mechanism for the process is unknown, these enzymes probably have a softening effect because they free active lipid molecules from complex lipids.

MEASURING SMALL AMOUNTS

Many purified ingredients are so potent and, therefore, used in such small amounts that you need specialized equipment to measure them accurately. That's true even of ascorbic acid (vitamin C) and fruit juices. In our lab, we rely on a mortar and pestle to turn tablets into fine powders that we use to make dilutions for enzyme-filled juices.

When using a mortar and pestle, make sure that the resulting powder is uniform, without any large chunks. You can dilute small amounts of liquid in a portion of the water for the dough to ensure that the liquid is evenly distributed.

Accurately weighing tiny quantities of purified powders can be tricky with an ordinary kitchen scale. We use an analytical scale, accurate to a ten-thousandth of a gram, to measure out such ingredients when making small batches of dough. Each time powder is added to the weigh paper or weight, wait a few seconds for the number on the scale to settle so that the weight can register correctly. Any major movement nearby can also affect your readout.



Use a mortar and pestle to crush tablets into fine powder



Make sure to tare the scale before weighing the powder



Using a spoon, add the powder in small increments to reach the desired weight

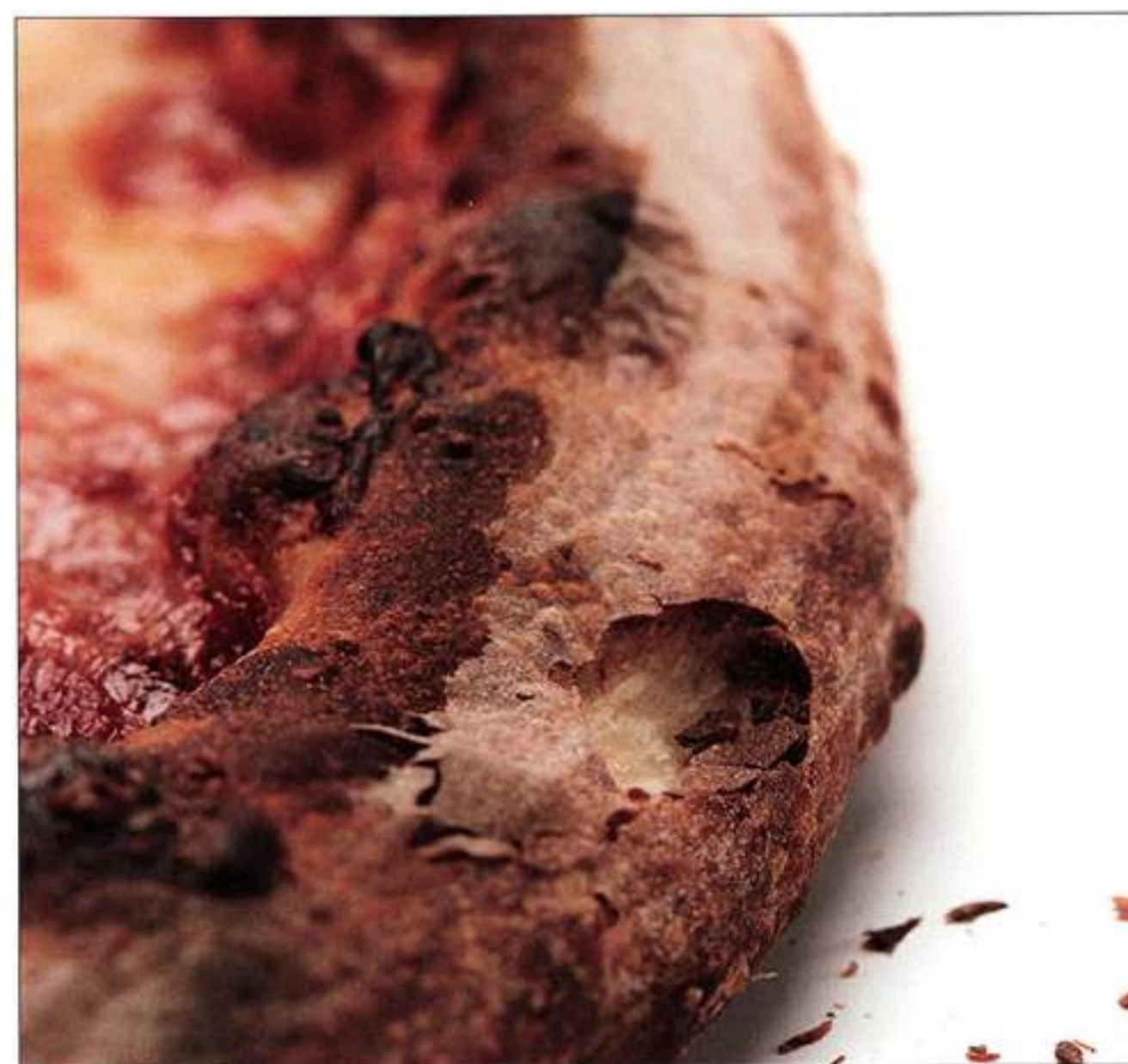
However, bean flours have a strong, beany flavor that gives pizza crusts an unpleasant aftertaste, so we do not recommend them.

When it comes to modifying texture, there's no reason to stop at the crumb. As we know, people have strong opinions about crust—crispy, soft, charred, blond, or nonexistent. The diversity of preferences is hardly surprising; after all, the rim crust is an integral part of most, but not all pizzas. Fortunately, you can exploit several ingredients to create innovative pizza doughs that blend desirable crumb attributes with unexpected crust textures. Imagine

soft-crust pizzas with a surprisingly crunchy crust or even gluten-free pizzas that have a crispy crust.

For a crispier crust that resists going soggy, try adding polydextrose or, for a subtler effect, sodium alginate. The glucose in these additives makes crunchy pizzas even crunchier as they bake. Once retrogradation begins, the ingredients delay the softening of the crust by trapping moisture in the crumb. A little goes a long way: we add around 1% polydextrose to our Modernist thin-crust, Brazilian thin-crust, and deep-dish pizza doughs to enhance their crispiness.

The top two photos show the crust of a New York pizza that has softened during cooling. Baking the crust just slightly longer than recommended will yield a crust that shatters, as shown in the bottom two photos. This could create an undesirable eating experience.





INCLUSIONS

Many different additions can be used to enhance a pizza dough, and the ideal preparation and quantity of each depend partly on your personal tastes and partly on the size, density, moisture level, and other qualities of the specific ingredient. Liquids and purees, for instance, will become an integral part of the dough's foundation, while what we call "inclusions" will coexist with the dough. The texture and density of the inclusion can dramatically affect the outcome: adding 10% whole oats, for instance, will produce a very different crust than adding 10% oatmeal. Some coarse ingredients, like raw bran, can tear the dough if mixed in roughly, while others—like toasted walnut pieces or pressure-cooked barley—will simply be suspended in the dough.

You'll need to make sure the inclusions you use don't steal water from the dough and affect its

hydration. That's one reason we soak our grains before adding them. On the flip side, if you add a wet ingredient to a dough, like a fruit puree or porridge, you will need to adjust the dough recipe to take that extra water into account, to the point that the puree or porridge may substitute for much or all the water in the recipe. Depending on the specific inclusion, you may also need to account for added sugar, starch, and/or acidity. The viscosity of an added puree also matters greatly.

Solid inclusions that cling to the dough but don't become part of it generally do not affect the integrity of the dough unless they are too big. For example, a walnut half might be too large to remain suspended within the dough; we recommend chopping walnuts for thin-crust pizzas and quartering figs for thick-crust pizzas. The inclusion combinations you can add to a dough are virtually limitless.

SELECT INCLUSIONS FOR PIZZA DOUGH

The table below provides rough guidelines for how much of each ingredient to add to a dough (see page 2:41). We based our recommendations on tests of pizza doughs with 70%-75% hydration on average, and we consider the estimates that follow to be ideal for similar doughs. For higher-hydration doughs, you may want to reduce the amount because they usually aren't sturdy enough to hold inclusions as well. We provide variation recipes for grain, nut, and seed inclusions on page 2:178. We also have instructions for making each of these categories of purees on pages 2:186-191.

If you're going to mix and match inclusions within the same category, use each proportionately in terms of the total suggested amount. For example, if there are two inclusions, divide the amount for each by two; if there are three inclusions, divide each by three; and so on. You can also combine ingredients of different types, but be careful to not overload the dough. Except for herbs, you should add each type of ingredient at the end of the mixing process—herbs can be incorporated at either the beginning or the end of the mix.

Type of ingredient	Suggested %
Cooked fruits (poached, roasted, sous vide), chopped	8-10
Cured meats, chopped or diced (examples: prosciutto, ham, salami, capicola, chorizo)	7-8.5
Dried fruits (examples: quartered apricots, raisins, diced figs, chopped prunes, cranberries)	12-15
Dry cheeses, grated or shredded (examples: Parmesan, Gruyère, Gouda, Manchego, Grana Padano)	8.5-10.5
Firm-cooked vegetables, chopped (examples: roasted potatoes, charred pearl onions, steamed broccoli)	8.5-12
Fruit and/or vegetable purees	15-20
Grains (soaked or cooked firm, al dente, or soft)	10-20
Herbs, chopped or minced (examples: basil, tarragon, rosemary, thyme)	0.3-1
Nuts, toasted and chopped (examples: walnuts, pecans, pine nuts, pistachios)	10-16
Porridges/grain purees	15-20
Pressure-caramelized grains	≤50
Seeds	10-16
Soft-cooked vegetables, pureed or chopped (examples: caramelized onions, garlic confit, roasted garlic)	15-20

The combination of grains that you can use as an inclusion in your dough is virtually limitless. Just be sure not to use more than 10%-20% in the dough.

GRAINS OVERVIEW

A grain is a grain is a grain, right? Wrong. There are many grains on the market, and each brings its own flavor and texture when added to a dough as an inclusion, whether it's soaked, sprouted, or cooked.

AMARANTH

These tiny seeds are gluten-free. When cooked in water, amaranth retains its outer crunch while softening on the inside; however, the cooking liquid can get goopy. Rinse the cooked grains before adding them to dough.

BARLEY

Hulled barley (also sold as dehulled barley) has had its outer covering carefully removed, leaving the bran layer intact. Pearled barley also removes the hull but using a process that takes some of the bran with it; because of that, it's not considered a whole grain in this form. Barley is also used for beer and other alcoholic beverages, like whiskey, as well as malted milkshakes and malt vinegar.

BUCKWHEAT

Despite the name, this grain is not related to wheat in any way. It's a naturally gluten-free pseudocereal with a distinctive earthy flavor that can taste slightly sour or fermented. It is sold as buckwheat groats (the whole kernel, with the bran and germ intact) and as kasha, which are roasted groats; kasha's intense flavor can be reminiscent of darkly toasted bread or hoppy beer.

BULGUR

Bulgur is wheat kernels that have been par-boiled, dried, and then cracked into pieces. It can be made from common bread wheat or durum wheat.

CORN

A grain (maize) native to the Americas and brought to Europe around 1500, its true origin was long a mystery. For purposes of inclusions, we use corn in the form of hominy or cornmeal (also sold as polenta or grits).

EINKORN

Sometimes called farro piccolo, einkorn is a type of wheat; it has a chewy texture and nutty flavor. With emmer and spelt, it is one of the triumvirate of grains that have been labeled as "ancient."

EMMER

One of the first grains ever cultivated, emmer wheat (sometimes called farro or farro medio) has a rich, nutty flavor. Pearled farro has been processed to remove the bran and germ.

FONIO

Fonio is the smallest member of the millet family. Fonio has a hint of sweetness and, because of its small size, cooks very quickly. If using fonio in a dough, you can simply soak it overnight instead of cooking it.

FREEKEH

Freekeh is durum wheat that has been harvested while the kernels are still soft and green. The chaff is then burned away, giving the grains a smoky flavor. The roasted wheat is cracked into pieces that resemble green bulgur.

JOB'S TEARS

Job's tears is widely used in various Asian cuisines for food, drinks, and medicinal purposes. It has a look, feel, and taste similar to barley although they are not in the same family.

KHORASAN

A type of wheat, Khorasan has a buttery flavor. Kamut is a trademarked variety of Khorasan.

MILLET

There are many kinds of millet, some of which are popular in the developing world. In the United States, millet is used mostly for birdseed but has begun appearing in gluten-free products.

OATS

Oats are available in multiple forms: oat groats are the entire kernel, minus the inedible husk, with germ and bran intact; steel-cut oats and Scottish oats are groats cut or stone-ground into smaller pieces; and rolled oats are groats that have been steamed and rolled into flakes.

QUINOA

This pseudocereal is native to South America and has a nutty flavor. Vegetarians like its protein content, which is higher than that of wheat (and does not contain any gluten proteins); quinoa also contains all nine essential amino acids.

RICE

Often used in gluten-free products, rice is finding new uses in the world of bread and pizza. There are more than 40,000 varieties of rice; we'll cover cooking techniques for different lengths and colors in the tables on pages 3:344, 3:348, and 3:349.

RYE

A hardy grain that thrives in colder climates, rye was viewed long ago as a weed. Scandinavians and eastern Europeans thought otherwise, and rye has long been their grain of choice. This grain has a distinctly earthy, sour taste.

SORGHUM

This drought-tolerant grain, a longtime staple in the developing world, is enjoying new interest within the gluten-free crowd. It imparts a nutty sweetness to the crust but it may be overshadowed by the pizza toppings.

SPELT

A type of wheat, spelt (also known as farro grande) has large kernels with a nutty, herbal flavor. When harvested while the kernels are still green, and then smoked, it is sold as grünkern (or gruenkern); it has a smoky (not surprisingly), ever so slightly sweet flavor.

TEFF

When we think of teff, we think of injera, the spongy Ethiopian flatbread-cum-eating-utensil. Teff is the tiniest grain of all (the size of a poppy seed), with a nutty flavor that can carry hints of cocoa. Because it's so small, teff has a higher percentage of bran and germ than other grains. It's also higher in calcium than other grains.

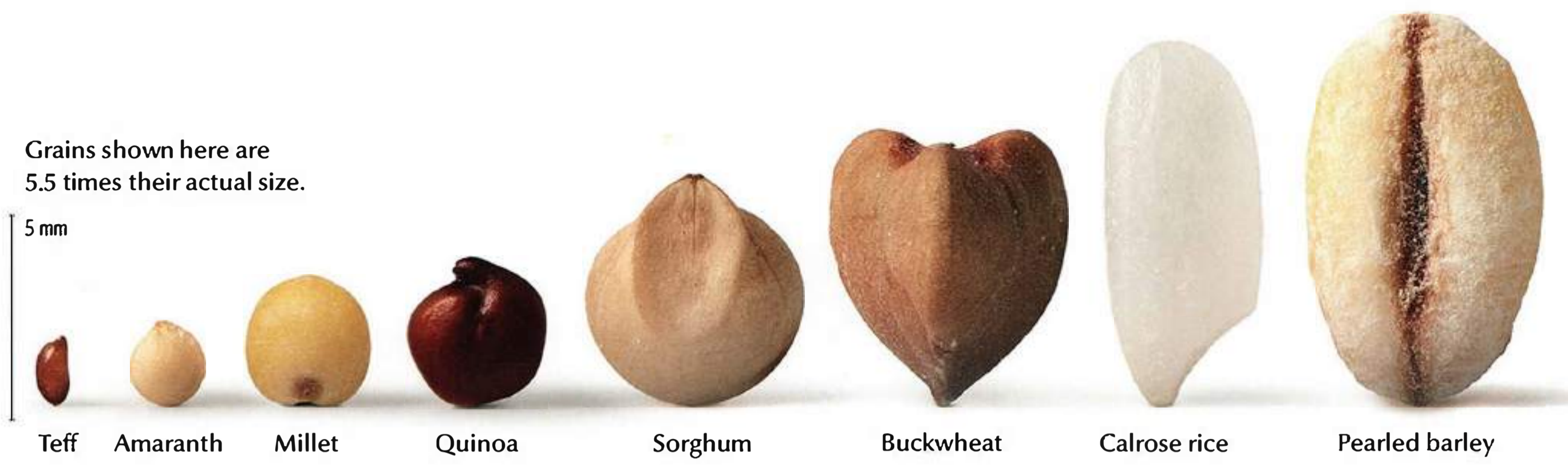
WHEAT BERRIES

Also called wheat kernels (see page 273), the grain that is used to make flour (such as hard red winter and soft white winter wheats) can also be used whole as an inclusion in doughs. When properly cooked, wheat berries can have a pleasant chewy texture and a nutty taste.

Most of the grains we eat today have been around for thousands of years. Often, the term "ancient" is linked to spelt, einkorn, and emmer. While it's true that these wheats have been cultivated for centuries, they have certainly evolved over the years. Really, the term is more marketing spin than anything else.

Grains shown here are 5.5 times their actual size.

5 mm



Actual size of wheat kernels



PREPARING GRAINS AND SEEDS

Grains and seeds are not ingredients that are commonly added to pizza doughs, but that doesn't mean you can't, or you shouldn't. We did so with almost every master pizza dough except for the very thin crusts such as Brazilian thin-crust pizza dough. Whole grains and other small plant seeds are among the most popular additions to bread and make delicious pizza crusts, too. A few, like teff seeds, are so tiny that they can be added directly to your dough. Others, such as shelled sunflower seeds, are soft enough to bite through and can be added as is.

Most grains and seeds, though, are too hard to bite through in their natural forms. Even if they've been cracked or rolled, most need further preparation before being added to pizza dough. If they are mixed into the dough in their raw state, they could also steal water away from the dough, which will lower your effective hydration.

Soaking and cooking are the two main ways to soften grains and seeds to the point that they're suitable to add to dough. Our top choice is pressure-cooking because it's faster and can easily be adjusted to yield different textures, but boiling is also an option. We've included grain cooking instructions and tables with cooking times and water and salt amounts on pages 3:344, 3:348, and 3:349.

Another common (albeit more time-consuming) method is to make a "soaker" by soaking grains and seeds in liquid long enough that they soften. (Some cooks use this term loosely to define any soaked item that is added to doughs; we use it exclusively for grains and seeds.)

Another advantage to soaking grains and seeds is that it makes them more digestible. Soaking allows enzymes and lactic acid bacteria to neutralize the bran's phytic acid, which prevents mineral absorption during digestion. Enzymes also break down complex carbohydrates that are difficult to digest. Without soaking, these starches may produce flatulence (perhaps adding insult to injury because the unsoaked grains might already have caused a cracked tooth).

You can soak large quantities of grains and seeds and then portion and freeze them for later use. With soakers, we recommend adding no more than 16–20% to a dough; that's because as the amount of a soaker increases, so does its weight—and it becomes harder for the dough to support that additional heft. The more soakers you add, the more the consistency of a dough will change. That's not a bad thing—you just need to keep it in mind.

The Basics of Biteability

Five basic textures can be used to describe softened grains, and the desired texture depends on the desired result (see below for images). Firm-cooked grains have been softened but not cooked through and have a texture similar to that of a raw peanut. Al dente grains are just cooked through. We recommend cooking grains to this texture using a pressure cooker (see page 3:343). When you open the pressure cooker, all or almost all the water will have been absorbed or evaporated, and the grains will be cooked just right.

Soft-cooked grains should still be distinct as individual grains but more tender than al dente grains;

From left to right: sprouted grains, soaked grains, pureed grains, porridge, grains cooked to al dente



think rice. Porridge is a thick, soupy liquid with visible pieces of cooked grain in it. Not all grains can be cooked to a porridge because there must be enough starch in the grain to thicken the liquid. Some grains, including wheat, won't thicken like porridge when they're cooked whole, but they will if they're cracked because that allows the starch to release into the cooking water. The best grains for porridge are oats (cracked, steel-cut, whole, or rolled), semolina, cornmeal, rice, cracked rye, cracked wheat (bulgur),

coarsely ground wheat (farina), barley, buckwheat, and hominy.

Purees can be made with most grains by either overcooking and then pureeing them in a food processor or by pureeing a porridge. For overcooked grain puree, the grains must be extremely soft, and a generous amount of water is needed for the blades of the food processor to produce a smooth puree. Pureeing a porridge may also require additional water.

Durum flour and semolina flour are both ground from durum wheat, but semolina is ground coarser than durum flour. Semolina flour is coarser and typically a little darker than all-purpose flour.

BEST BETS FOR PREPARING GRAIN OR SEED INCLUSIONS

Most grain and seed inclusions benefit from softening before being added to a pizza dough, for two reasons: to make them more palatable/biteable and to ensure they don't end up stealing water from the dough.

Below are the most common ways to soften grains and seeds, and their pros and cons.

Type of preparation	Advantages	Disadvantages
soaking	requires only minimal work to prepare the grains or seeds	soaking alone may not sufficiently tenderize the grain
sprouting	softens the grain and achieves a texture different from soaking; popular because of perceived health benefits; can sprout grains well in advance and freeze	requires advance planning; sprouts can develop mold if not properly maintained; can develop off-flavors and woody texture if grains or seeds oversprout
cooking to al dente	adds a textural contrast between the crumb and the grain or seed; adds visual interest to the crumb; will not interfere with the texture of the crumb	can easily be undercooked or overcooked
porridge	can improve the texture of a crumb, making it moister; adds flavor; great way to incorporate grains like cornmeal and rice; can be made a few days in advance and refrigerated	tends to firm up and cluster if refrigerated; must be loosened before adding to dough; can negatively affect the dough's texture if not properly mixed in
pureeing cooked grains or seeds	can add flavor and moisture; goes beyond traditional additions, with many possibilities for innovation; can be added by layering during folding in bulk fermentation rather than mixing completely into the dough	not all grains or seeds puree well (some get very gummy); can require significant preparation time



While there's no regulated definition of a sprouted grain, the American Association of Cereal Chemists International's version requires that the sprout not exceed the kernel length.



Sprouted rye berries



Grains cooking



Pressure-cooked steel-cut oats

Soaking Grains and Seeds

Unsoaked grains and seeds can steal water from dough. Hydrating them beforehand ensures that both the grains/seeds and the dough each gets to hold on to the moisture that it needs. The process for soaking grains is straightforward; combine 100% water and 100% grain and add 1% salt. For example, if your recipe calls for 200 g / 7 oz soaked rye berries, use 100 g / 3.5 oz rye berries and 1 g / 0.03 oz salt soaked in 100 g / 3.5 oz water. There's generally no need to subtract the amount of water that the grain absorbs from the water quantity in the dough; it has negligible impact on the hydration of the finished crust.

Keep two things in mind when you incorporate soaked grains or seeds into a dough using a mixer: add them when the dough has reached medium gluten development and mix them in at low speed so that the kernels don't disrupt the gluten network. The intent isn't to develop the gluten further but instead to fully disperse the grains. If you're mixing the dough by hand, however, incorporate the grains during bulk fermentation, after the second four-edge fold, spreading them over the top of the dough. Try to distribute the grains evenly with every fold. Soaked grains and seeds can impede gluten bond formation, so we like to add an extra fold to further encourage a well-developed gluten structure. If your dough doesn't have the gluten development step, mix the dough by hand to medium gluten development. Spread the inclusions over the dough and hand mix to full gluten development.

Sprouting Grains and Seeds

Sprouted grains and seeds have gained popularity for their perceived health benefits, but they have been a part of the bread-baking and general cooking landscape for as long as humans have used agriculture to provide sustenance. Sprouted grain, or *nieh*, was used to make a type of wine in Neolithic China. And sprouting barley to make malt is a technique that's been around for as long as beer has.

Whole intact grains and seeds are generally capable of sprouting. If you have one that won't germinate, it may have been heat-treated to kill fungal spores in order to extend the grain's shelf life. It's important to note that if a grain is intended to be a viable seed (meaning it was packaged for use in the garden, not in the kitchen), it's often treated with a fungicide—which is why we always recommend the use of organic sprouted grains. Grains that are cracked or polished (or damaged by heat) won't germinate.

Once sprouting begins, enzymes transform starch in the endosperm into simpler molecules that the

growing plant can easily digest. You can slow down sprouting by refrigerating the sprouted grains or seeds or, better yet, by freezing them in an airtight container. Making more than you need is a good idea because you can freeze the excess for later use. Weigh out the sprouted seeds in the amounts you'll likely use, and place them in an even layer in a zip-top bag before freezing flat. When you need sprouts for a dough, retrieve a bag from the freezer and submerge it in cool or room-temperature water until it's thawed.

Cooking Grains

The desired result for al dente-cooked grains is to have each grain (or piece of cracked grain) visibly distinct from the others, rather than as part of a homogeneous mass, as in porridges and purees. For the majority of the grains in the table on page 3:344, the ratio of water to grains has been calculated so that there will be no water left in the pot when cooking is complete; all the water will have either been absorbed by the grain or evaporated. When we want to make a grain puree, we purposely use more water than the grain will absorb, then drain the excess. This ensures that there is always more than enough water to achieve the doneness we are looking for.

Pearled and cracked grains, as well as white rice and brown rice, should not be poured into boiling water. Instead, combine them with cold or room-temperature water as specified in the table on page 3:344.

As a general rule, when cooking grains on a stove top, avoid lifting the lid of the pot unless the recipe calls for it (the lid must be removed for some grains so that water can evaporate). Depending on the type, cooked grains can be refrigerated for up to 3 days or frozen for up to 3 months.

PRESSURE-CARAMELIZED INCLUSIONS

When we were writing *Modernist Cuisine*, we developed a method for caramelizing food under pressure using baking soda to accelerate the process. This produces particularly rich results, intensifying the caramelization of sugars (in both the food and the added sugar) and concentrating the flavors through the alkalinity of the baking soda combined with the heat buildup at 120°C / 248°F in the pressure cooker. When we first worked on this technique, we used it mostly for chopped vegetables and, to a lesser extent, fruits. It turns out that the method also works for many other foods, including grains.

To pressure-caramelize grains, you need to cook them to al dente first, on the stove top or in a pressure cooker according to the guidelines in the table on page 3:344 (this applies only to grains;

no other ingredient requires prior cooking before pressure-caramelizing). Then you add a bit more water (just for grains—other ingredients like onions don't require this), along with sugar, butter, and baking soda for the caramelization. We have found that in addition to intensifying the flavor of the inclusion, these small amounts of sugar, butter, and baking soda improve the structure and quality of the dough, producing greater volume and a more open crumb structure. We suggest adding up to 50% of pressure-caramelized ingredients to your dough.

PORRIDGE

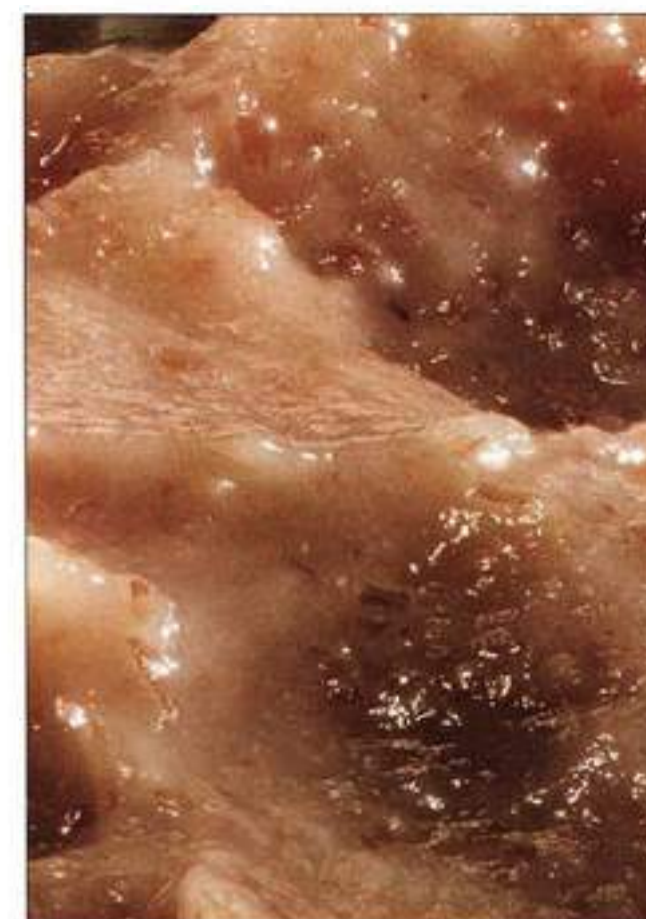
To make porridge, a grain is cooked in boiling water or milk to a thick, soupy consistency. Oatmeal is typically the first grain that comes to mind for this treatment; other grains (or, occasionally, legumes) work equally well, including semolina (to make some types of polenta), rice (used in congee, a traditional Chinese porridge), wheat, barley, buckwheat, rye, and corn.

Not all grains cook the same, which means there's no single, fail-safe water-to-grain ratio that applies to all. Small-particle and cracked grains, rather than whole grains, tend to form the thickest porridges since they have a higher absorption rate of water due to their size. Because porridges absorb a lot of water, they sometimes loosen dough when added to it. Small grains interfere with—and weaken—the structure of dough. We suggest handling a dough you've added

porridge to as you would a high-hydration dough if it becomes difficult to shape (see page 2:59). When storing porridge in the refrigerator, don't automatically discard it if it becomes unpalatably hard. Grains tend to retrograde (going from soft to brittle and crumbly as the starches recrystallize), but most grains will soften again when they're reheated during baking, which reverses the process.

COOKING GRAINS FOR PUREE

The goal of cooking grains for puree is to overcook them. We recommend taking them just beyond the point of fully cooked so that they are slightly mushy and yield easily to pressure when squeezed. To achieve this state, you'll need a generous amount of water. Follow the directions for cooking grains al dente (see page 3:343), using the measurements and timing in the table on page 3:349. Once the grains burst and lose their shape, they will typically be overcooked. If there is excess water in the pot, strain the grains, reserving the water, and place them in a food processor. Allow the grains to cool for a few minutes, then pulse them. If the blade doesn't catch, add some of the reserved cooking water so that the blade can take hold, and puree the grains to a smooth paste. All percentages in the table on page 3:349 are based on weight, not volume. We don't recommend cooking fonio, freekeh, Khorasan (Kamut), millet, or teff with this method because they can get gummy.



Pureed wheat berries



Cooked grits

COMMON GRAIN-COOKING PROBLEMS

If this is your first time cooking grain, here are some common hazards and strategies for avoiding them.

IMPROPERLY COOKED GRAINS

Determining the final texture of the grains is up to you. If they are undercooked, put the pot back on the stove over medium heat or in the pressure cooker on low after reaching full pressure, cook for a few more minutes, and check for doneness. If the grains are too soft—well, you can't uncook grains, but they may still be usable for mixing into your dough. They'll be less firm than properly cooked grains but will nonetheless contribute flavor and make for a chewy crumb.

SCORCHED GRAINS IN A STOVE-TOP PRESSURE COOKER

Make sure the heat is low enough to prevent scorching but not so low that it isn't hot enough to maintain pressure. Always start cooking with high heat to get the pressure buildup going, then reduce the heat to medium-low or low to keep the liquid from boiling. Cooking the grains in an instapot will help prevent scorching.

IMPROPERLY SEALED PRESSURE COOKER

The pressure cooker's gasket can crack, which will prevent the cooker from sealing correctly. To extend the life of the gasket (it's often one of the first things to go), rub it lightly with cooking oil, and wipe off the excess with a clean paper towel. This helps keep it from drying out.

SCORCHED GRAINS IN A POT ON THE STOVE TOP

Scorching is easier to avoid when you are cooking on the stove top and not in a pressure cooker because you can lift the lid as the grains cook and check how things are looking on the bottom. Keep in mind that each time you lift the pot's lid, the temperature will drop, which can extend the cooking time. To help mitigate scorching, you can place an upside-down heat-safe plate at the bottom of your pot to keep the grains from coming in contact with the base.



Scorched grains



This splatter painting of different purees includes pesto, tomato, spinach, red pepper, aji amarillo, and huitlacoche.

FLAVORED LIQUIDS AND PUREES

An easy way to elevate your pizza crust's taste and color is to add flavored liquids or purees to the dough. The two differ in consistency but have a similar effect on the crust. Generally, flavored liquids and purees can be substituted in a 1:1 ratio for the water used in the dough if the consistency is the same as water. For a thicker puree you'll need to thin it with water so that it has the consistency of heavy cream. The key is to maintain the same hydration of the recipe that you are altering.

Some purees add very little flavor even when used in large quantities. For example, a green bean or bok choy puree will practically go undetected in a baked pizza, especially once you add cheese and sauce. Think about flavors that will be pronounced and hold up against the other elements of the pizza. For example, mushrooms or roasted red pepper can be very flavorful. Additionally, they can add color to the dough.

Some juices or purees may be too acidic and could adversely affect the dough. If you wanted to make a lime juice dough, for instance, the amount of acid might break down the dough. The good news is that some flavors carry so well that they can be diluted with water and still be pronounced. While we did not use stocks to mix into our specific dough recipes, they can also be used as the liquid portion of the dough, but they have to be fairly concentrated in flavor in order to have any sort of impact on the baked pizza.

Fruit and Vegetable Purees

Purees can be made out of pretty much any fruit or vegetable. They are a flavorful enhancement to many types of dough and can be mixed directly into it. What matters most, regardless of the ingredient used, is that you create the smoothest puree possible. The more powerful the blender, immersion blender, or food processor you use, the better. And passing the puree through a fine sieve will ensure there are no unwanted chunks.

Purees can be made from raw or cooked fruits or vegetables, but cooking produces a smoother puree for some. Fresh soft fruits are good for pureeing. Frozen fruits can be thawed and pureed, and you can also purchase frozen purees. Using canned or jar-preserved products is also a time-saving option. These foods are already cooked and usually canned or jarred with a liquid (typically water, juice, or a sugar syrup) that can be either strained out or blended into the puree. Fruit purees can be a particularly good addition to dough because they contribute flavor and sometimes sweetness.

When using a puree, be mindful of its consistency. A very thin puree can be used in place of the water in a dough. Applesauce is a good example of a thick fruit puree that adds the fruit's flavor and natural sweetness; it also contributes to a rich mouthfeel without adding fat. Applesauce contains a good amount of solid matter. In this case, you will need to mix a little bit of water into the puree to adjust its consistency, then weigh the amount you need before mixing it into the dough. Also consider that the sugar in the puree will make the dough brown a lot faster while it bakes. You may want to consider dropping the baking temperature by 5%–10% so that the dough will bake fully without the crust getting too dark or burning before all the cheese is melted and the dough is fully cooked. Many low-fat, no-sugar-added baked goods (like no-sugar-added muffins) use applesauce as a humectant (a substance that helps a food retain its moisture) and natural sweetener.

Canned, Frozen, and Preserved Purees

Canned or frozen purees are consistent and convenient, but you can also make your own purees from canned fruits. (If you use canned fruits at all, it's best to puree them.) Whatever you choose, remember that canned items contain different amounts of water (for example, tomato sauce versus crushed tomatoes), and you may need to experiment since some purees might turn out too thick or too thin, and some might just be too bland to taste. Both thin and thick purees work well in pizza dough. If you use a thin puree, you'll need to adjust your water to maintain the same level of overall hydration. Thick purees like applesauce or pumpkin pie filling should be thinned to the consistency of heavy cream.

This Black Garlic High-Hydration al Taglio Pizza Dough (see page 2:186) is an example of using a pureed inclusion that lends both a warm color and a distinctive flavor to the crust.



PUREE SUBSTITUTIONS

We have grouped different puree options below by consistency and acidity. What this means to you is that how you mix one puree into a dough and how much of it you add to a recipe can be applied to all the ingredients in that row. We have also developed specific recipes with purees that we like for each type of pizza (see pages 2:186–191). Some of those variations fall outside the ranges listed below, which serve as a jumping-off point for you to experiment. The percentage ranges below are compared to the amount of water in a dough (by weight, not by volume), not the flour, because most of these ingredients need

to be incorporated into the dough by being pureed or mixed into the water portion of the recipe rather than separately. Because the majority of these purees need to be mixed with the water portion of the dough, they are incorporated at the beginning of mixing. Otherwise it would be extremely difficult to mix the dough since you wouldn't have enough moisture (or fat in some cases) to create a cohesive dough. Note that the purees here are added at a different time than many of those that are outlined in the Pizza Dough Recipes chapter (see page 2:81). Some of those were formulated to be added to the dough at a specific stage of mixing.

Type of ingredient	Scaling %
Acidic fruit and vegetable juices (examples: passion fruit*, pineapple, cranberry, tomato water, tomato juice)	50–100
Acidic fruit purees (examples: mango, apricot, black or red currant, cranberry, blackberry, passion fruit*, citrus juices, raspberry)	50–70
Alliums (examples: shallots, onion, garlic, black garlic, spring garlic)	50–70
Canned or jarred ingredients (examples: roasted peppers, chipotle peppers in adobo sauce, applesauce, corn, peas, olives, lychees, cherry/blueberry/apple pie fillings, Amarena cherries, tomato paste, sun-dried tomatoes in oil)	15–50
Herbs (examples: basil, tarragon, rosemary, thyme)	5–10
Legumes (examples: lentils, all beans, chickpea/hummus, peas)	25–40
Nonacidic fruit purees (examples: coconut milk, strawberry, apple, pear, fig)	50–80
Nonstarchy vegetables (examples: carrots, cauliflower, mushrooms, peppers, chile peppers, broccoli, zucchini, spinach, artichoke hearts, nettles)	50–70
Nut butters and pastes (examples: peanut butter, cashew butter, almond butter, tahini, hazelnut praline paste, candied chestnut paste, sunflower seed butter)	20–35
Pickled vegetables (examples: kimchi, sauerkraut)	10–15
Sauces (examples: all moles, salsa, curry sauce, gochujang, romesco, tomato sauce)	20–35
Starchy fruits and vegetables (examples: potatoes, sweet potatoes, taro/poi, pumpkin, butternut squash, acorn squash, banana, sunchoke, corn)	15–25

**Passion fruit is sold commercially as a fruit puree, but it is not as viscous as most purees and is more like a fruit juice in texture. Read the label closely, as it might also be a concentrated form of passion fruit, in which case we suggest mixing it with an equal part of orange juice or water to make it less acidic.*

You can cook legumes yourself or you can use canned legumes. If using canned legumes, we recommend draining and pureeing them with some (or all) of the water portion of the dough.

The nonstarchy vegetable purees are often mixed with water to make them loose enough to make a cohesive dough.

Often there is no water substitution in the recipe for starchy fruits and vegetables. The puree is simply mixed into the dough, where the developed gluten will be able to handle the additional starchy ingredient.

You do not typically need a large quantity of herbs to add flavor to a dough. Herbs are usually blanched first and then blended with the water portion of the dough.

If an acidic fruit or vegetable puree is too acidic, it could affect the consistency of the dough, in which case you should combine it with up to 50% water to water it down.

Herb artisan pizza dough





Tahini thin-crust pizza dough



Refried black bean thin-crust pizza dough



Corn puree new york pizza dough



Poblano pepper high-hydration al taglio pizza dough



Pressure-caramelized shiitake mushroom
Neapolitan pizza dough



Huitlacoche Neapolitan pizza dough



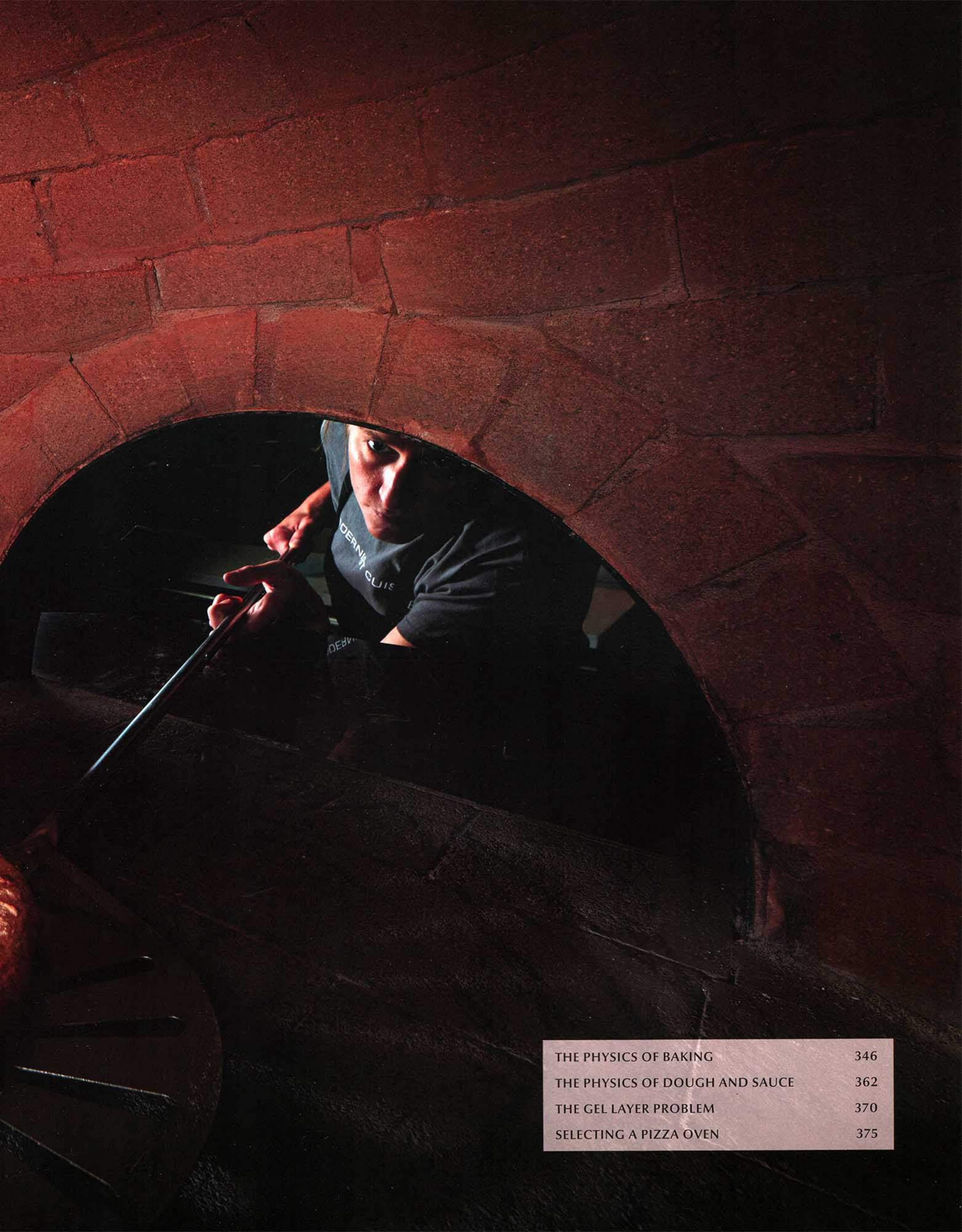
Sunflower seed deep-dish pizza dough



Spring garlic deep-dish pizza dough

CHAPTER 5
PIZZA OVENS





THE PHYSICS OF BAKING	346
THE PHYSICS OF DOUGH AND SAUCE	362
THE GEL LAYER PROBLEM	370
SELECTING A PIZZA OVEN	375



PIZZA OVENS

To master baking pizza, we must hone our intuition about how heat works on dough as well as the ovens and equipment that we use. Most pizza makers already know that aluminum pans heat more quickly than those made of iron, though they may not be able to explain why. They understand instinctively that in addition to being an art form, baking is also a physical, chemical, and biological process governed by scientific laws. Most of those laws describe how energy moves into, within, and out of a mixture of ingredients—and how the heat generated by that energy causes irreversible changes that transform dough into pizza. What is true for pizza is true for all cooked food. When pizza makers or chefs debate the finer points of flavor, texture, color, and nutritional value, often they are really talking about how energy, in its various forms, alters food.

With a working knowledge of some basic physics and the fundamentals of heat transfer, you can greatly reduce failures and frustration in your pizza making. This knowledge is especially important for Modernist techniques, which push beyond the conventional methods that have been refined by generations of trial and error. Armed with an understanding of the underlying science, your vision expands, and new avenues for culinary innovation become apparent. Indeed, the

most inventive pizza makers get excited when their experiments bump into some counterintuitive aspect of the science of baking: they see such surprises as lessons that can often teach something of real use. You'll find that understanding the basic science of how baking works in an oven makes baking easier and more interesting.

The bulk of this chapter gets into the nuts and bolts of pizza ovens. You can spend inordinate amounts of money on an oven. If you're serious about making good pizza, an oven should be among your biggest investments (followed by temperature control and then a walk-in refrigerator). A reliable oven is the backbone of any pizzeria (see page 375). If your oven fails during service, you're done for the night. But if you're more of a pizza-baking enthusiast, there are many economical options that will bake one pizza at a time, which may be all you need.

Whichever type of oven you choose, this chapter will help you understand the trade-offs, capabilities that really can make a difference in pizza quality, and work-arounds you can use to compensate for the weaknesses of your model. You'll find more tips, along with step-by-step guides to making pizza in a wide range of ovens, in the chapter *Baking Pizza* starting on page 2:387.

NEW DISCOVERIES AND TECHNIQUES

How heat conducts through food (see page 348)

Using a baking steel to improve the volume of your pizza (see page 355)

Dough is a heat pipe (see page 362)

Why sauce keeps the center of your pizza from rising (see page 369)

How and why a gel layer forms in your pizza (see page 370)

The pizzaiolo equation (see page 372)

How to choose the best oven for the job (see page 380)

While wood-fired pizza ovens are used by many pizzaioli to make Neapolitan pizzas, we find that the heat is uneven and can vary wildly depending on where the pizza is baked (see page 356). It's also difficult, if not impossible, to maintain a consistent temperature because the fire is constantly changing as it burns. We prefer gas-fired pizza ovens for these reasons.

THE PHYSICS OF BAKING

All matter is composed of molecules, which are themselves composed of atoms. We are familiar with some of these molecules: water is H_2O (two hydrogen atoms and one oxygen atom); carbon dioxide is CO_2 (one carbon atom and two oxygen atoms). At the molecular level, molecules are constantly in motion and bumping into each other or constantly influencing each other by wiggling within the constraints of being in a solid. In a gas or liquid, you can think of molecules like a set of billiard balls that are careening around on a table, slamming into and bouncing off of each other.

If we took the average speed of the billiard balls, we would get a certain number. At a molecular level, that is what temperature is (the molecular basis of heat). It's counterintuitive, perhaps, that temperature is just the speed at which molecules are moving. In air at room temperature ($21^\circ C / 70^\circ F$), the individual molecules are shooting around at approximately 670–890 mph (or 1,080–1,430 kmph). The reason that we don't perceive it as such is because there are so many molecules and they are moving in many directions. Of course, baking a pizza occurs at a level well above the molecular one, but it's useful to keep this in mind.

HEAT AND FOOD

The single most common step in cooking is to heat something, which dramatically raises its

temperature. Why? The reason is that heat governs the rate at which chemical reactions occur. Any individual food will have its own unique chemistry, but a variety of important changes take place.

Food scientists draw a distinction between reversible and irreversible reactions. A reversible reaction is one where nothing permanently changes. You heat something up, cool it back down, and it's fundamentally the same. Most foods have a range of temperatures where this is approximately true. If you buy raw vegetables at the store, their temperature might increase on the drive home, but then when you store them in the refrigerator, their temperature goes back down. Over a long period of time the food may spoil, but within a reasonably short period of time, the carrots you bought at the store will be pretty much the same despite the change in temperature.

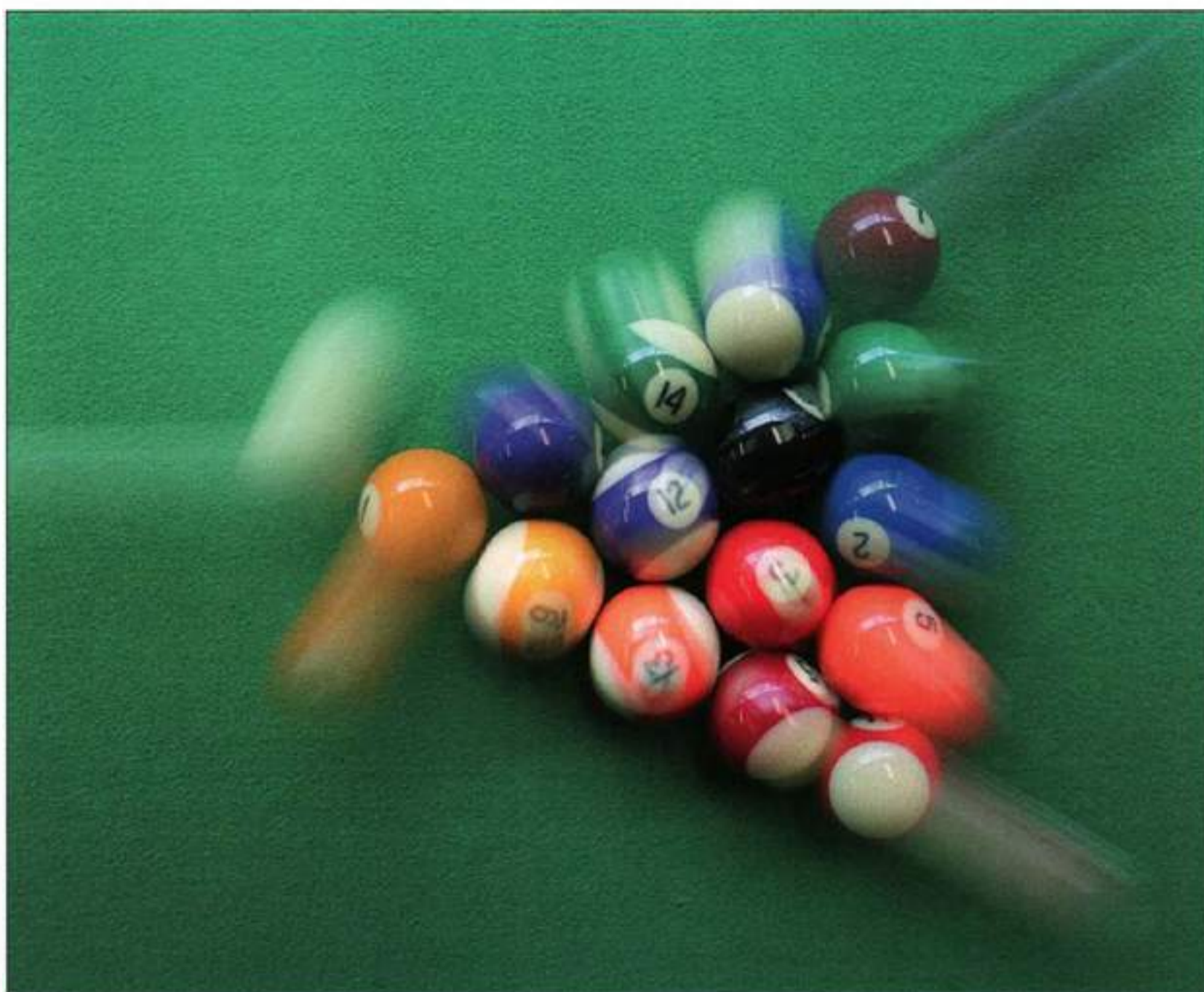
During cooking, however, many irreversible chemical changes occur in foods. These changes can alter the specific heat capacity of the food as well as other properties, some subtle (such as the shapes of protein molecules) and some obvious (such as color). As the name suggests, irreversible chemical changes are the sort that cannot be undone.

A primary irreversible reaction that occurs in food is that protein molecules stick together or break apart. If you heat an egg up to $60^\circ C / 140^\circ F$ or higher, the proteins in the egg white will start to irreversibly stick together (the process is called cross-linking). Chilling the egg back down does not mean it's raw again. Some of the chemical reactions that happen when you cook meat can be very slow, depending on the temperature and the item that you are cooking—to make tough meat tender, it needs to cook a long time. Other reactions, like the coagulation of the egg or the change of red meat to gray, happen very quickly.

Another important set of chemical reactions occur when starch molecules undergo irreversible changes. Like proteins, starches can both stick together and break apart during cooking. The most important starch transformation for pizza making is “gelling” the starch. In fact, the two phenomena controlling crumb formation are the coagulation of the proteins and the gelatinization of the starches.

Protein coagulation involves the irreversible bonding of the proteins to form a solid network. When the dough is raw, the stretchy gluten network created by the proteins that are in the flour helps trap gas bubbles (see page 2:29), but this network

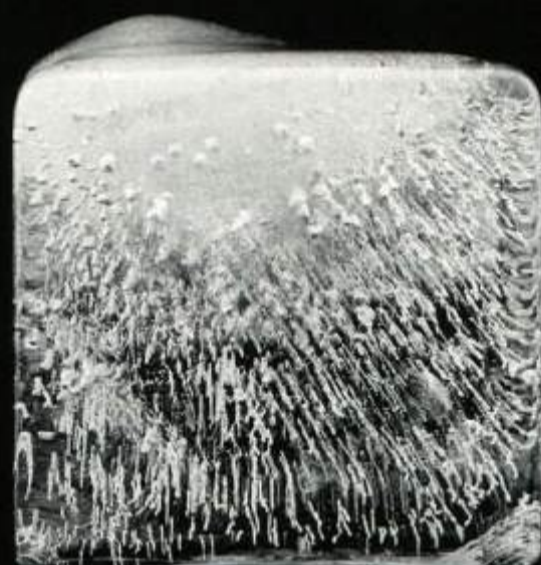
Just as billiard balls jostle one another at varying angles and speeds when you break at the beginning of a game of pool, molecules collide and transfer some of the energy of their motion.



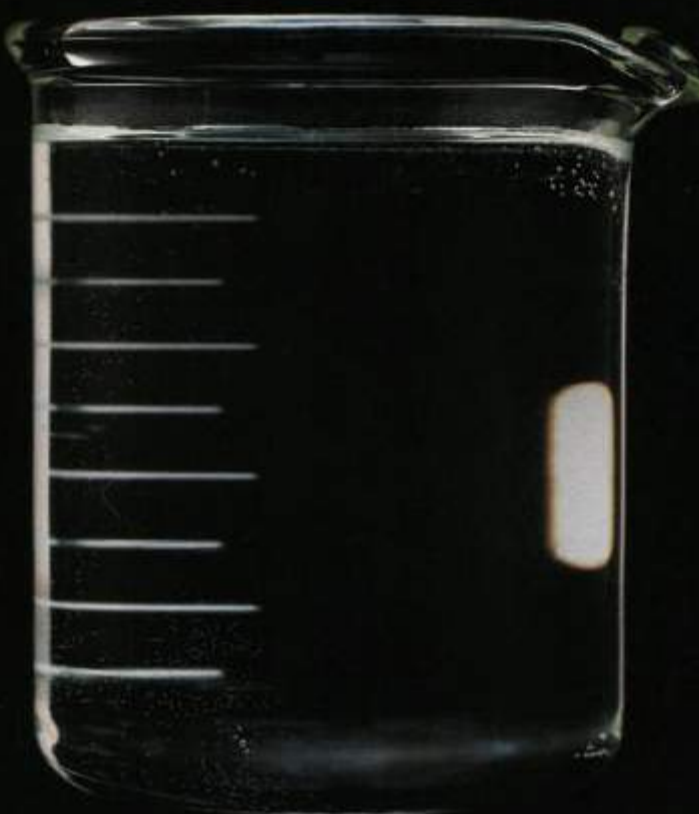
COMPARING REVERSIBLE AND IRREVERSIBLE CHEMICAL CHANGES IN COOKING

Freeze some warm water, melt it again, boil it to steam, and recondense it; at the end, you'll have the same substance you started with, and its specific heat will be just as it was at the beginning. In other words, those changes are completely reversible by the application of energy and work. If you take an egg from the refrigerator at 5°C / 41°F and warm it to 25°C / 77°F, that is also a reversible change. You've made the egg 20°C / 36°F warmer. But not long after you return the egg to the refrigerator, it will be essentially the same as before, aside from some subtle changes due to enzymatic activity.

If you instead heat an egg from 45°C to 65°C / 113°F to 149°F, the appearance, texture, and taste of the egg all change profoundly. As in the previous example, the temperature of the egg rises just 20°C / 36°F. But in this case, the heating elicits chemical changes that transform the egg from raw to cooked. You can cool the egg back to 45°C / 113°F, but it will never again be raw. This kind of transformation is what we mean when we refer to an irreversible change.



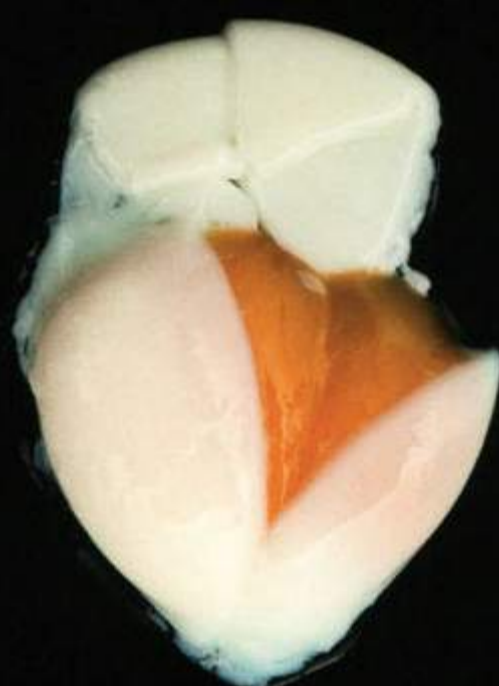
Solid



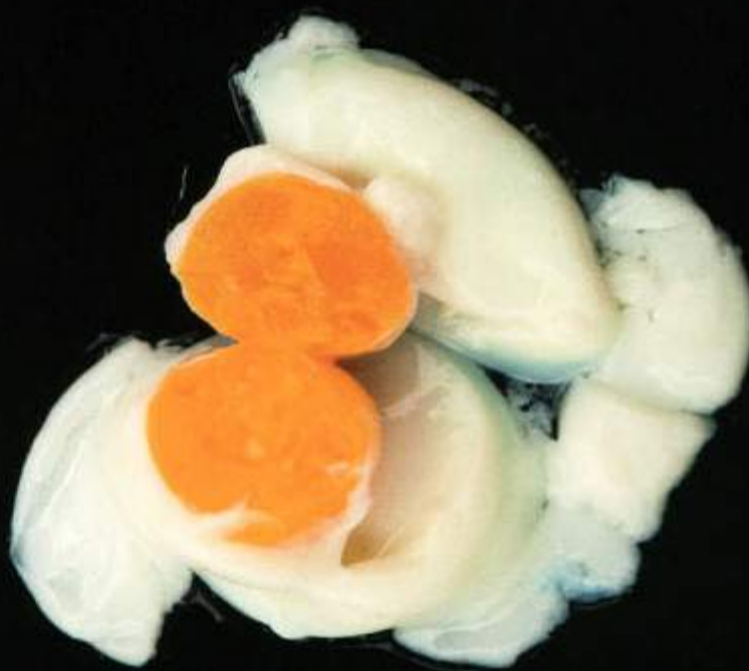
Liquid



Gas



65°C / 149°F



68°C / 154°F



70°C / 158°F



72°C / 162°F



82°C / 180°F



84°C / 183°F



86°C / 187°F



90°C / 194°F



What happens when you cook a starch with water? It becomes a clear gel. That's right, a gel (it reminds us a little of shower glass). And yes, while the inside of your pizza crust may appear white, if you look closely at an open-crumb rim, the very thin alveoli are transparent sheets of set gel. When the sections of crumb overlap (with drops of water stacking up), they appear white. The same thing happens in clouds; they're made of droplets of water or ice, but they appear white from a distance. This phenomenon is called Mie scattering.

Evaporative cooling occurs when water evaporating from the ingredients hits colder air in the kitchen and condenses. As pizza cools, you might think that you see steam above the pizza but it's not steam, it's visible fog.

The cooling rack will absorb and release the heat streaming from the pizza until it reaches room temperature.

alone can't hold the dough together as it bakes. Instead, the starch granules in the flour, when heated in the presence of water, degrade, leak amylose, and then stick together to make a gel at temperatures between 55–65°C / 131–149°F. This gelled starch is what holds the bubbles together and forms a stable structure in the crust.

The foam structure (or the set bubbles) that make a bread or pizza dough light are initially created by the yeast but their size and role in the crust is primarily determined by what bread bakers call oven spring. This is primarily due to the expansion of the bubbles from the boiling water within them. As the water in the dough rises to 100°C / 212°F, it will boil and expand enormously in size. This inflates the tiny bubbles that were originally created by the yeast.

After baking, a New York square pizza on a cooling rack will cool to room temperature as it reaches thermal equilibrium.

THE FLOW OF HEAT

Energy takes many different forms and also moves in a variety of ways. In baking, the most common movement of energy is heat. Although technical dictionaries define heat as a transfer of energy, from a pizza maker's point of view, it is much more useful—and accurate enough—to think of heat as a form of internal energy, one that always flows from a substance at a higher temperature to another at a lower temperature.

Other factors also affect the speed at which heat moves. No doubt you have noticed that some doughs and cooking utensils heat faster than others under similar cooking conditions. Materials vary in their reaction to heat for several reasons. The size, mass, complexity, and chemical composition of the substance all play roles. Temperature and pressure



Heat can flow very slowly or very fast. Its speed within a solid object from a hot spot to a cooler one is proportional to the temperature difference between the two places—the wider the span, the faster heat flows. You can see this effect when you stick a thermometer into a hot New York square pizza just out of the oven: the thermometer reading shoots up quickly at first, and then slows as the tip approaches the actual core temperature of the crumb.

The air circulating under the cooling rack will cool the pizza faster than if you left it in the pan. While keeping it in the pan will keep the pizza warm longer, you risk the bottom of the crust getting soggy because the steam evaporating from the pizza can get trapped between the bottom crust and the pan.

can also affect the amount of energy required to raise the temperature of a given mass (represented as joules/kg or BTU/lb) of material by a certain amount (usually 1°C or 1°F), a parameter that scientists refer to as the specific heat capacity (or, simply, specific heat) of the substance. Water's apparent resistance to heating (see page 350) spawned the aphorism "a watched pot never boils."

Heat can flow from one thing to another by several means. The simplest is called conduction. When a hot object is put in direct contact with a colder object, heat will flow from the hotter object to the colder object at the interface between the two. At a molecular level, the speed at which the heat transfers is influenced by how fast the molecules are slamming into each other.

Conduction is important to us in making pizza because that is how the heat flows from a hot oven floor or from the hot pan into the pizza dough. The high speed at which a massive oven floor can transmit intense heat is what allows Neapolitan pizzas to produce their distinctively leopard-crusted (see page 366). Pizzas baked in pans or on racks also receive heat conducted through the metal—but the pan or rack itself is heated primarily by convection and radiation. Elsewhere in the kitchen, conduction is behind almost any kind of cooking done in a pan. When you heat a pan, either by using a gas stove or a hot electrical element, the heat then flows through the pan via conduction. Pure conduction only exists for a solid object. In liquids and gases, conduction does sometimes occur, but it usually plays only a minor role.

For a liquid or gas, as the heat flows into it, it will change the density. Nearly all substances expand when they warm and, in doing so, become a little less dense. This effect is subtle for most solids but more pronounced for liquids, and the expansion is quite dramatic for air and other gases. As fluids and gases heat and expand, they become more buoyant; as they cool, their densities increase, so they tend to sink. One everyday example is that hot air rises. Even if only the bottom heat source in an oven is running, the air surrounding the burner or element rises. As the density changes, it causes motion to occur, which creates convection heat.

Convection is different than conduction because the heat medium itself moves rather than occurring at the site of contact. Convection is the second most commonly used mode of heat transfer in cooking as a whole, but it figures prominently in baking and pizza making. In natural convection, heat alone is the driving force, and the fluid tends to circulate in a pattern of loops called convection cells. In the kitchen, we're familiar with a "convection oven" but it's a misnomer because all oven chambers undergo convection. The real term for this type of oven is a "forced convection" oven. Forced convection ovens attempt to overcome the drawbacks of natural convection by using fans to blow the air around the oven interior. Although the fanned air can accelerate drying and thereby speed cooking for certain kinds of foods, the results vary widely depending on the size, shape, and water content of the food.

A third type of heat transfer is by radiation, which turns out to be the most important type of heat

To quantify just how quickly convection moves heat from source to food, we need a measure that considers the density, viscosity, and flow velocity of the fluids involved, in much the same way that thermal diffusivity incorporates the analogous information for heat conduction in solids. The heat transfer coefficient is just such a quantity; it conveys in a single number just how quickly heat passes from one medium or system to another.

Convection ovens cook some foods faster because they have a higher heat transfer coefficient than conventional ovens do. In general, forced convection increases the heat transfer coefficient by tenfold or more, which typically means a reduction in required cooking time of up to 35%, depending on what you are baking or cooking.

Some materials conduct heat more readily than others, of course; that is why oven mitts work. Thermal conductivity is a measure of the ease with which heat moves within a material. An oven mitt has a very low conductivity, so it is a good thermal insulator; just make sure to keep it clean and dry. Invest in thick leather mitts, especially if you are moving something extremely hot and heavy, like a preheated baking steel.



Forced convection—also known as stirring—helps disrupt a thin sheath of fluid, called the boundary layer, which surrounds the food and insulates it somewhat from the heat. A boundary layer forms when friction and viscosity slow the movement of fluid passing close to the rough surface of the food. The boundary layer can be the most important factor that affects how quickly your food bakes or boils at a given temperature. The fan in a convection oven can break up the boundary layer and hasten cooking; stirring a simmering pot of tomato sauce has the same effect.

transfer for baking pizzas (we go into more detail on this on the next page). The basic principle for radiative heat is that all substances give off light if they're hot and the temperature creating the light is very high. In the kitchen, the majority of the light that's involved in radiative heat transfer is in the infrared part of the spectrum, so we can't see it with the naked eye. Although we can't see it, we know that it's there and can photograph it with specialized cameras (see page 392).

The final kind of heat transfer that's important for pizza is heat transfer by a phase change. There's one phase change that dominates all others, both in the kitchen and on planet Earth—water. At 100°C / 212°F , water boils into steam; this requires a significant amount of extra energy (see below). An illustration of this amount of energy is that you can put your arm in a 260°C / 500°F oven for a moment or two without getting hurt. But you can't safely hold your arm over a pot of boiling water or the steaming spout of a tea kettle for even a second. The difference between the two situations is captured by the heat transfer coefficient, a measure of how readily thermal energy passes between a fluid (such as the air in the oven or the steam above the pot) and a solid (such as your arm).

In a still, dry oven, the value of that coefficient is about $20\text{ W/m}^2\cdot^{\circ}\text{C}$; in steam-filled air, it's 100–1,000 times higher because of the terrific amount of heat released when water changes from vapor to liquid. In the kitchen, most of the things we heat have water in them, which can evaporate from the food if you are cooking it at high enough temperatures. The energy involved in evaporation is also why we feel cold when we get out of a pool; the evaporating water takes heat away. In any cooking method, these four modes of heat transfer operate independently and often simultaneously, but one mode is almost always dominant in any given method.

There is a single measure that takes into account all three of the properties that matter in cookware: conductivity, specific heat, and density. It's called thermal diffusivity. The higher the diffusivity of a material, the faster it transmits a pulse of heat. People say that copper cookware “conducts” heat well, and in fact, copper is an excellent conductor. But what they actually mean is that copper's high thermal conductivity and low specific heat are balanced by its relatively high density, which exceeds even that of cast iron. They also mean that it heats not only quickly but evenly, too. They mean, in short, that it has high thermal diffusivity.

THE ENORMOUS AMOUNT OF ENERGY IT TAKES TO BOIL WATER

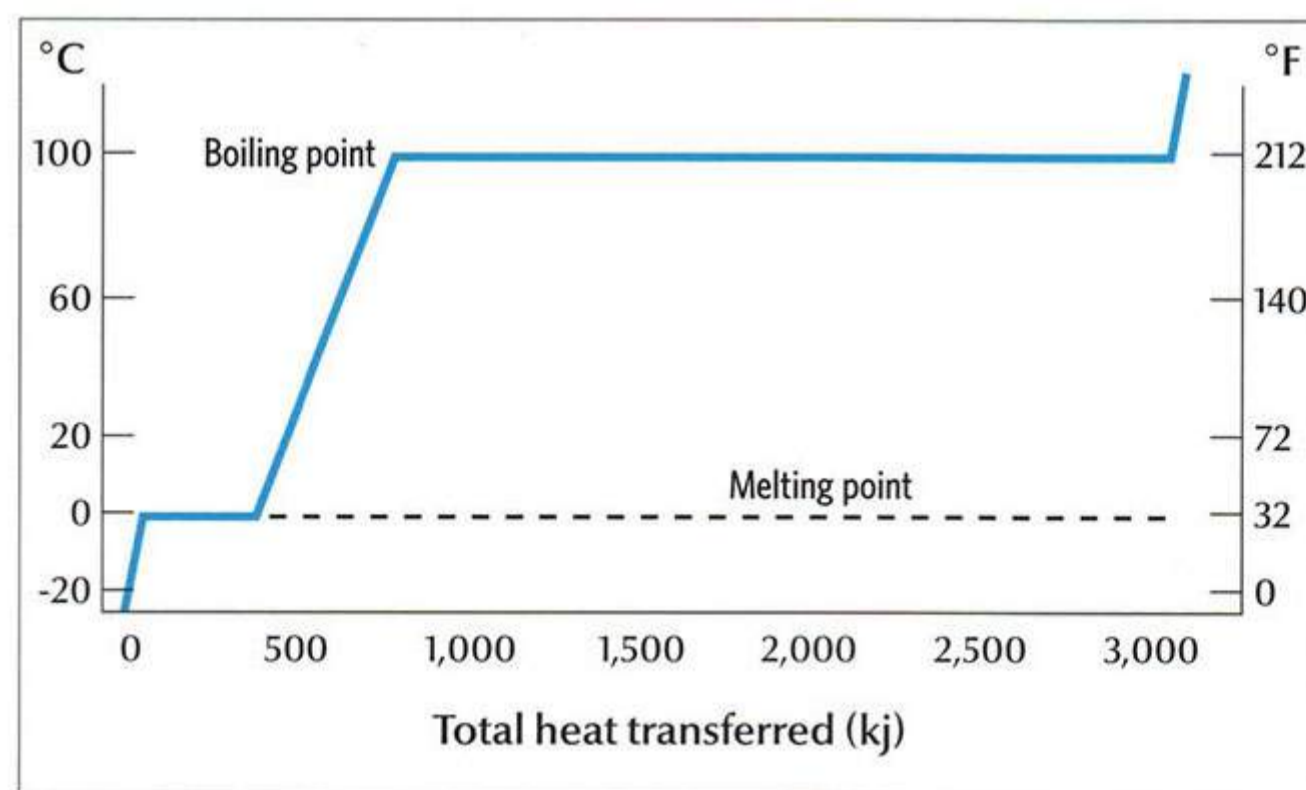
Stick a thermometer in a glass of water. Now heat the water and watch the temperature rise; cool the water, and the temperature falls—simple, right? Unfortunately, no. Water begins to boil at a much higher temperature than do other liquids made of similarly lightweight molecules. Its freezing point is also surprisingly high. Water expands when it freezes and shrinks when it melts—just the opposite of almost all other substances. In fact, one of the greatest sources of frustration for pizza makers is the counterintuitive behavior of water as it thaws and boils or condenses and freezes.

As you pour joules of heat into a kilogram of ice, it warms for a while, then halts at the melting point. Energy continues to pour in, but the temperature does not start to climb once more until the last sliver of ice has melted. The temperature plateaus again at the boiling point, and here the temperature stays until every drop turns to steam. The pattern applies in reverse, too, as steam condenses and water freezes.

You must pump an unusually large amount of heat into water to raise its temperature by even a small amount. It takes more than five times as much energy to boil a pot of hot water as it does to heat it in the first place.

Even after it has reached its boiling point, liquid water soaks up a very large amount of heat—called latent heat of vaporization—before it transforms into steam. The energy barrier between water's ice and

liquid states, called the latent heat of fusion, is similarly high. Notice that it is the amount of heat *energy*—not the power, temperature, or rate of energy transfer—that matters. You can double the heating power to speed up the process, but the phase changes will occur at the same temperatures.



The well-defined plateaus shown here appear only when working with pure water; in food, both freezing and boiling occur over a range of temperatures, owing to the presence of fats, dissolved solids, and other components.

Heat Rays

A flickering gas flame, a crackling wood fire, and a pile of glowing coals obviously radiate light as well as heat. Less obvious is the fact that much of the heat they give off is actually transmitted by light rather than by conduction or convection. In fact, even “dark” sources of heat, such as an electric burner set to low or the black walls of a preheated oven, radiate light as well—the light they give off just isn’t the visible kind.

“Heat rays” typically fall into the part of the electromagnetic spectrum that lies outside the relatively narrow band that human eyes can perceive. The radiation that cooks food, for example, is mostly in the microwave and infrared range. These waves have longer wavelengths and thus lower individual energy than even the lowest energy (deepest red) visible light—hence the “infra” in infrared.

Wood-fired or gas-fired pizza ovens, broilers, and grills cook mainly by radiant heat, meaning radiation in this infrared energy range. Burning coals and broiler flames emit a wide spectrum of light—visible, infrared, and even some microwave light—in every direction. Atoms in the food absorb some of the radiant light, and we perceive this change in internal energy as an increase in temperature. How much energy the food absorbs depends on two things: how much light hits the food, and how much of that incident radiation is absorbed rather than scattered or reflected, a fraction called reflectivity. Dark foods having dull surfaces absorb more of the heat rays that hit them than do light-colored, shiny foods. Everyone who has worn T-shirts

in the summer has discovered that a black shirt gets much warmer in the sun than a white one does.

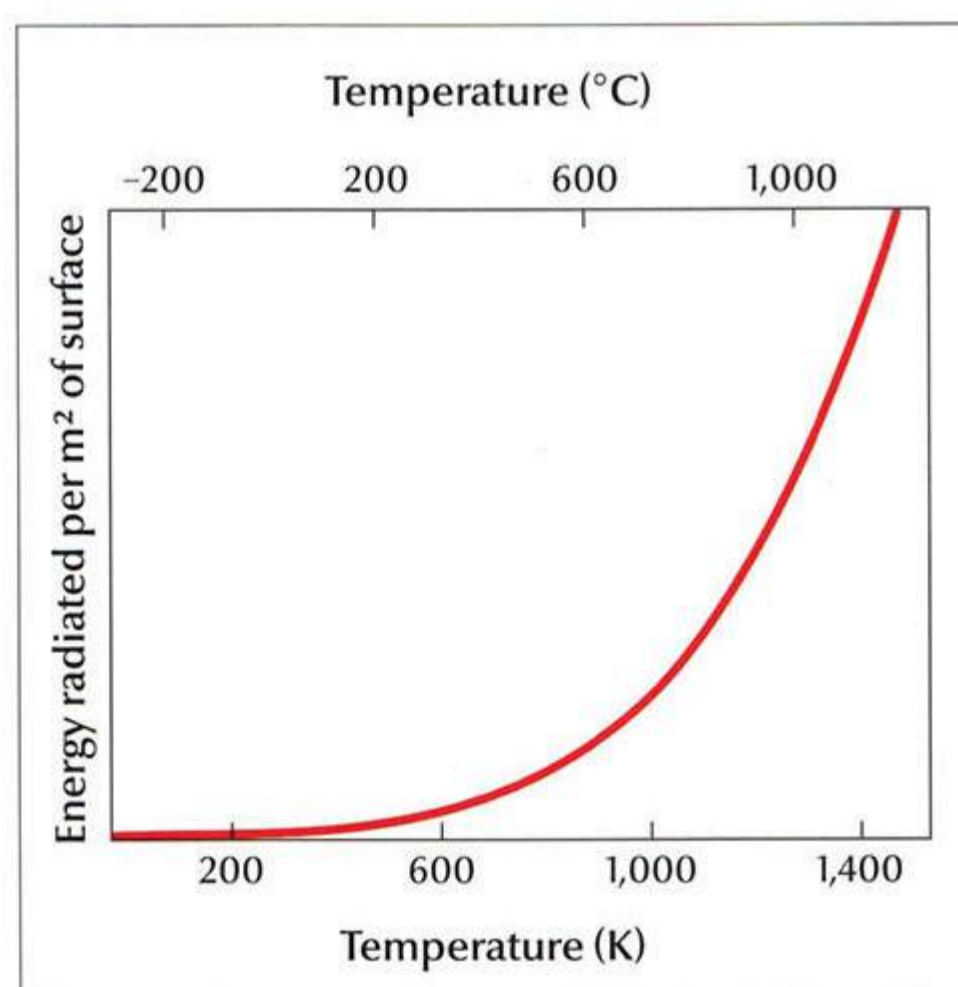
A food’s reflectivity can change as it cooks, creating challenges for the pizza maker. Color shifts happen routinely in baking: many doughs go in white and come out brown. As a pizza crust gradually darkens, its reflectivity progressively decreases, and it absorbs ever more radiant energy from the oven—so the baking accelerates. This phenomenon explains why bread in a toaster or under a broiler can go from light brown to charred in the blink of an eye (see page 354). Changes in reflectivity are usually to blame when a food at first responds slowly to radiant heat and then suddenly overcooks.

Counterintuitively, objects that absorb more radiation also emit more radiation. Your black T-shirt is beaming out almost as much radiation as it’s taking in, albeit in a different part of the spectrum. This equivalence has been proved in a set of calculations known as Maxwell’s equations, which have the curious property of working just as well when the direction of light is reversed. That means, essentially, that absorption and emissivity are two manifestations of the same fundamental phenomenon.

The magnitude of the heat radiation is proportional to the temperature raised to the fourth power, according to the Stefan-Boltzmann law (see page 372). It’s important to note that this relation holds only for temperatures expressed in absolute scales such as kelvins, but not for those in degrees Celsius or Fahrenheit. That fourth-power relationship means that the radiant energy thrown off by a broiler element or a pile of glowing embers grows by leaps



A candle flame can be quite hot, but the flame is heating a small amount of gas over a relatively confined area. You can’t bake a pizza powered by a candle even though the temperature of the flame alone might be much higher than the temperatures found in some pizza ovens.



Thermal emission scales with the fourth power of temperature; this means that if you double the temperature, it goes up by a factor of 16.



Darker objects both absorb and reflect more heat, as demonstrated by wearing a black T-shirt on a sunny day. But this principle exists in food as well. Japanese teppanyaki grills are extremely hot and yet customers can sit around them. Why? Because the grills are made of chrome, so the shiny surfaces radiate less heat than a darker grill.



Emissivity is the amount of light that bounces off of something but this can also translate to the amount of heat coming off of an object. A cast-iron pan will absorb and retain more heat than a shiny pan both due to emissivity and thermal conductivity (see page 350). Try holding your hand over these two types of pans after they have been heated to the same temperature and you'll feel the difference in the heat radiating from the different materials.

and bounds as its temperature inches upward. At low temperatures, like those in a proofer (which is typically set to 27°C / 80°F), the heat source emits long-wavelength light that carries little energy; radiative heat transfer is such a small effect that we can virtually ignore it. But when an object's absolute temperature (in kelvins) doubles, its radiant energy goes up 16 times; when the temperature triples, the power of its heat rate skyrockets by a factor of 81!

In a very high-heat environment, like a high temperature broiler where temperatures can reach 800°C / $1,470^{\circ}\text{F}$ / $1,073\text{ K}$ or a wood-fired or gas-fired pizza oven (typically set to $425\text{--}480^{\circ}\text{C}$ / $800\text{--}900^{\circ}\text{F}$ or $698\text{--}753\text{ K}$), radiation is the dominant means of heat transfer (see page 354). The air temperature doesn't matter. The radiation generated at these high temperatures is what gives you the characteristic leoparding in a Neapolitan pizza.

This is very different from a conventional oven with a lower heat source (200°C / 390°F / 473 K or below) where convection—the movement of hot air—carries most of the heat from the cooker's element to the food (albeit fairly weakly). This mode of heat transfer plays more of a role when baking thicker bread-like pizzas that would burn on the outside if

you baked them in a high-temperature wood-fired or gas-fired pizza oven. Radiation is not very important in cooking on top of a stove, where most things are below the boiling point of water. In a pizza oven, however, radiation is all important due to its higher temperatures.

Radiation differs from conduction and convection in yet another way: how it diminishes over distance. As a form of light, heat rays obey the inverse-square law of light, meaning that the intensity of radiant heat received from a point source is inversely proportional to the square of the distance to the source. An LED light bulb, for example, looks only about a quarter as bright from two meters away as it does from one meter; the distance doubled, so the brightness fell by a factor of four (2^2). Back up to a distance of three meters, and now the brightness is down to a ninth of its intensity at one meter.

Most people grasp this property of radiative heat transfer intuitively but tend to overestimate its importance in the kitchen. The heating elements used in ovens and grills aren't point sources like tiny light bulbs; instead, they tend to be linear bars (in the case of an oven element) or flat planes (such as a bed of coals) spread over a relatively wide area.



Firebricks are a common material used to build the floor of wood-fired or gas-fired pizza ovens. When they are new and clean, they have an emissivity of 0.68.

CLEAN VS. DIRTY WOOD-FIRED PIZZA OVEN FLOORS

First things first: let's be clear about terminology. A "clean" oven is one that has relatively shiny walls and floor while a "dirty" oven is one that is sooty. It's likely dirty because you didn't sweep it. Initially, when a dirty oven is coming up to temperature, it's black from the soot. One thing that we learned from pizzaioli, however, is that the oven is ready when the soot has vaporized and the blackness of the oven walls is gone.

Why does the color of the oven matter? The thermal emissivity of the oven (see page 354) is determined by the color. The approximate

emissivity of black soot or carbon is 0.95 while 0.68 is a typical value for the emissivity of firebrick and refractory stone. The emissivity controls how much of the infrared light is absorbed versus reflected, so it determines the rate at which an object heats.

Suppose that the floor of the oven is cold because a pizza has just been baked on it. As soon as you move the pizza, the floor will absorb infrared radiant heat from the ceiling of the oven. If the floor is black (0.95 emissivity), then it will absorb heat faster than if the stone is clean (emissivity about 0.68). The difference is the ratio of the two numbers $0.95/0.68$, so the black floor will heat at a rate that is about 1.4 times faster, initially, and it will recover more quickly.

THE IMPORTANCE OF REFLECTIVITY IN YOUR OVEN WALLS

Have you ever wondered why the interiors of electric ovens are often lined with shiny material? In contrast to dark surfaces, materials that are shiny will act as mirrors, reflecting infrared heat waves at the same angle and with the same intensity. We started wondering what would happen if, in addition to our pizza deck oven's shiny back and side walls, we made the oven door reflective. Could we increase radiation and improve the oven's performance?

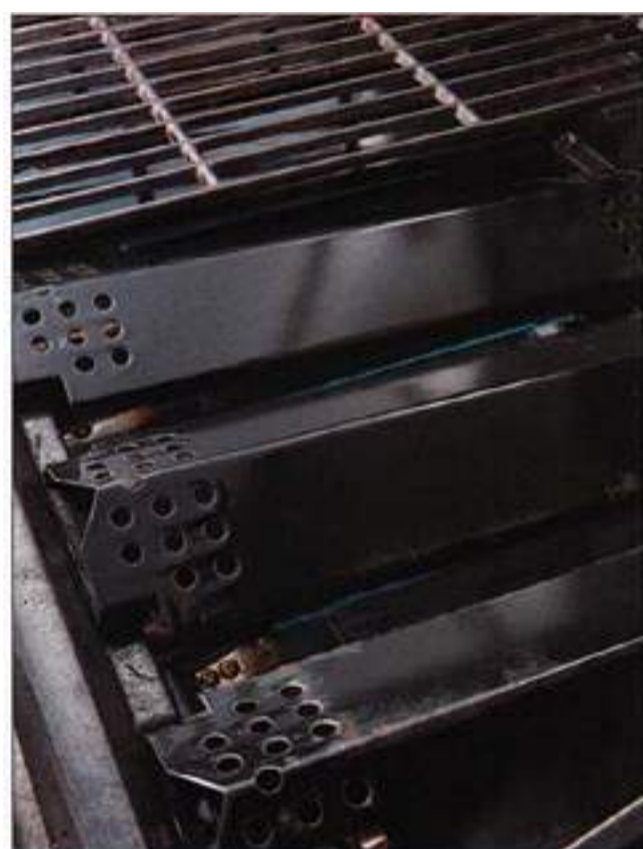
We created a #9 mirror-finish stainless steel plate that would fit in the oven door and cover the glass completely. This additional door was designed to receive the radiative heat from the oven and reflect it right back to help us bake a better Neapolitan pizza by using all of the available infrared radiation. In our pizza deck oven, a Neapolitan pizza typically bakes in 2½ minutes at 400°C / 750°F. The addition of the mirror

door dropped the baking time to 1½ minutes, which is closer to the baking time of a Neapolitan pizza in the wood-fired or gas-fired pizza oven.

Not only was the pizza baked to perfection in a shorter time, but it also showed some characteristic attributes usually associated with a Neapolitan pizza baked in a wood-fired or gas-fired pizza oven: a better crumb, a higher volume, and leoparding (see page 366). Another interesting observation is that under these conditions, the pizza baked almost homogeneously throughout without requiring any turning, a necessity when baking in a wood-fired pizza oven. Typically, a Neapolitan pizza baked without turning in an oven with no glass door is clearly darker on one side (see page 355). We realize that replicating this experiment in your own oven could be difficult. But this could be a call to action for oven manufacturers to make the oven door with a reflective material.



A surface's effectiveness in emitting energy as thermal energy is its emissivity; this could include both visible and infrared radiation. Generally speaking, emissivity is the ratio of the thermal radiation from a surface to the radiation from a blackbody (see next page) at the same temperature.



Pizza doesn't see flame when it's baking; it sees the indirect result of the oven surface being hot (see page 356). This is well known to people who make gas grills. Gas grills also create indirect heat by heating metal screens or plates with a gas flame.

After you wait for a while, however, you'll find that they would reach different temperatures! The reason is that the black surface absorbs more heat, but as it starts to get hotter, it also radiates more heat away.

Suppose that the ceiling of the oven is uniform at $700^{\circ}\text{C} / 1,300^{\circ}\text{F}$ (in practice the ceiling is not uniform, but this makes the math simpler). In that case, the equilibrium temperatures for a clean floor (0.68 emissivity) with a clean ceiling would be almost $460^{\circ}\text{C} / 860^{\circ}\text{F}$. The same floor with a black ceiling would be about $520^{\circ}\text{C} / 970^{\circ}\text{F}$. Meanwhile, a black floor (0.95 emissivity) with a clean ceiling would come to equilibrium at $150^{\circ}\text{C} / 300^{\circ}\text{F}$ and a black floor with a black ceiling would be around $190^{\circ}\text{C} / 375^{\circ}\text{F}$.

The clean floor gets much hotter than the black floor. If you have a clean floor, then you have a higher chance that the pizza dough can burn, especially if it's not tempered (see page 2:16). This is counterintuitive, but that is what happens with radiation. We consulted a prominent pizzaiolo in Italy to see if this theory plays out in the real world, and he agreed. He observes differences in baking on a black floor compared to a clean floor. If he puts a pizza on the black floor, the pizza will bake slowly and uniformly, not only in the middle but also underneath the pizza. Conversely, if he puts a pizza immediately on a clean stone, the bottom crust will be cooked unevenly, and it will be raw in the middle.

The pizza is releasing steam at $100^{\circ}\text{C} / 212^{\circ}\text{F}$, which cools the floor. But the floor is still hot enough that it scorches the bottom of the pizza in spots, which requires a temperature greater than

$100^{\circ}\text{C} / 212^{\circ}\text{F}$. The pattern of cold and hot spots on the floor will look like the underside of the pizza—some parts will be cooler than others because steam was channeled along those paths. The places where the underside of the pizza is brown or black are the places where there was no steam. So the temperature of the floor under the pizza ought to be varied—about $100^{\circ}\text{C} / 212^{\circ}\text{F}$ in places where the underside of the pizza is still white, and $160^{\circ}\text{C} / 320^{\circ}\text{F}$ where the pizza is brown.

When the pizza is removed, the cooling effect of water and steam is no longer there. Some heat from deeper into the stone will flow up to help the surface recover, but it is slow because the material is not a good heat conductor. The dominant effect in the floor recovering heat is absorbing radiation from the ceiling, and a black floor will absorb heat at a rate that is much faster due to emissivity.

The Physics of Heat in Wood- and Gas-Fired Pizza Ovens

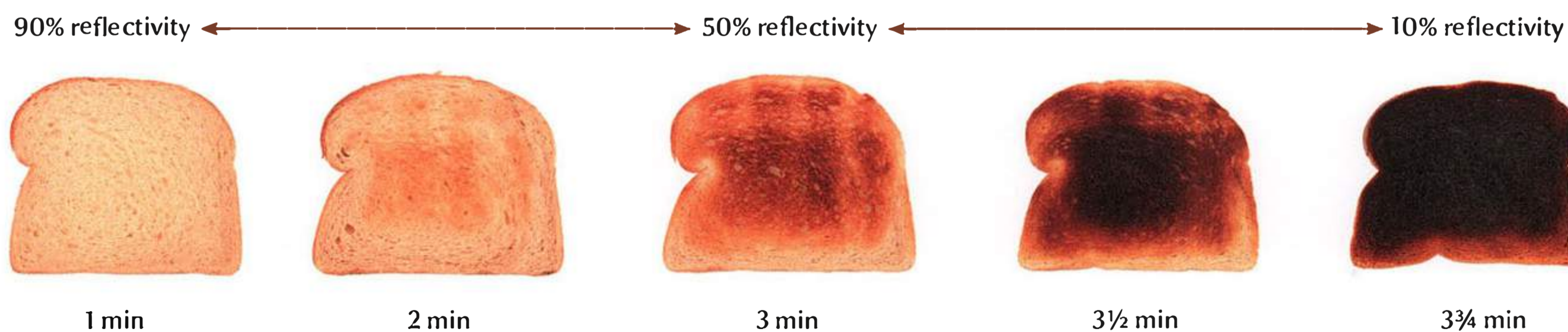
With the high temperatures that are commonplace in wood-fired or gas-fired pizza ovens, you might assume that the flame itself is generating all that heat. But, perhaps counterintuitively, that flame is optically thin. Whether you have a gas or a wood flame, even though the actual flame creates light, it doesn't create any significant amount of radiation for heat transfer. We both measured this and confirmed this with a group of French scientists who study wildfires.

This is important because in a gas oven, the only thing a pizza "sees" is the temperature of the thermal

TOASTING

Toasting bread takes much longer to go from white to brown than it does to go from brown to burnt. The reason it takes a while initially for this process to get going is because there is water in bread. The water keeps the toast at a low enough temperature that it doesn't brown (as long as it's below $100^{\circ}\text{C} / 212^{\circ}\text{F}$). Browning occurs only where the parts of the toast have lost enough water to brown. Light food also scatters and reflects less incoming energy and absorbs more as it darkens.

Well-toasted white bread soaks up more than 10 times as much radiant energy from the heating elements as when its surface has darkened and its reflectivity has fallen. The darker it gets, the more energy it absorbs. The fact that browning speeds up as it toasts means that you have to be mindful. The toaster also has to have even heat or you'll get dark spots, which will brown faster than the rest of your slice of bread.



THE EFFECTIVENESS OF STEEL IN UNIFORMLY BAKING PIZZA

Physicists often talk about an idealized substance that absorbs every ray of light that strikes it; they call such an object a blackbody. Any light coming off the object, called blackbody radiation, is thus emitted by the object itself rather than reflected or scattered from some other source. It will emit as much or more radiative energy than any other body at the same temperature. Moreover, the energy emitted is radiated independently of direction.

When baking pizza, a blackbody in an oven would have the capacity to absorb the heat, then reemit it in infrared, efficiently dispersing it in all possible directions. The result would be homogeneous heat throughout the oven, which would compensate for the common problem of hot spots (see page 385). We wondered how to put this theory into practice. The most critical requirement is to come up with a setup where the blackbody is positioned right above the pizza so that it is able to absorb and radiate the heat in a uniform way. We used a black baking steel placed on a grill rack that is elevated high enough to allow the pizza to rise without baking into it; we opted for a baking steel rather than a baking stone because the steel radiates heat better than masonry (see page 391).

We tried baking three sets of Neapolitan pizzas (see photos below), the first being without the baking steel setup and without rotating it. We determined a 2½ minute control baking time and saw—as expected—a burned area on the part of the pizza that was toward the back of the

oven. The second pizza was baked with the baking steel setup in the oven for the same amount of time without turning. This time the pizza was baked homogeneously but it browned too much because of the increased radiation. Finally, we baked a pizza under the baking steel until we achieved a perfectly baked crust with uniform browning (and even some leoparding). We also observed a 29% increase in pizza volume for the last pizza that we baked.

It's worth noting that we performed this experiment in an Italian-made pizza deck oven that has a door that you can close, and that was key to the successful results. When we replicated this experiment in a pizza deck oven with the door open (as is the case in many pizzerias because the pizzaiolo typically spins the pizza), we did not obtain the same results.

A blackbody in the oven homogenizes the heat distribution and improves the overall outcome. You will see a volume increase, a baking time decrease, and more even baking. The mathematics of blackbody radiation reveals that you can tell how hot a completely nonreflective object is by analyzing the spectrum of the light it emits. At room temperature, a blackbody emits mostly infrared radiation, but as its temperature increases past a few hundred degrees Celsius, it starts to give off visible light, beginning with the red wavelengths—it's what you see when your toaster coils heat up.



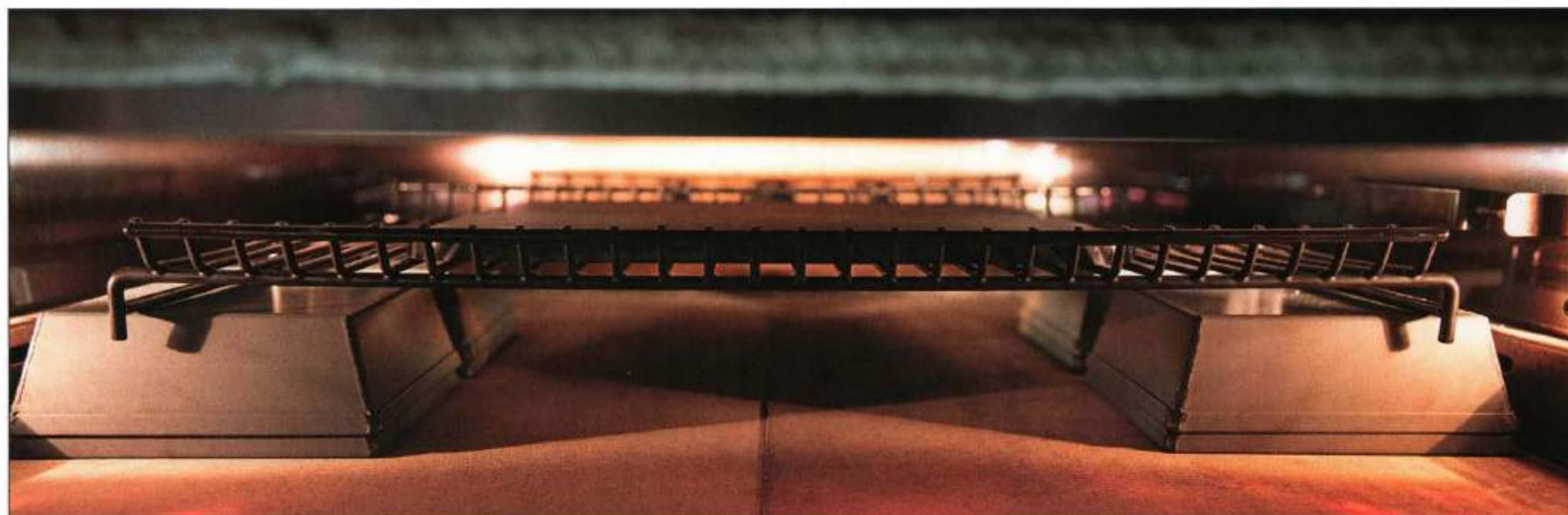
Neapolitan pizza without baking steel
(electric oven, not rotated, 2½ min)



Neapolitan pizza with baking steel
(electric oven, not rotated, 2½ min)



Neapolitan pizza with baking steel
(electric oven, not rotated, 1½ min)



Electric oven setup with a baking steel on an elevated grill rack

radiation from the walls and ceiling of the oven, and not the flame. This is well known to people who make gas grills. They manufacture their grills with metal grates or sheets that are there to radiate heat since they know that the flame won't do the trick.

Meanwhile, it's different with a wood-fired pizza oven. The flames still contribute nothing, but the embers contribute a lot of heat— $1,200^{\circ}\text{C}$ to $1,500^{\circ}\text{C}$ / $2,190^{\circ}\text{F}$ to $2,730^{\circ}\text{F}$. That's a tremendous amount of radiation. The pizza sees the indirect result of this heat, which is the surfaces of the oven being hot.

If you sum up the little contributions from every part of the oven, that will tell you its radiative intensity. We mapped the floor of the oven to show the radiative intensity expressed as temperature. In each possible position for the pizza, there is a variation in temperature. One part of the pizza may experience more heat from the oven than another part. Let's call that temperature difference delta T. Out of the thousands of different pizza positions, we can now calculate which positions have the minimum delta T, and which will have the maximum delta T.

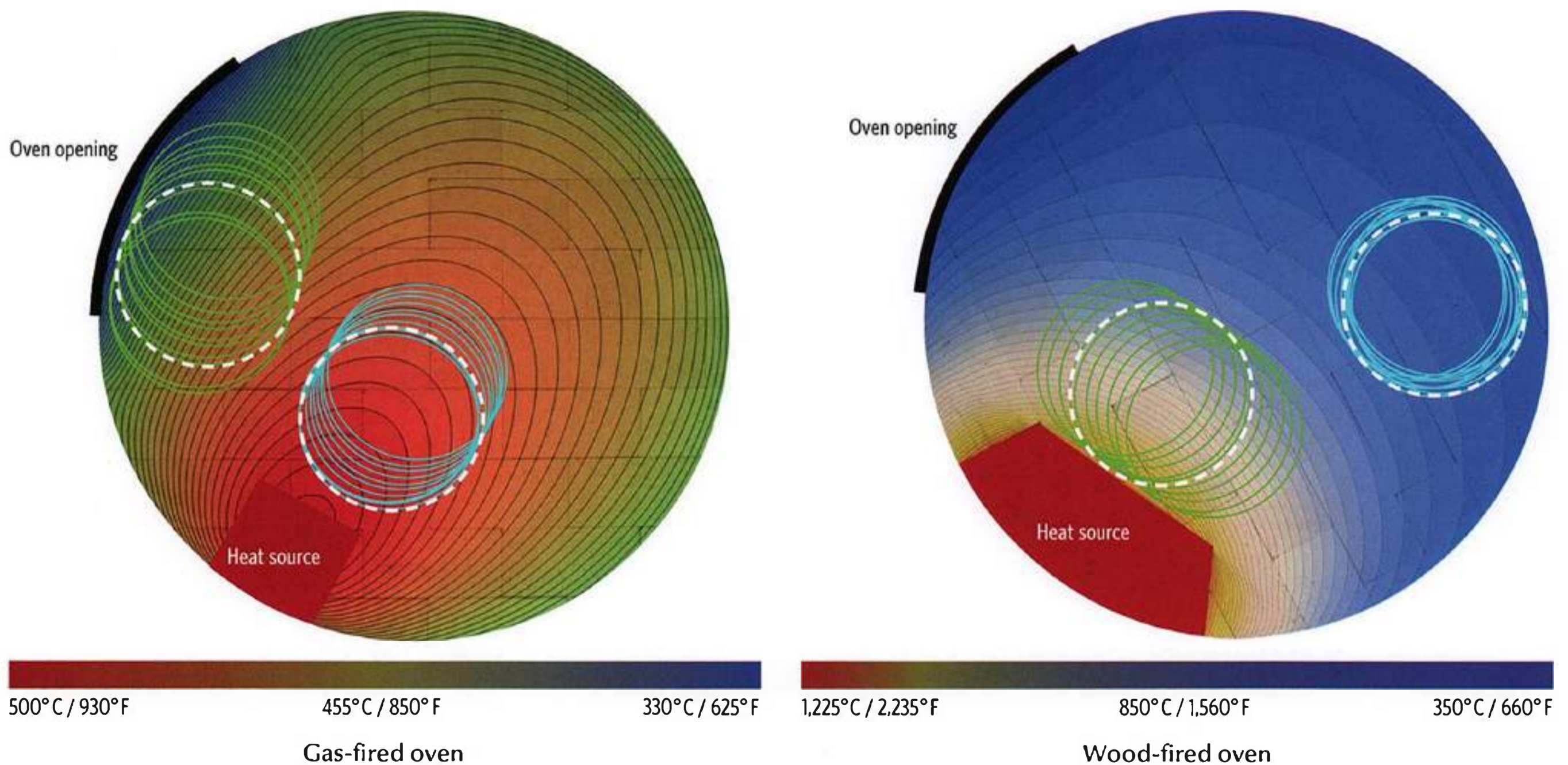
In the plots below, the dashed white circle over the thin blue circles shows the position that has the lowest delta T across a 30 cm / 12 in pizza. The thin blue circles show the top 10 positions with the lowest delta T. Conversely, the dashed white circle

over the thin green lines shows the position with the highest delta T, and the thin green circles are the top 10 positions with highest delta T. For gas-fired pizza ovens, the lowest delta T is a position right by the burner, which is also the hottest place in the oven. The largest delta T occurs near the oven door, which is the coldest part of the oven. The reason for this is easy to understand. No infrared heat comes from the flame of a gas fire; as mentioned before, the infrared heat comes from the walls and the ceiling of the oven.

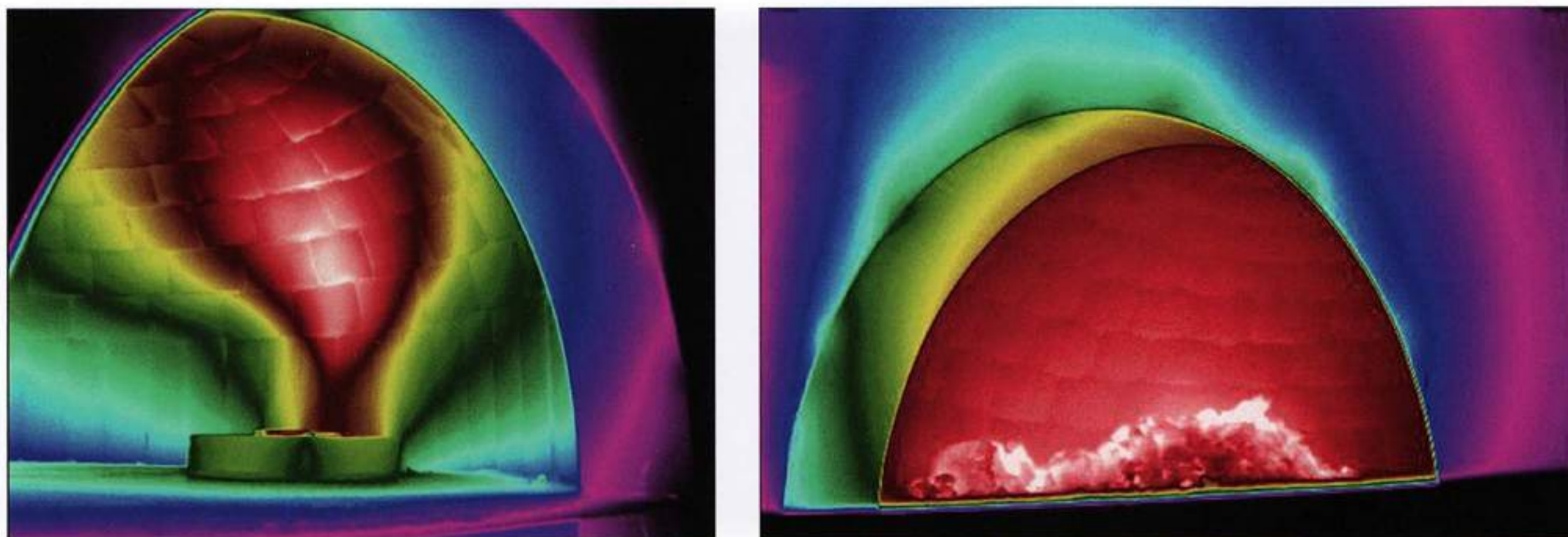
Notice that the positions of the highest delta T for the wood-fired pizza oven are the *opposite* of the gas-fired pizza oven. Here, the highest delta T is the position near the fire while the lowest delta T is toward the back right of the oven. The flame from the wood generates no infrared radiation, but the wood and embers do contribute infrared radiation. You can clearly see the pile of embers in the thermal image at top right on the next page. We consulted a highly regarded pizzaiolo from Naples to confirm that the position where you place the pizza in the oven changes according to whether the oven is gas-fired or wood-fired. He supported our theory, saying that if he places the pizza near the wood fire, the side of the pizza near the outside will tend to burn.

The gas oven is like a spotlight shining on the ceiling (see photo at top left, of the next page),

We mapped the temperature at a variety of points inside our oven while burning both gas and wood in order to calculate the distribution of the infrared energy (this tells us the rate at which things cook). The green circles show the positions in the oven that have the largest variation in temperature across the pizza while the blue circles show the area that has the smallest variation in temperatures. The very smallest and very largest are within the dashed white circles.



Both bars (above) map temperatures from red to blue, but the heat source is not the same. If you measure the temperature of the flame in a gas oven, you would say it's much hotter, but the temperature of the flame actually doesn't matter that much.



making indirect light, while the wood oven is providing direct light. The gas oven is acting like a wood-fired pizza oven with no wood burning—i.e., as if you heated the oven up by burning wood and then swept out the ashes.

The process of baking a pizza in the oven is more complicated than just looking for the places with the lowest, or highest, delta T, but it does tell us something very basic about the nature of the heat in the oven. Of course, as the wood burns, or new wood is put in, the direct light provided by the wood will change (this leads to uneven heating), but the general principle that a wood-fired pizza oven has more concentrated heat will still be true.

HOW LIGHT BAKES PIZZA

We wanted to physically demonstrate the role of radiative heat in baking pizza. One logical answer would be to suppress radiation and observe the result. In a similar way that visible light is reflected by a mirror, the radiative heat can be reflected as well. Remember focusing sunlight with a mirror on a sheet of paper and burning a hole in it as a kid?

We decided to see if a mirror could suppress radiation, preventing the pizza from baking all the way through. We created a mirror shield that would partially cover a Neapolitan pizza (see photo below, at left) with a double reflective “roof” in order to better shield the pizza from infrared radiation.

We placed the shield in the wood-fired pizza oven and carefully positioned a Neapolitan pizza under it. It baked at 450°C / 840°F for the standard amount of time without rotating. As clearly demonstrated in the photo below, in the center, the resulting pizza had an underbaked white stripe of crust at the location of the shield and an infrared “sunburn” on the exposed crust. The crust covered by the shield had a much lower rim (we measured an 11% decrease in volume). We also observed significantly less cheese melting under the apparatus and no cheese browning.

The experiment was repeated in an electric oven at 400°C / 750°F with similar results, thus confirming the significance of radiative heat in the overall pizza-baking heat budget. As expected in accordance with the Stefan-Boltzmann law (see page 372), a less dramatic effect was observed at 400°C / 750°F than at 450°C / 840°F.

Wood- and gas-fired pizza ovens can operate at very high temperatures; in both cases, the baking is overwhelmingly achieved through radiation. These thermal images illustrate that the gas-fired pizza oven (top left) heats primarily by light shining from one side of the oven while a wood-fired pizza oven (top right) provides additional heat from the embers of the wood. Both types of ovens, however, bake with an uneven distribution of infrared energy.

While visiting pizzerias for this book, we had several pizzas that were out of this world. But we had to laugh when astrophysicist Neil deGrasse Tyson tweeted that “Venus’s 900deg air would cook a 16 in pepperoni pizza in 9sec & vaporize you. Runaway Greenhouse: Good for pizza. Bad for life.” It’s a good thing that you can safely eat Neapolitan pizzas that are baked at similar temperatures here on Earth.



Mirror shield



Pizza baked with the mirror shield



Pizza baked without the mirror shield

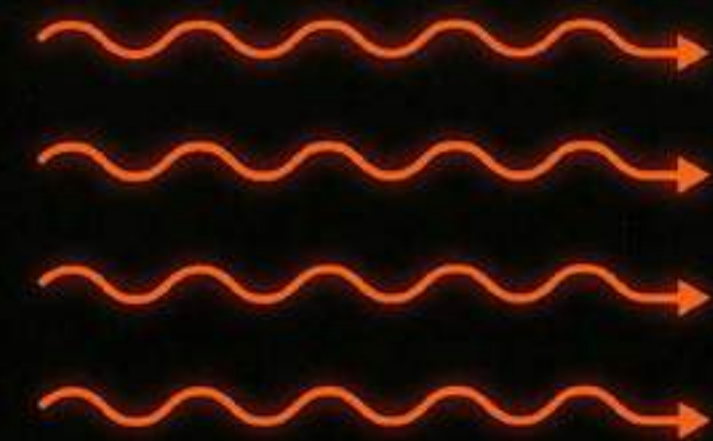
WHERE HEAT COMES FROM IN A DECK OVEN

To transform dough into pizza, you just apply heat, right? If only it were really that simple. For pizzas baked in a wood-fired or gas-fired pizza oven, radiation is all that matters (see page 354). The heat in the oven floor in these types of ovens comes almost entirely from the floor absorbing the radiation that's coming off the ceiling. There's very little

conduction through the stone because the stone is an insulator and doesn't conduct heat very well. But in a deck oven, most of the energy of baking is delivered to the pizza by radiation and conduction. The energy flow is somewhat different when pizza is baked in a pan.

Even though the warmed walls of a preheated oven apply heat from each side, every oven has hotter and cooler spots (see page 385), so natural convection happens here, too. Pizza pans or large pizzas like the pizza a metro (see page 3:82) can disrupt the flow of air, however, chipping away at efficiency, exacerbating hot spots, and generally making cooking less predictable.

A pizza pan warms as it absorbs heat from radiation and convection in the oven; darker pans do a better job of absorbing incoming heat than lighter, shiny ones do. It then transmits some of that heat—but only a portion—to the adjacent dough by direct conduction. The pan also reradiates heat back into the oven chamber and conducts it to the surrounding air.



Radiation

The preheated oven's walls, deck, and heating elements all radiate infrared waves. Some of the radiant energy warms the oven air, but more is absorbed by the pizza and other solid surfaces in the chamber. As the temperature of the emitting surface increases, the frequency of the radiation it gives off rises, and so does the intensity of the heat it transmits (see page 352). Although the dough absorbs only 5%-10% of the incident radiation at the beginning of baking, the absorption increases significantly as the crust darkens.



The temperature of the oven deck—typically around 285-315° C / 545-600° F—is an important variable in baking. Good deck ovens offer reliable, accurate control of this temperature.

The heating element in a deck oven gets far hotter than the pizza ever does. Heating the crust to the same temperature as the element would char it in an unpleasant way.

Dark surfaces emit more radiant energy than reflective or light-colored surfaces do, and radiant heating power increases rapidly with temperature. As a result, if the ceiling of a deck oven is very dark while the floor is shiny and cooler, then the ceiling may beam more than five times as much heat toward the pizza in the form of infrared rays. But heat also passes very quickly from the floor to the pizza via conduction, and that tends to balance the heat arriving at the top and bottom of the crust.

Natural convection and the boundary layer: in a deck oven, a thin blanket of steam released by the baking pizza envelops it. Natural convective air currents mix drier air into this boundary layer, disrupting it, but it reforms quickly.



Infrared

90% reflected; 5%-10% absorbed by the dough

Conduction is heat transfer by direct contact. As atoms and molecules bump into and vibrate against one another, they exchange energy. The energy can spread in this direct fashion through a solid object or from one object touching another. To ferry energy from the surface of most solid foods into the center, you must rely almost exclusively on conduction.



The pizza pan's walls make it harder for steam to evaporate initially. But as the bake continues, the crust pulls away from the walls and creates a path through which water vapor leaves. The same is not true for the bottom crust, where the dough remains pressed against the pan throughout. This is why the bottom crust of some pan-baked pizza tends to be thinner and less crispy. When using a home oven, you can compensate somewhat for the effect by placing the pan on top of a preheated baking steel in the oven.

In baking, the role of conduction is most pronounced when dough is placed directly on metal or stone, as in a deck oven.



Conduction

The thick stone floor of a deck oven absorbs a huge amount of heat, mostly from a gas flame or electric element below. The hearth then releases the heat gradually by conduction into the base of the pizza. Conduction also moves heat within the pizza from the outside in, but this process is quite slow, especially compared with convection within the dough.

THE BAKING ENVIRONMENT OF A WOOD-FIRED OR GAS-FIRED PIZZA OVEN

Making pizza in a wood-fired or gas-fired pizza oven is one of the trickiest methods to master. Not only do you have to navigate the best place in the oven to put your pizza, which can vary because the temperature of the oven floor changes as you bake, but you also have to contend with spinning the pizza so that it bakes evenly (see page 2:406). And you have only about 90 seconds to make it all work. Understanding the different factors that can impact the pizza while it's baking will help you successfully bake Neapolitan pizzas. Well, that and a whole lot of practice.



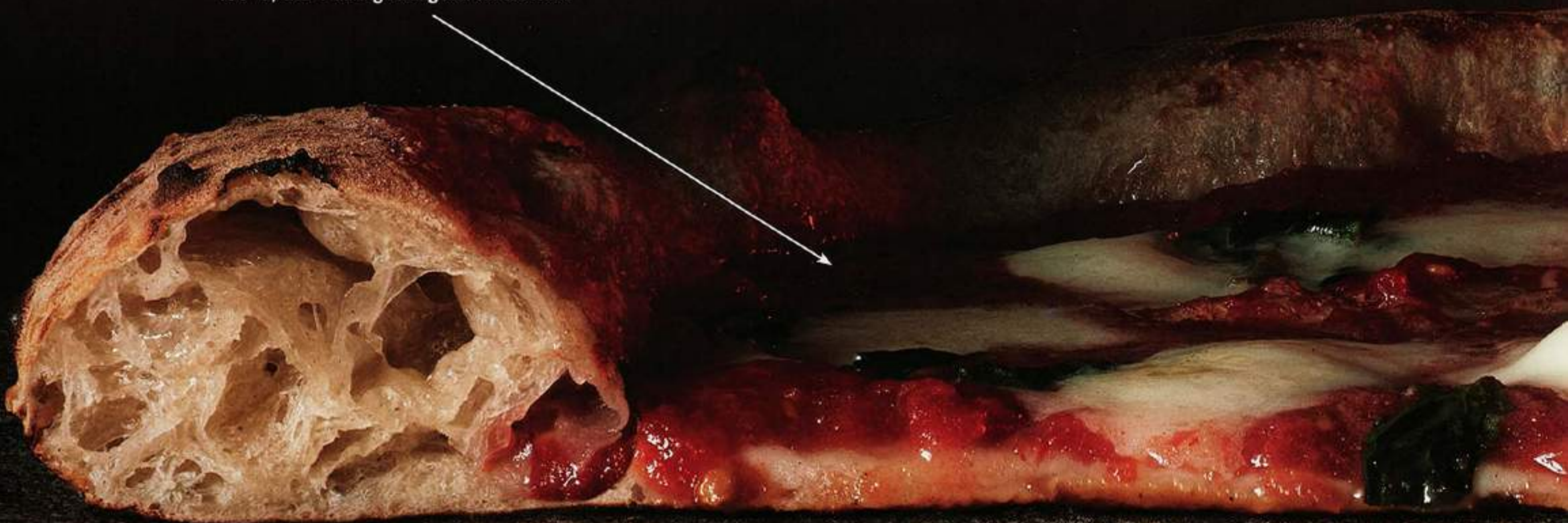
We tried building a temperature sensor that measured only the air temperature. We obtained some initial readings but weren't confident that the radiative heat was completely blocked out, so we decided to keep trying with other iterations of the air sensor.



The smoke generated from the fire in a wood-fired pizza oven hovers at a height above the top of the mouth of the pizza oven before it vents out the back. Some pizzaioli refuse to dome their pizza (see page 2:405) because they think that the smoke contaminates it. If you bake the pizza properly, you shouldn't need to dome your pizza to finish cooking it.

The temperatures in a wood-fired pizza oven are constantly changing as the fire burns down and you build it back up to maintain the oven's heat. This requires special action by the pizzaiolo (see pages 2:404–405). For an easier-to-learn procedure, we recommend using a gas-fired pizza oven because the temperature is more consistent (see page 454).

The bubbling sauce maintains a temperature around 100°C / 212°F during baking and emits steam.

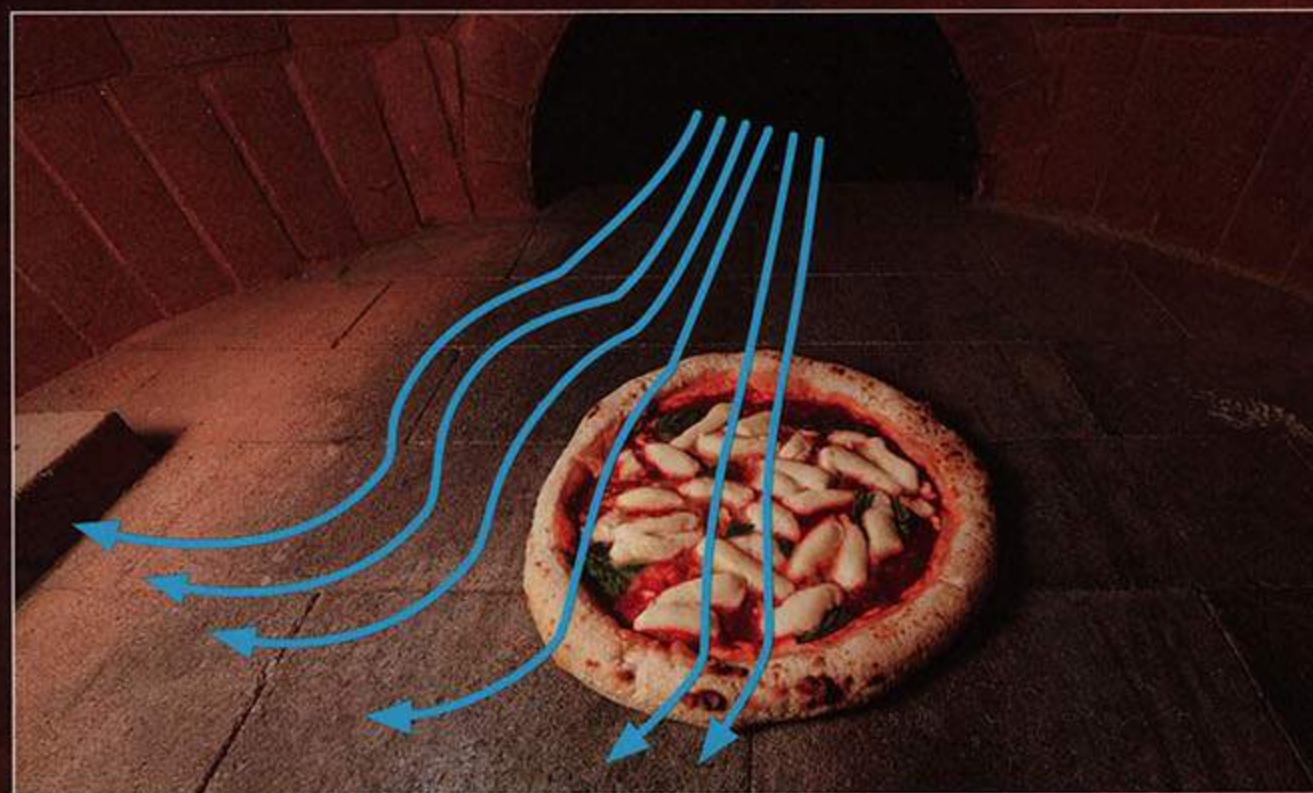


Pizzaioli typically bake their pizzas at temperatures between 450°C and 480°C / 850°F and 900°F, although the oven can certainly be used at lower temperatures. These days, the temperature is usually determined by an infrared thermometer, which is taking a reading of either the oven floor or the ceiling.

Wet dough will cool down the oven floor when you first load the pizza into the oven. When you remove the pizza after it's baked, be sure to allow the oven floor time to recover its temperature before placing another pizza in the same spot.

THE AIR TEMPERATURE IN YOUR OVEN DOESN'T MATTER

Air temperature is very difficult to measure in a wood-fired or gas-fired pizza oven. We tried building a device to measure it but the problem is that the temperature probe must be shielded from radiation; otherwise you are not measuring the air temperature. But the air temperature in the oven might not even matter. The first clue that air temperature isn't important is that most gas-fired and wood-fired pizza ovens have open doors. The air temperature near the floor of the oven where the pizza bakes is quite low because of cold air rushing in from the door to the fire (it feeds the combustion of the fire). Another phenomenon that shows this is that when you first start a wood oven, you get a layer of smoke—it's above this layer that all the hot air sits. People think this gives the pizza a smoky flavor, but this isn't actually true because the smoke never comes in contact with the pizza. It sits in a layer above the top of the oven door opening before it vents out.



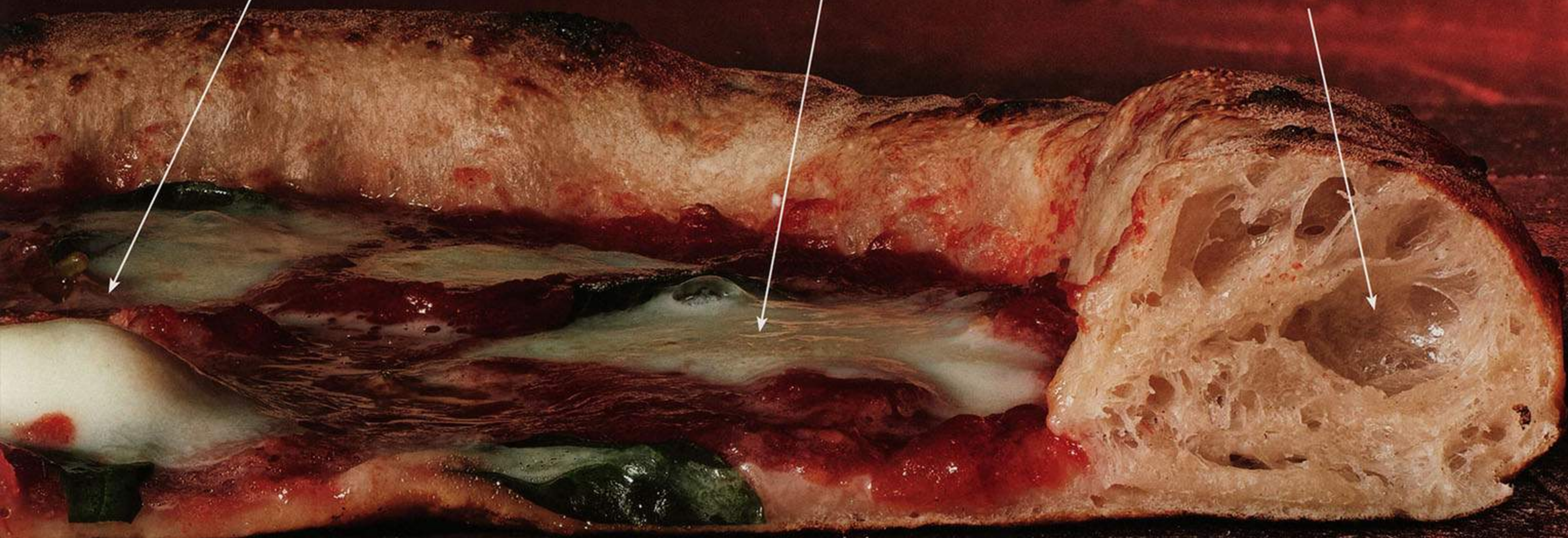
When you open the door of your oven at home, cold air rushes in and the temperature of the oven drops dramatically. If you've seen a wood-fired or gas-fired pizza oven in an open kitchen of a pizzeria, however, you'll notice that the door of the oven is *always* open. The cold air doesn't affect the pizzas because they are baked by the heat radiating from the ceiling and from the radiant heat and conduction from the oven floor. That cold air is drawn in to supply oxygen to the wood or gas flame.

The center of the pizza does not rise because it is chilled on top by the sauce and toppings (see page 369).

While mozzarella absorbs some light in the oven, it actually reflects more and becomes whiter as it bakes (see page 373; low-moisture mozzarella has more of a tendency to brown than fresh mozzarella).

The glow of the fire burning inside a wood-fired pizza oven is a welcoming sight to customers in many pizzerias, but the flame doesn't actually contribute that much to the baking of the pizza (see page 354).

The rim is inflated by steam, which expands the existing bubbles.



The temperature of the pizza dough quickly jumps to 100°C / 212°F as the water in the dough begins to boil. It cannot rise above that temperature so long as there is water close to the point where the dough is being heated. As the moisture evaporates and the crust forms, the temperatures climb even higher (see page 2:392). Even in a Neapolitan pizza, which is baked at high temperatures, you will find islands of charred crust separated by white areas of the crust that never got above 100°C / 212°F.



Pizzas are baked almost exclusively by infrared radiation in a wood-fired or gas-fired pizza oven, although the embers from the fire in a wood-fired pizza oven do contribute some heat. The infrared radiation is very uneven, however (and more so in a wood-fired pizza oven; see page 354).

THE PHYSICS OF DOUGH AND SAUCE

Before you make a substantial investment in a specific oven, you should know something about how a hot oven turns dough into pizza. You may not think of this process as physics, but it is. And the physics of pizza making work differently than many people think. For example, did you know that convection is the dominant mode of heat transfer within the bubbles of leavened doughs, regardless of whether the oven has a fan? Or that the temperature you set on the oven controls is not even close to the temperature that the pizza experiences?

The physics of baking play out a little differently in a convection oven than they do in a conventional, or still, oven. Let's first follow a simple New York square pizza through the basic baking process. The first step, while your dough is proofing, is to turn on the oven to begin preheating—an important step (see *The Importance of Preheating*, page 392). Keep in mind that similar processes are occurring in thin-crust and medium-crust pizzas but primarily in the rim; the sauce and cheese in the center of the pizza are interacting with the dough in a different way than with parbaked pizzas (see page 2:419).

DOUGH IS A HEAT PIPE

When you first put a loaf of bread in the oven, the carbon dioxide, alcohol, water vapor, and air that have built up during proofing all expand thermally as the temperature goes up, to create what is called oven spring. It can add substantially to the volume of the bread during the initial stages of baking. The amount of volume increase depends to a great extent on how effectively the dough can retain the gas inside the crust.

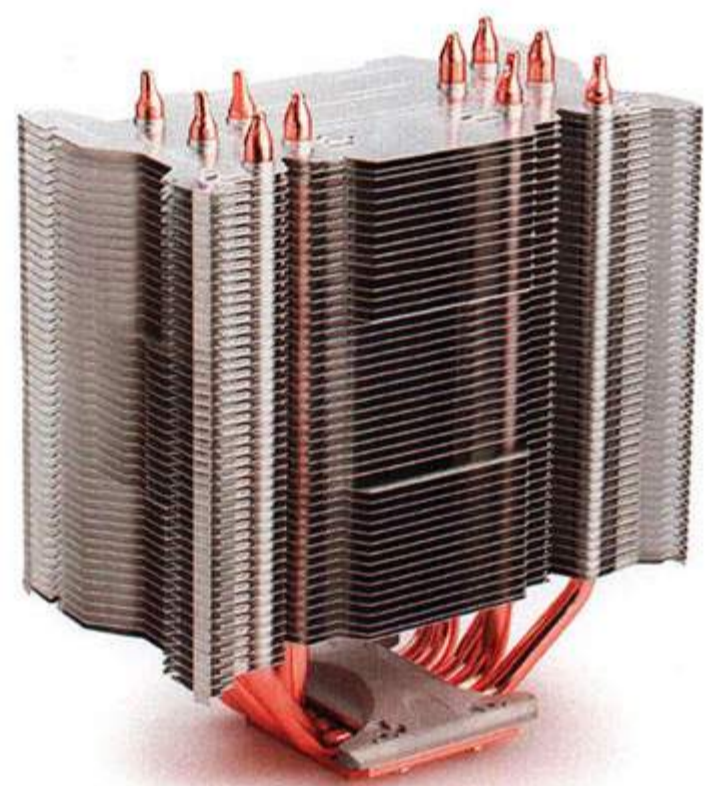
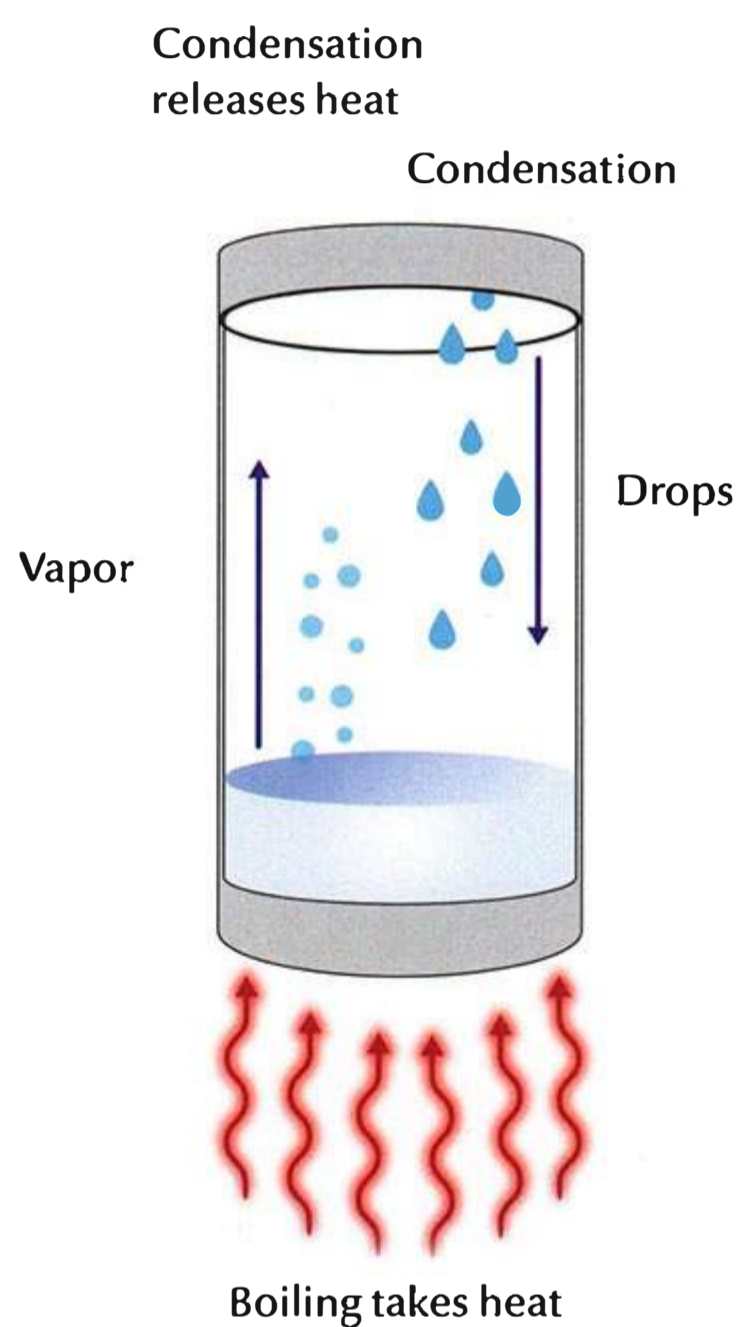
Pizza also experiences oven spring when you first put it in the oven but that is overwhelmingly due to steam rather than the combination of steam and CO_2 . A thin-crust pizza has a degree of oven spring that is enormous compared to bread; you don't get that with bread because you typically don't bake at the higher temperatures at which you bake pizza. For example, an unbaked Neapolitan pizza has a 2.5 cm / 1 in wide rim that is 5 mm / 0.2 in thick and, by the time that you are done baking it, the rim is easily 2.5 cm / 1 in tall. A loaf of sourdough doesn't expand nearly as much, proportionally, during baking. We want to stress that these higher temperatures are used only for thin-crust and some medium-crust pizzas. For bread-like pizza, the baking temperatures are generally lower and the amount of oven spring is similar to that in a loaf of bread.

Oven spring comes to a halt when dough starts to lose most of its stretchiness. Between 60°C and 80°C / 140°F and 176°F, granules of starch in the dough gelatinize, and proteins unravel and coagulate. These and other chemical changes produce the soft yet solid interior crumb of the crust.

The transition from dough to crumb happens from the outside in, of course, as heat makes its way toward the interior. And how exactly does all this heat move through the dough? Surprisingly, food scientists believe that about three-quarters of the energy makes its way toward the center via convection rather than conduction. It moves much faster than heat flows through copper or other highly conductive metals. That phenomenon is responsible for both channeling heat through the dough and inflating it. Physicists refer to the specific mechanism as the heat pipe effect.

Before the dough changes to crumb, the bubbles in it are separated from one another by thin walls of dough. Heat moving by conduction through the dough must thus follow a slow, circuitous route. But convection offers a much shorter and faster path. As the outer edge of a bubble warms up, the heat evaporates water from it, investing the resulting water vapor with thousands of joules of latent heat energy (see page 350). The vapor quickly diffuses through the bubble toward the cooler center of the dough. When the vapor hits the far side of the bubble, it condenses back into liquid—and this tiny droplet of dew releases into the dough all the latent heat that went into evaporating it a moment earlier. The heat passes by conduction through only a thin membrane to reach the next bubble, where the process can start all over again.

The speedup in heat transfer that internal convection offers is substantial in the early stages of baking, but it really gets cranking once temperatures move above about 70°C / 158°F and the dough becomes crumb and sets into crust. Now, rather than inflating, the bubbles are locked in position. Evaporation and thermal expansion of the gas inside them continue, however, so the interior pressure builds until at last those thin separating membranes burst, interconnecting adjacent bubbles by passageways. Hot vapor, air, and carbon dioxide shoot through these pores, carrying both heat and water rapidly into the interior of the pizza crust. The temperature at the thermal center of the crust skyrockets. The bigger the bubbles in the dough, the faster heat moves toward the center.



This copper computer condenser is powered through the same heat-pipe effect that we see in baking dough but the heat moves through it (and releases energy after condensing) in a much slower manner than in dough.

THE HEAT PIPE EFFECT

Dough rises dramatically in the first several minutes after it enters the oven through a process called oven spring, as heat turns water into steam and causes it and some carbon dioxide to expand. The balloon-like bubbles inside the crumb burst and turn into what are essentially a few huge interconnected bubbles. The crumb changes from a foam to a set

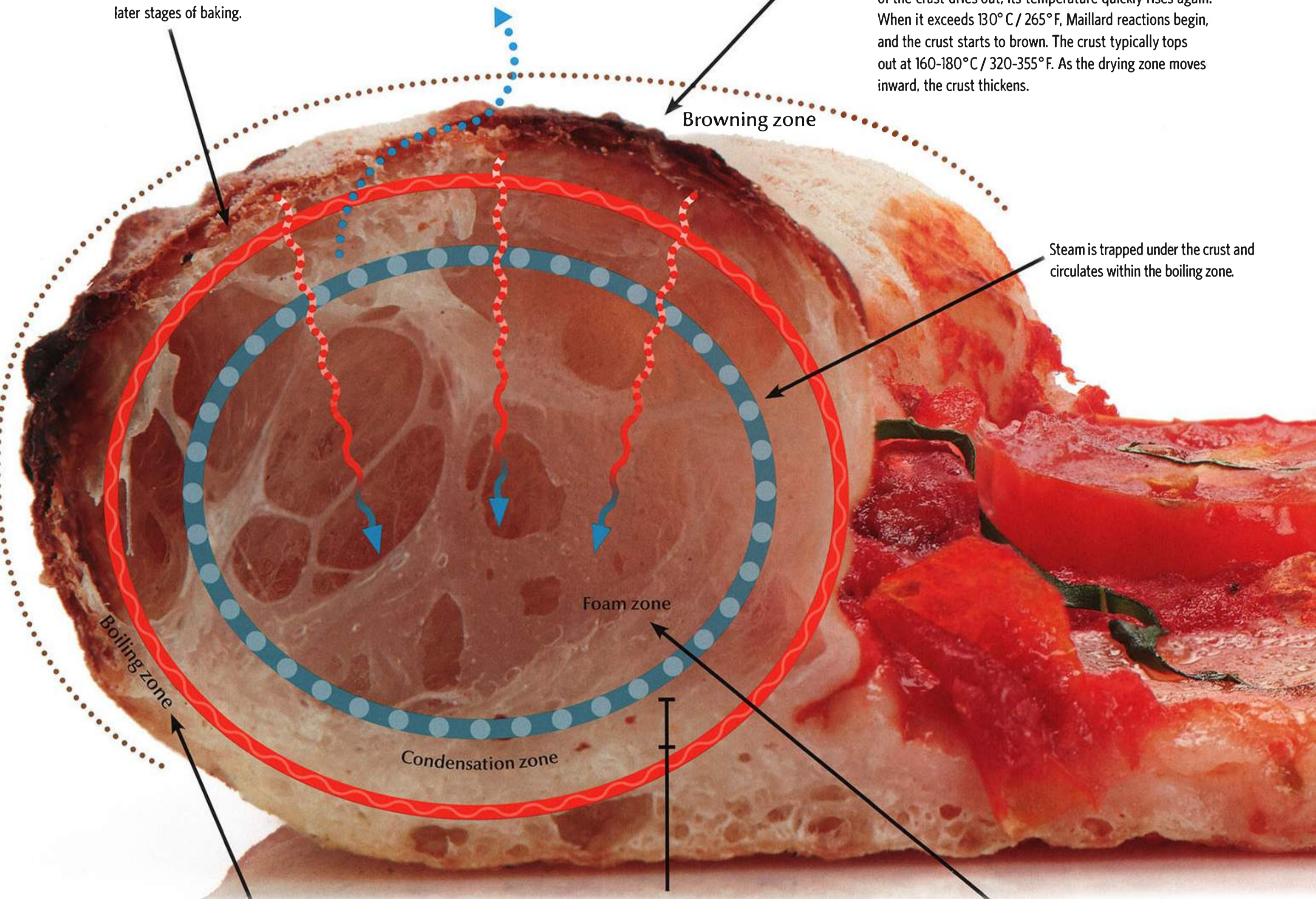
gel when the temperature rises above 70°C / 158°F . The boiling zone advances toward the center of the crust as the foam zone retreats (see below). As the crust temperature eventually rises above 130°C / 265°F , Maillard reactions spur browning and flavor development in the crust.

The impermeable crust traps steam inside the crumb, creating a pressure chamber that keeps the steam and carbon dioxide bubbles inflated until the starch and proteins are set in the later stages of baking.

Steam escapes through fissures in the crust. It's hard for steam to escape through the bottom of the pizza, especially in pan-baked pizzas.

The browning zone occurs at temperatures greater than 100°C / 212°F . While the surface of the dough remains wet, it cannot get any hotter than the boiling point of water; virtually all the incoming heat goes into transforming that water to steam. But as soon as the surface of the crust dries out, its temperature quickly rises again. When it exceeds 130°C / 265°F , Maillard reactions begin, and the crust starts to brown. The crust typically tops out at $160\text{--}180^{\circ}\text{C}$ / $320\text{--}355^{\circ}\text{F}$. As the drying zone moves inward, the crust thickens.

Steam is trapped under the crust and circulates within the boiling zone.



The movement of hot air, water vapor, and liquid water transmits heat via convection. Convection is the most important mode of heat transfer within the pizza, but natural convection plays a relatively minor role in heating the surface of the dough. The internal convection is most prevalent in the boiling zone, where wet dough transitions to drier crumb (see diagram on page 364).

In the condensation zone, the energy released when steam condenses into liquid helps heat up the raw dough. Bubbles burst and then connect to each other, propagating the heat pipe as it continues inward.

In the foam zone, intact carbon dioxide bubbles in the closed-cell foam begin to burst and interconnect into a set open-cell foam when this zone comes into contact with the boiling zone.

For more on transitioning between different phase changes of water, see *The Enormous Amount of Energy It Takes to Boil Water*, page 350.

In the final stage of baking, temperatures throughout the crumb converge at the boiling point of water. As the gradient of temperature and vapor pressure within the dough weakens, the inward flow of water comes to a halt. The crust is now fully baked, and the water content at its core is actually a little higher than it was when the dough was raw. The excess water reverses direction and starts to diffuse outward, toward the crust.

The moment the pizza emerges from the oven, steam from the interior starts to condense on the crust as it hits the relatively cool air of the kitchen.

After cooling, the water content equilibrates so that it is more or less uniform throughout the crust. Blowing air over a parbaked pizza, like our New York square pizza, cools it more quickly by sweeping away the humid air that otherwise blankets the warm pizza, thus allowing the crust to dry more quickly and thoroughly. The moving air also cools the surface rapidly by both convection and evaporation, and as the exterior cools, the condensation zone moves inward into the crumb, minimizing the moisture deposited into the crust from below.

A CLOSER LOOK AT THE CRUST

When the water in the dough reaches 100°C / 212°F, steam starts to blow out of the fissures, large and small, that have formed in the crust. When the crust dries out and reaches 175–205°C / 350–400°F, it creates the browning zone where the Maillard reactions take place. Many modes of heat transfer are at work in the outermost edge of a pizza crust as it bakes in the oven.

A boundary layer of steam blanketing the exterior elevates the wet-bulb temperature (see next page) experienced by the crust. Water vapor leaves the pizza through fissures in the crust, like lava out of tiny volcanoes.

The crust thickens as infrared radiation passes through the boundary layer largely unhindered, heating, drying, and darkening the pizza crust's surface.

Desiccation and boiling zones form beneath the crust and allow heat to move inward via both convection of water vapor and direct conduction.

About three-quarters of the heat makes its way to the crust's center through convection. Before the dough becomes crumb, heat moves inward mainly by conduction and, to a lesser extent, by the migration of water.

Almost every one of the bubbles in this piece of fully baked pizza is punctured by a hole. This is because the pressure of the gas inside the bubble overwhelms the strength of the bubble walls, which also lose their elasticity as they bake. The holes open up, connecting bubbles to their neighbors.



BRINGING THE DOUGH TO A BOIL

Once preheating is complete, the air and walls of the oven are stable at the temperature you set on the controls—temperatures can range from 175–480°C / 350–900°F, depending on the style of pizza and type of oven. If you peek into the interior and look at the oven’s temperature sensor, you’ll notice that it is dry. The temperature the oven is going to strive to maintain is called the dry-bulb temperature.

The dough you are putting in, in contrast, consists of 50%–80% water. So, like any wet food, it actually experiences the wet-bulb temperature, which is cooler than the dry-bulb temperature—often a lot cooler. The interaction of the heat of the oven and the water in the dough determines to a great extent what happens next.

The heat that moves into the dough through its surface—what scientists call the heat flux—arrives in three distinct ways. First, direct contact with the hot air of the oven, a hot pan, or the oven hearth transmits heat by conduction. In a home oven filled with relatively dry air, conduction delivers a large share of the heat flux. Second, infrared rays stream off the oven walls and heating elements, injecting heat into the dough by radiation. Third, warm air rises and flows over the dough, pushing heat in via natural convection. If the air in the oven contains enough humidity and the surface temperature of the dough is colder than the dew point, then steam condensation dumps an enormous amount of latent heat onto the dough as the water changes from vapor to liquid. What may look like beads of sweat on the dough are actually dewdrops. As the heat pours in, the dough starts to warm.

Dough is full of water and water is evaporating off the dough from the moment it enters the oven. Every gram of water leaving the surface of the crust takes a couple of thousand joules of heat with it. Just as evaporating sweat cools your skin on a hot summer’s day, the water vaporizing from the surface of the crust staves off some of the heat of the oven. This is why the wet-bulb temperature is lower than the temperature read by a dry thermometer.

A fraction of the water vapor escapes through the oven vent, but much of it hangs around inside the chamber. The humidity in the oven begins to rise, but at the temperatures that certain pizza ovens are operating (often 425–480°C / 800–900°F), the humidity isn’t as important as it is in other baking applications because the temperatures are well above the boiling point of water. Keep in mind, though, that the higher the relative humidity, the slower the water evaporates from the dough.

As the temperature of the dough continues to climb toward the boiling point of water, a funny thing happens. The temperature starts to level off. The oven thermostat is steady, but remember: that’s the dry-bulb temperature, which doesn’t take evaporation into account. At this point, nearly all the heat absorbed by the dough either passes by conduction into the dough’s interior or gets put to work boiling water at or near its surface. With so much heat going into boiling rather than warming the exterior surface of the dough, the temperature there lags briefly in its upward climb. Baking has entered a new phase: crust formation. In this instance, when we say “crust” we are talking about the outer layer of the dough, not the foundation of the pizza that the sauce, cheese, and toppings sit on.

DRYING THE CRUST

A crust starts to form on a pizza as the exterior dries out where the dough is not covered in sauce. With all that heat working to boil away the surface moisture, this doesn’t take terribly long in a hot oven. Once the water in the outermost layer starts to boil, it takes only a short time to evaporate nearly all of it. The exact duration depends on the moisture content of the dough, the heating power of the oven, the relative humidity, and other factors. The temperature of the dough’s exterior then resumes its ascent, although not quite as rapidly as before because the thermal conductivity drops as dough turns to crust.

When the surface temperature exceeds roughly 130°C / 265°F, Maillard reactions start to occur rapidly. Sugars react chemically with amino acids and other protein fragments to produce brown pigments, complex flavor compounds, and a stiff, brittle surface—all crucial elements in a good crust.

You may have noticed that dry flour stuck to the outside of a pizza crust doesn’t brown nearly as much as the dough does, if it browns at all. That is because water activates enzymes in the flour that break down starch into sugars that more readily participate in Maillard reactions. The enzymes are still dormant in dry flour, allowing the flour to brown at only much higher temperatures.

The Maillard reactions accelerate as the temperature of the crust continues to rise. The color deepens, and that darkening in turn increases the rate at which the pizza absorbs radiant heat emitted from the oven walls, ceiling, and floor. So the darker the pizza gets, the faster it darkens.

The formation of the crust usually roughens the surface of the pizza. Air currents sliding past the pizza drag on the rough parts and slow down. The deceleration can be so pronounced that small, thin



NEAPOLITAN PIZZA'S SIGNATURE LEOPARDING

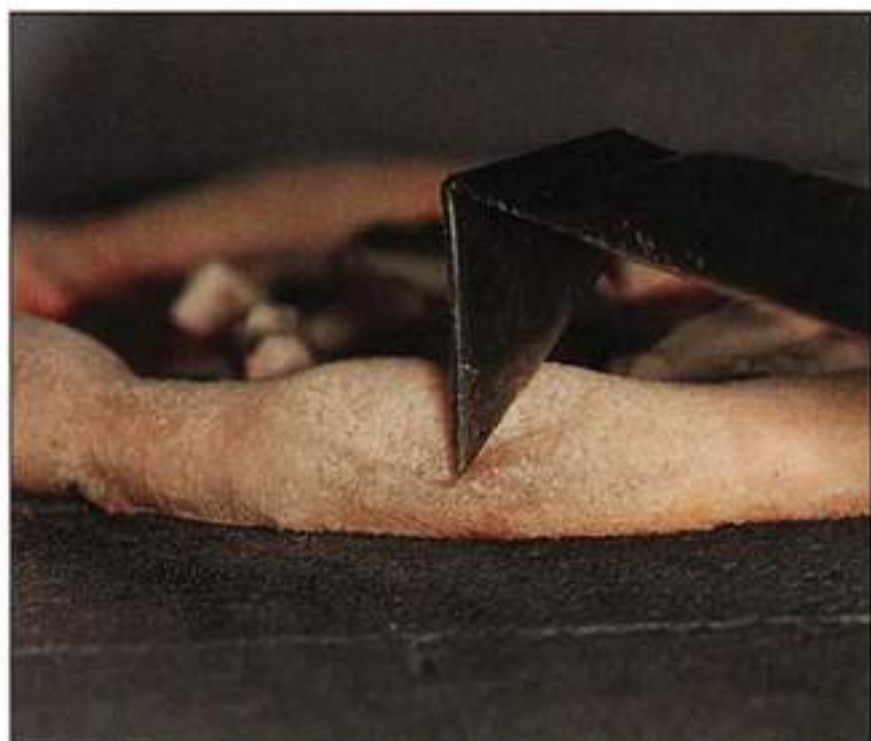
If you've ever taken a close look at a loaf of sourdough bread, you may have noticed small blisters on the crust. Blisters show up in the form of little white spots on doughs that have fermented for long periods (typically in cold-proofed doughs) and doughs that have been frozen and then thawed. Although these blisters are present in raw doughs (but are hard to see), they don't become visible until a loaf is baked. Some bakers and scientists believe that blistering compromises the bread's quality, but blisters don't change the taste. They do, however, make a loaf look different from one proofed for a shorter period.

Leoparding, one of the hallmarks of properly baked Neapolitan pizza, is closely related to blistering. Leoparding is typically caused by dough browning in places that dry out a little faster than the rest. When the baking starts, usually at temperatures around 425–480°C / 800–900°F, the crust absorbs infrared radiation and starts evaporating steam. While the steam is evaporating, water migrates from the center of the crust to the outside and the crust dries.

The big difference, though, is that this effect is increased at higher temperatures, when baking happens more unevenly. Part of the insight that toast gives us is that the rate at which a dark spot cooks can be many times higher than the rate at which a blond spot cooks (see page 354). As soon as you get any unevenness in the browning of the crust, the dark spots will become exaggerated.

One of the most common ways that this occurs is if you have a big bubble. It becomes inflated with steam and grows larger. The issue is that the top of the bubble expands farther away from the moist dough of the crust. As a result, it will dry out and then turn black. There is no good way to compromise in this situation. You either have to pop the bubble as soon as it forms or resign yourself to eating pizza with burnt spots.

So you'll get some places where the crust is fairly pale while other spots are charred nearly black. Leoparding, which is a desirable feature in Neapolitan pizza, occurs because you have a very hot oven, and the degree of the leoparding will tell you how relatively hot the oven is. You will also see micro bubbles alongside the leoparding that are akin to the blisters that you see on bread.



Once a large bubble starts to form in the oven, use a dough bubble poker (see page 2:13) to pop it.



If you don't pop the bubble in the oven, it could blacken and be unpleasant to eat.



The super-thin membrane, or airy interior wall, shown here illustrates why bubbles burn so quickly in super-hot ovens.



The bubbles that protrude from the surface of the dough are more exposed to the heat and start to brown.



Baking is complete; most of the bubbles have browned and produced the leopardied look.

bands of stagnant air and steam actually pool over parts of the pizza, forming a boundary layer. This layer acts like a wet blanket: it makes it harder for heat to get into the crust and harder for water vapor to get out. The moderating influence of the boundary layer can actually be a good thing for some kinds of pizza. Forced convection (see page 349) can thin or disrupt the boundary layer.

As baking continues, more and more of the exterior loses its water to evaporation, so the crust thickens. Although most of the water vapor produced from the crust escapes to the oven, some of it moves inward, carrying both heat and moisture toward the center of the pizza base. This convective heat flow adds to direct conduction in warming the outer crust and converting dough to crumb.

WHAT HAPPENS WHEN SAUCE BAKES

In addition to all of the chemical reactions previously discussed for dough, the sauce also goes through a series of changes while it is in the oven, the most important of which being evaporation. But what does this technically mean? Scientifically speaking, evaporation is a type of vaporization that occurs on the surface of a liquid while it changes its phase to gas. It can happen only if the surrounding gas is not already saturated with the evaporating substance. In other words, the humidity in the oven must be lower than 100% to allow for sauce evaporation.

For molecules of liquid to evaporate, they must be located near the surface and have sufficient kinetic energy to overcome liquid-phase intermolecular

forces. At room temperature, only a small portion of the water molecules in sauce meet these criteria, and the rate of evaporation is low. Since the kinetic energy of a molecule is proportional to its temperature, evaporation speeds up as temperature increases.

Besides temperature and humidity, the other factors influencing evaporation are pressure (which explains why liquids boil at a lower temperature at higher altitudes), the flow rate of air (evaporation will happen faster in a convection oven because of the continuous airflow), and the surface area of the sauce (larger surface areas offer more opportunities for water molecules to escape).

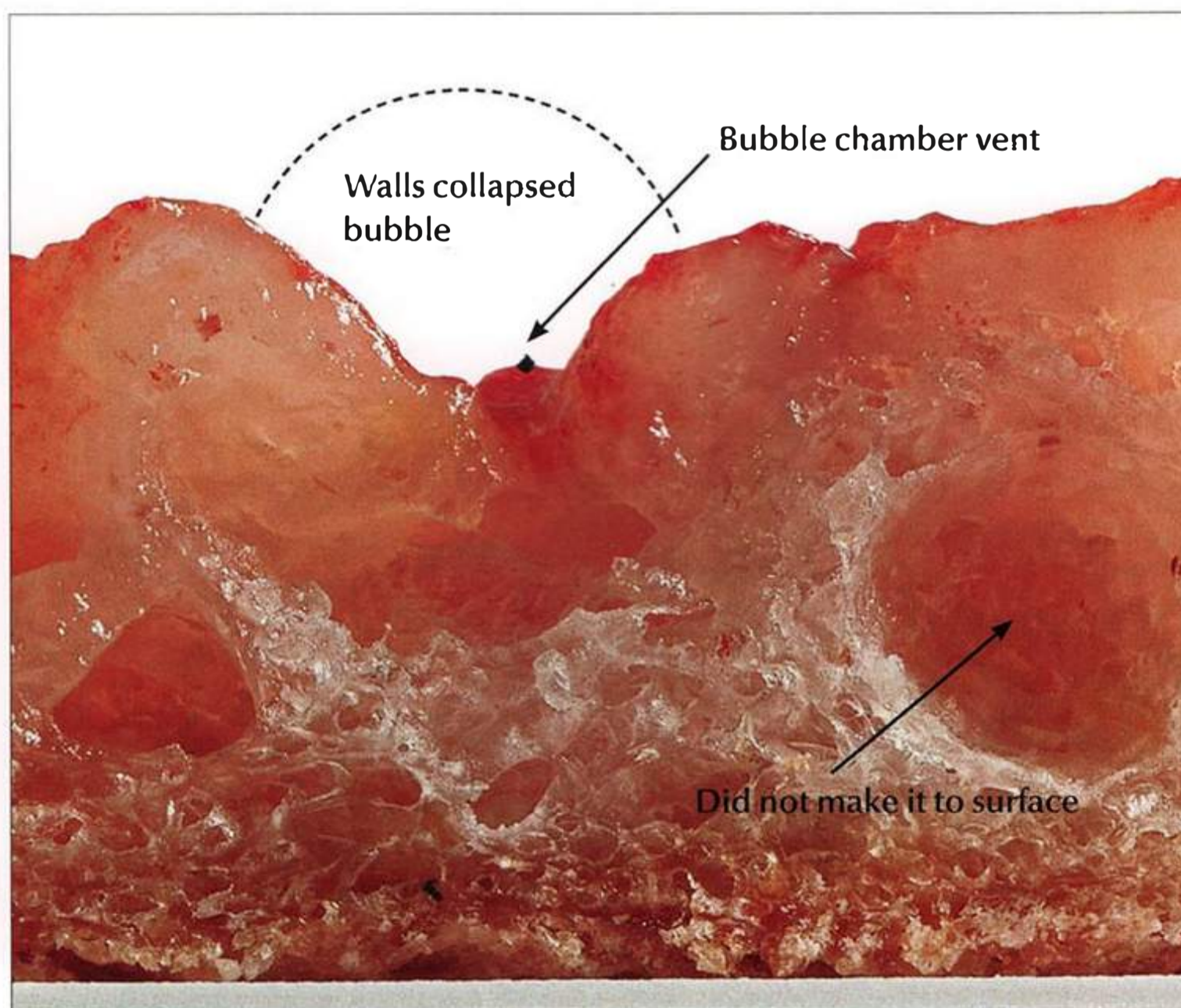
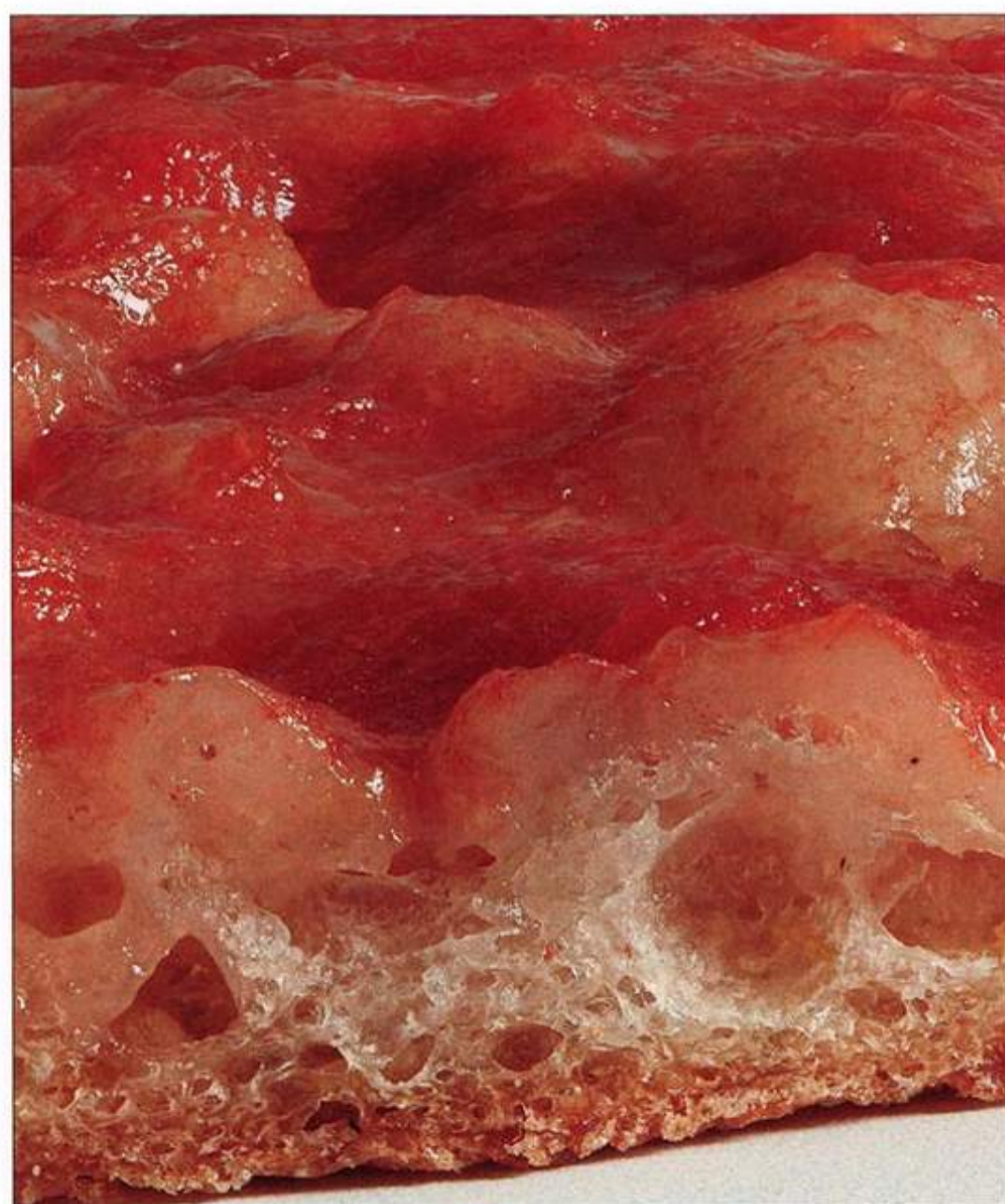
The most common pizza sauce is some form of cooked tomato, be it pureed, milled, shredded, or chunked and cooked tomato. (As far as we're concerned, raw tomato is a topping, not a sauce.) The main thing that happens in the oven is that the tomato sauce heats up, boils, and evaporates and then becomes a higher viscosity because the water has reduced and you're left with a higher percentage of tomato solids. Tomato paste is a good example of this since it is basically just a concentrated form of tomato sauce.

But there are also other types of sauces used on pizzas that have a protein that coagulates and thickens them, like the eggs in a hollandaise. Those proteins will cross-link and set with heat, and those sauces act pretty differently than tomato sauce in the oven. Another type of sauce could have something in it that melts, like cheese, which could alter how the sauce interacts with the other ingredients on the pizza.

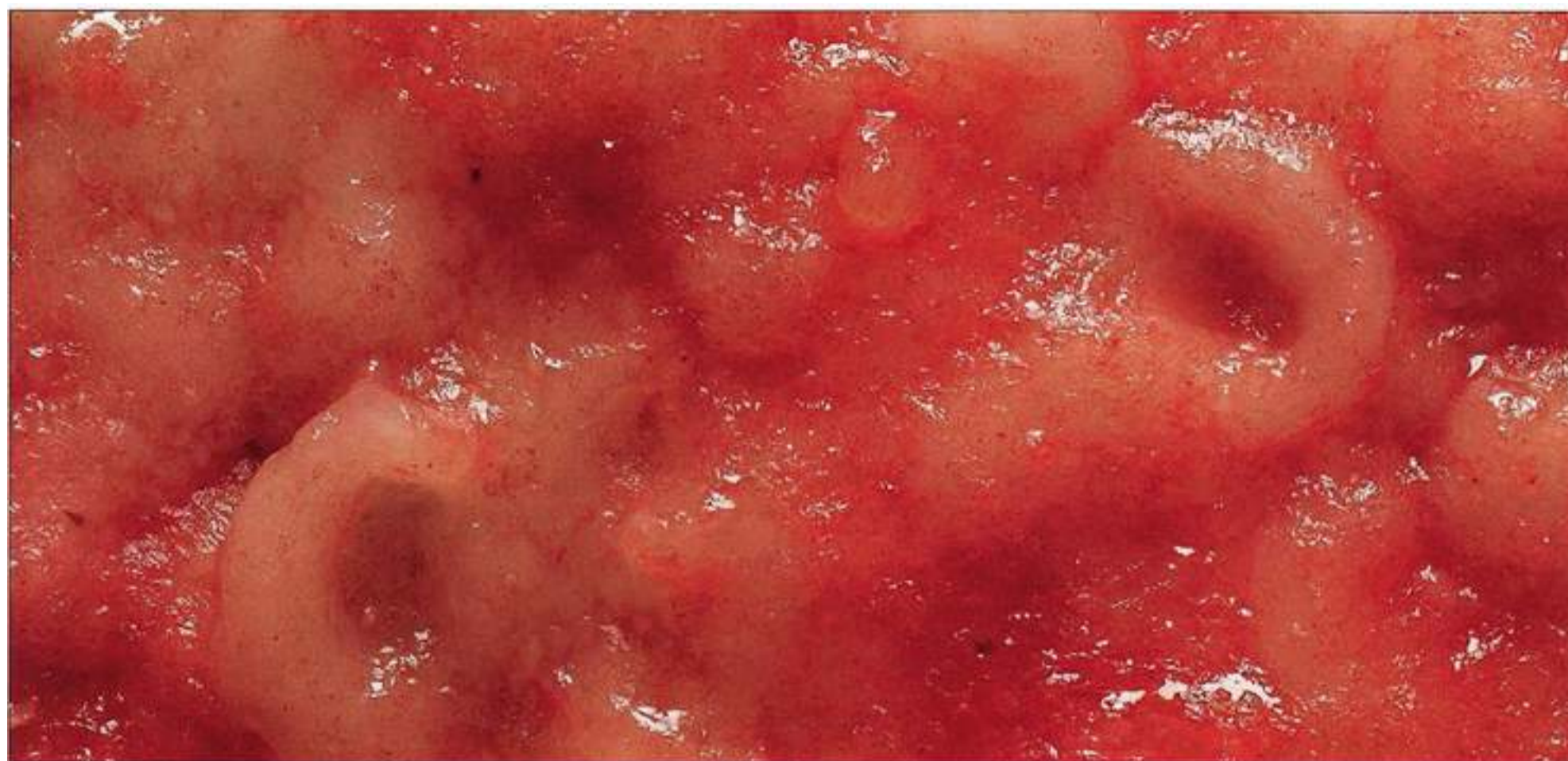
For more on the many types of pizza sauce, see the Sauce chapter starting on page 2:203.

Water doesn't transfer heat very well by itself. Imagine how a wet suit works. It traps a layer of water near your body. As long as the water is trapped, it insulates you well. When it moves, that's when you get cold. In a sense, this is what a sweater or down jacket does also—if the air trapped inside escapes, you will lose heat and become cold.

The water trapped in the dough will bubble up through the sauce and create miniature dough "volcanoes" through which the steam escapes once it comes to a boil. Some of the bubble walls will collapse as the steam escapes while some bubbles will remain trapped beneath the surface of the dough.



When you peel back the cheese and sauce layer from a slice of baked pizza, you'll often see a gum line (see page 370). In this case, we observed a pattern of popped bubbles, presumably from the carbon dioxide and water vapor escaping during baking.



The issue with baking sauce on pizza is that cooking sauce is familiar in many ways, with one notable exception. Normally when we are cooking a sauce or a soup, we're cooking it on a stove top and the heat source is below it. This causes convection heat to rise up, which stirs the sauce. When we bake a pizza, we are cooking the liquid from above, primarily with infrared heat. Essentially, we are broiling it.

As the top layer absorbs the heat, it becomes lighter and more buoyant, so it doesn't move and transfer the heat through convection to the sauce below. This means the top heat is not going to get all the way down to the bottom of the sauce, and the temperature of the sauce that sits next to the dough will be significantly cooler. Eventually the sauce becomes hot enough that it boils and steam will come off, but the heat that transfers down has to go by conduction rather than convection, which is much slower.

In the oven, evaporation can significantly reduce the sauce's moisture content. The tomato sauce that we typically spread on pizza, while initially fluid and typically brightly red, becomes denser and darker during baking. The initial sauce consistency will influence the eating qualities of the final pizza. Additionally, nearly every pizza style has its own characteristic sauce with a well-defined texture (see page 2:225). A traditionally soupy Neapolitan-style marinara sauce, for example, is very different in consistency from the dense, almost tomato paste-like al taglio pizza tomato sauce. The thinner Neapolitan tomato sauce has enough moisture in it to withstand the scorching hot temperatures in a wood-fired or gas-fired pizza oven and evaporate at the appropriate rate. If you used the thicker sauce, it would burn. Simply put, they are not interchangeable.

While you can count on your sauce evaporating somewhat during baking, the thickness of the sauce

layer is material in figuring out how much evaporation occurs and whether you need to adjust the thickness of your sauce. Furthermore, if you bought a can or jar of ready-made sauce and you've never used it on a pizza before, would there be a way to test it without wasting time and ingredients assembling and baking a pizza? The answer is yes, and the method is quite easy. Simply bake the desired amount of sauce in a pan that is the same dimensions as your pizza, and the result allows you to see how much evaporation will occur when you bake it on pizza so that you can plan for next time.

If you are unsure whether your sauce has the right consistency to deliver a gratifying pizza, this simple test can help you assess it after it is baked so that you can decide if it needs to be thickened or diluted. This test can be used on any store-bought tomato sauce or any nontraditional sauce that you are thinking about putting on your pizza. Depending on the outcome, you may consider thinning your sauce using water, milk, or cream; thickening it with xanthan gum or a starch; or straining it. The latter will deliver a more refined, silky-smooth texture. We also offer practical methods for adjusting the consistency of your sauce in our Sauce chapter on page 2:203.

There are techniques that you can try to evenly evaporate the sauce in the oven, like doming the pizza or putting it near the mouth of the oven (see page 2:405), but if the sauce has too much water in it, there will be water left in the end. There's always a limiting factor of how long you can keep the pizza in the oven and heat is the main one. The higher the temperature of the oven, the more you need to worry about wateriness in your baked sauce. While some consider soupiness to be an authentic characteristic of Neapolitan pizza, we find soupiness in any style of pizza to be a flaw (see page 2:8).

WHY IS PIZZA CRUST LOW AND FLAT IN THE CENTER?

When we asked various pizzaioli during our travels, many people thought they had a simple answer to this question. The first theory is that the crust is thinner in the center because the pizza maker shapes it thinner there. While this is true to some degree, there are many pizzas that aren't thinner in the middle. In fact, most Neapolitan pizzas don't have an obvious difference in height between the center and the rim before the pizza is topped. The next theory is that the weight of the sauce in the center holds down the dough. This is consistent with another practice in the kitchen, which is using pie weights for pie dough. But again, this is not the reason.

Our various tests led us down a long path before we finally found the answer. We baked pizza dough with and without sauce to establish a baseline for what happens in a typical pizza (see photos below). The combination of heat escaping from the surface of the dough and the lack of moisture on the pizza without sauce led to a doming of the center of the pizza. We were curious if moisture was really what made the key difference, so we tested a number of inert dry and wet materials to see what happened.

We started with the dry materials. We performed a series of tests with aluminum foil, black foil, aquarium sand, and an aluminum plate that covered the same surface area as the sauce in the center of the dough. The aluminum foil and plate both produced a mirror effect in the oven, reflecting the heat away from the dough and preventing it from rising.

The black foil and sand, however, achieved the opposite effect. The black foil contributed to the heat distribution in the dough, providing a higher volume than the control pizza that didn't have any material on top. And while many people tend to believe that the weight of the toppings keeps the center from rising, our experiment with sand proves this wrong. The pizza topped with sand equal to the weight of the sauce still had a significant rise. We attribute this to the lack of moisture on the top of the dough. As a matter of fact, as long as the relative humidity of the oven is lower than 100%, there will be evaporation from the sauce, which will create a heat sink that prevents the dough from rising. To test this hypothesis further, we repeated the experiment with ice and a wet towel (both at the equivalent weight of the sauce). With both materials, we witnessed results consistent with our sauce experiment.

The real answer is more complicated and it illustrates an important aspect of baking pizza. The key is latent heat of vaporization of water. Sauce is wet—it's full of water—and when it starts to boil, the evaporation of the additional moisture from the toppings steals heat (a huge amount of it) during baking, and then there is not enough heat available to dry the dough. Consequently, the center will not rise. We can conclude that the effect of putting sauce on a pizza in correlation with the rise of the center of the dough is a response to the moisture content of the toppings and the conduction of heat in the dough during baking. It's the heat absorbed by the sauce that is the key; the weight of the toppings doesn't matter.



Pizza baked with sauce



Pizza baked with nothing on top

THE EFFECT OF SAUCE REFLECTIVITY ON PIZZA

We saw what happened to dough when we baked it using a shiny material as opposed to a dark surface (see page 353). This got us to wondering whether the color of the sauce would have any effect on how the dough baked. Heat and light are both different types of energy, and light energy can be converted into heat. A black object absorbs all wavelengths of light and converts them into heat, so the object gets warm. A white object reflects light wavelengths, so the light is not converted into heat and the temperature of the object does not increase as noticeably.

We chose our New York pizza for this experiment because it is typically baked in a pizza deck oven that relies on radiant heat. Radiative heat transfer involves a source of electromagnetic radiation that beams energy to food. Different types of food have their own way of interacting

with this radiation (known as absorbance). The food can reflect the radiation or let it pass through.

In this experiment, we made a béchamel sauce that was colored half black and half white and baked the sauces side by side on our New York pizza dough. We observed radiant heat being absorbed on the black half of the pizza, which baked faster, and mainly reflected on the white side of the pizza. As expected, the volume of the black half was almost twice as high as the white half. Taking this into consideration can help when you make a pizza: if you are baking a darker sauce with the same consistency as a lighter sauce, your baking time will need to adjust from one pizza to the next.

At right you can see the white béchamel side of the pizza contrasted with the black béchamel side of the pizza. The cross-section of the pizza illustrates how much more volume the black side gained while baking, which was the result of it absorbing more radiant heat.



THE GEL LAYER PROBLEM



If you lift up the cheese on many deep-dish slices in Chicago, you'll find a gummy gel layer where the sauce meets the dough. We offer a method on page 3:88 for prebaking the deep-dish pizza shell to help minimize the gum line.

For more on Chicago deep-dish pizza, see page 62.

Believe it or not, that white stuff is the gel layer, not cheese. This pizza is a marinara, so there is no cheese on it.

Examine a slice of pizza from the side. In between the crust and the sauce, you may notice a white, doughy, and gummy line—what we refer to as the gum line or gel layer. To better observe it, pull back your sauce, cheese, and toppings. What you typically see is undercooked starch gel.

When you bake a pizza on the oven floor, the heat conducts from the bottom of the pizza, and the steam generated in the dough rises upward through the crust. If there is sauce on the dough, it presents a cool surface where the steam can condense. Since very little heat is able to get through from the top, the temperature of the sauce next to the dough will remain relatively cold for most of the baking time. This explains why the last thing to cook will be that top layer of dough that is in contact with the sauce. When you remove the pizza from the oven, the tiny bubbles at the interface between the sauce and the dough will collapse and you will be left with a translucent layer of dough that was only partially cooked (see page 367).

When the gel layer is thin, it may not be discernible in the overall mouthfeel of the pizza. When it is thicker, you may erroneously think that the gooeyness is due to cheese or some other topping. We can assure you it's not. This is a layer of uncooked dough, and it is not very appetizing. This is why we view the gel layer as a fundamental flaw in pizza making. Unquestionably, when the dough is fully cooked, it will have a better texture and taste than when it is not.

We decided to dig deeper into the nature of this problem to identify ways to mitigate it. We measured the extent of the gel layer in a methodical experiment with 120 pizzas, covering nearly every possible iteration of dough thickness, baking temperature, and topping scenarios. The one notable conclusion to come out of these experiments is that the only way to completely counteract the gel layer is to prebake your dough (see page 2:419). As a matter of fact, by design, New York square or al taglio pizzas that are prebaked are not prone to this problem. If



you don't prebake these bread-like pizzas, however, they can be some of the worst offenders.

Similarly, the gel layer can be a problem for almost any kind of pizza where you bake sauce on top of raw dough, although it is most apparent in thicker, bread-like doughs. A good example is the stuffed Chicago-style double-crust pizza. It features a top crust and is assembled like a double-crust pie. Unfortunately, the top crust is completely covered in a layer of sauce, so there's no possible way for it to ever cook properly. As a result, you get one large stretchy, gooey, sheet of uncooked dough. Note that in our own recipe for Chicago Double-Crust Pizza on page 3:105, we were able to fix that problem by placing the sauce under the top crust and then scoring the dough.

What is to be done if you are working with pizza styles that are not typically prebaked? We propose

three ways for controlling the gel layer. First, you can reverse the typical order of the sauce and cheese. Applying cheese on the dough first and saucing the pizza afterwards will produce a much smaller gel layer than placing the sauce on the dough first (with or without adding the cheese). Second, controlling the topping amounts can also help: the larger the load of toppings, the harder it is to avoid the gel layer. We don't notice gel layer as much in our thin-crust or medium-crust pizzas either, because our recommendations for saucing, topping, and baking prevent this from happening. Finally, a dough press helps lessen the gel layer (see page 3:14). Although this shaping technique is not for every pizza style or pizzeria, it works well with thin-crust pizzas that are commercially made in large quantities.

These pizza slices, photographed during our travels, were among the biggest culprits when it came to a gel layer. The selection below includes New York square and deep-dish slices, both of which are prone to a gel layer if they aren't prebaked (see page 2:419).



THE PIZZAIOLO EQUATION

Dough + Sauce + Cheese + Toppings = Pizza

Pizzaioli have a lot to juggle on a day-to-day basis, from menu development to training their staff to monitoring the quality of the pizzas they serve their guests. On top of all of this is the balancing act that they have to perform every time they put a pizza in the oven. At a minimum, they have to contend with the different cooking rates of the dough, the sauce, and the cheese on a pizza. And that doesn't even take into account the different toppings that they are likely to include, which add another wrinkle to the already complex process of baking a pizza.

This overview of how a New York pizza bakes describes what happens to this style of pizza in a pizza deck oven. The physics of baking shift a little—and sometimes more than a little—when you bake this same style of pizza in a wood-fired pizza oven or a home oven. Let's consider each of these situations in turn. In a home oven, radiation and natural convection are the dominant modes of heat transfer to the dough. Natural convection plays a distinctly secondary role (see page 349) because heat conduction from the air is weak indeed, due to the pathetic thermal conductivity of air. By contrast, radiation rules in a wood-fired pizza oven, followed by the heat conduction through the bottom of the pizza crust since the dough sits directly on the oven floor.

Some other aspects make baking pizza difficult. Each of the different elements of pizza have a different reflectivity/emissivity—the dough, the cheese, the sauce. Consider the factors below when you are baking different styles of pizza.

The temperature is much cooler where the sauce meets the dough (see page 367).

Raw dough starts off white with an emissivity of roughly 0.1. This means that it reflects about 90% of the light and absorbs about 10%. As it bakes it gets darker and absorbs more light, and the emissivity can get closer to 0.9.

Unbaked tomato sauce starts off with an emissivity of roughly 0.5 but becomes darker as the water evaporates during baking, causing the emissivity to increase.

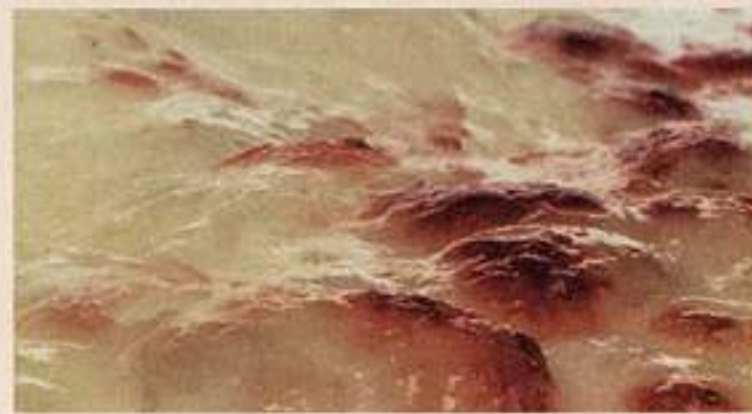
All matter with a temperature greater than absolute zero emits thermal radiation, which is produced by particle motion. The higher the temperature, the faster the motions. The thermal radiation can be determined using the Stefan-Boltzmann law, which specifically states that the total energy radiated per unit of surface area of a blackbody per unit of time is directly proportional to the fourth power of the blackbody's temperature. In other words, when we are baking Neapolitan pizza at 400°C / 750°F, the thermal radiation contribution is 16 times higher than if we reduce the baking temperature to 200°C / 390°F.

A white sauce has a different emissivity than a red sauce (around 0.1 for the former and 0.5 for the latter). This will drastically affect how the pizza heats (see page 367).

Cheese is an important topping from a thermodynamic perspective. It's white and it also becomes whiter as it cooks (see above, at right). It also takes a lot of energy to melt. Whatever the heat transfer is in sauce alone, it's even smaller underneath the cheese.



During baking, the cheese temperature initially increases to its melting temperature. It will remain constant at this temperature during the phase transition from solid to liquid, preventing the layer of underlying dough from cooking through for the duration of this process. As soon as all the cheese has fully melted, the heating of the cheese and the dough underneath will resume.



The reflectivity of mozzarella cheese changes in a surprising way when you bake it. While most things brown when you heat them, like toast (see page 354), mozzarella actually becomes whiter. It absorbs less heat and instead reflects it, so the amount of heat going into it changes by a factor of two.

Heat comes in through the bottom crust by conduction and warps the dough during baking because of the weight of the toppings. When it warps, you have areas that lose contact with the surface of the oven, making it bake unevenly. This would happen every time you cook in a pan on a stove top except that we usually put fat in the bottom of a pan, which promotes even heat transfer across a surface. But pizzaioli (other than in Tokyo, perhaps: see page 208) don't usually bake their pizzas on the oven floor with a ton of fat underneath.



Leoparding occurs because there are small bubbles (≤ 1 mm) just under the surface of the dough, which cause the pizza surface above them to dry out faster than the surrounding dough. That makes the spot above the bubble get darker. But the darker it gets, the faster it absorbs heat, so it becomes quite dark while the rest of the dough stays white, or gets only a little color. The emissivity of the spot eventually would become 0.9 when it is black.



If there are toppings other than cheese, they're usually not as important to the pizza baking process as the sauce and cheese. But if they're small, they can burn. For example, if you have black olives, you have to be really careful they don't burn because they are black and absorb a lot of heat.





SELECTING A PIZZA OVEN

The biggest difference between how a professional pizzaiolo makes pizza and how an amateur does it is the oven used. For most pizza makers, professional or not, the oven is the most important—and most expensive—piece of cooking equipment in the kitchen. Choosing an oven has serious implications for your pizza making because the capabilities of the oven determine to a great extent the kinds and quality of the pizzas you can bake in it. We give you our recommendations on page 380. Ovens that are flexible and perform well on a wide range of pizzas don't have to be tremendously expensive. Unfortunately, however, every oven is imperfect in some way. To master pizza making, you have to gain experience with the idiosyncrasies and limitations of your own oven.

By buying an advanced oven that matches your needs, you can avoid the most frustrating performance issues. The type of oven you want depends on the type of pizza you want to make. Broadly speaking, there are three kinds of ovens when classified by temperature range: high-heat ovens (these are best for baking Neapolitan-style pizza), medium-heat ovens (these are best for baking thin-crust, artisan, and New York pizzas), and low-heat ovens (these are best for baking thick bread-like pizzas).

These are broad categorizations, and people can use different ovens for many styles of pizzas, but Neapolitan pizzas usually have to be baked in a wood- or gas-fired oven or an electric or gas deck oven that is specially made to produce extra-high temperatures. New York, artisan, and thin-crust pizzas bake best in a pizza deck oven (but can be baked in others); some artisan pizzas can be made in a high-temperature oven when set at a lower temperature. Bread-like pizzas do best in a bread deck oven, a pizza deck oven (at a lower temperature), or a home or convection oven. Commercial impinger ovens can be used for all of these categories but are a very nontraditional choice. These are all the ideal ways to bake specific styles of pizza, but you can also get more out of the oven you already have by using clever workarounds. Our aim is to provide a guide to choosing a new oven, as well as making the best of what's already in your kitchen.

Pizza makers today have a wider choice of oven designs than ever before. The most important feature for choosing an oven is not solely how the oven generates heat—by gas, electricity, wood, or some combination of these—but rather how the oven delivers heat to the pizza dough (and how much heat it transfers). Wood-fired or gas-fired pizza ovens rely

heavily on radiant heat, for example, which makes them a good choice for Neapolitan pizzas but not for, say, focaccia. Pizza deck ovens and bread deck ovens are best suited for certain types of pizza in part because they can deliver heat in multiple ways, including by direct contact with the heated floor, infrared rays from the heated ceiling and the walls, and hot air (see page 358). We'll cover each of these types of ovens based on the temperatures at which they operate.

HIGH-HEAT OVENS

The high-heat wood-fired pizza oven is by far the most famous oven used in pizzerias, and it's the primary oven promoted by the AVPN for baking Neapolitan pizzas. Besides wood, gas is a very popular alternative for these types of ovens. Although it breaks with tradition and the rules dictated by the AVPN, it's very clear to us that a gas-fired pizza oven is far simpler than a wood-fired pizza oven, the reason being that when you turn the oven on, it retains its heat evenly, the heat is always in the same place, and although the heat inside the oven is very uneven, that unevenness is the same one day to the next. A wood-fired oven, on the other hand, has a highly variable temperature depending on the state of the burning wood and how much wood is in the oven. You also have to periodically add wood, which can create flare-ups and extra heat, and the temperature changes from moment to moment.

In both of these types of ovens, because they typically operate at very high temperatures (314–535°C / 600–1,000°F), the baking is overwhelmingly achieved via radiation. Some heat comes directly from the wood, if that is how you are fueling this type of oven. But this makes for uneven distribution of infrared energy (see page 354). Because it's very uneven, this means that baking a pizza in these ovens is a dynamic act, not a static one. Most baked items are static because the oven provides an even thermal environment. When there's an asymmetric heat source, the food has to be moved. The higher the heat, the more the pizza needs to be in motion.

The most important thing to understand about high-heat ovens is that cooking is achieved via light. It's all about radiation; in effect, a pizza oven is a broiler. These ovens have zero heat dedicated to the floor. The floor is made from masonry, usually firebrick, but can also be made of proprietary types of ceramic or natural stone. The only way for the floor to get hot is by radiation from the ceiling. This is problematic if you're busy and there are lots of

There is a lot of mysticism surrounding the creation of pizza, and the type of oven certainly factors into that. People have imported wood-fired pizza ovens brick by brick from Italy, believing that an oven floor made from the sand in Naples will imbue their pizza with better flavor. But Our Marra Forni oven that is manufactured in the US provided results that were comparable to pizzas we've had that were baked in imported ovens.

For more on our definitions of pizza styles, see page 125.

The hotter the oven, the more frequently you need to rotate the pizza. A Neapolitan pizza, typically baked at 455–480°C / 850–900°F, needs frequent spinning, while a pan-baked pizza often requires only a single 180° rotation because it's baked at a lower temperature. Baking pizza in an impinger oven doesn't require spinning to achieve even baking.

For more on techniques you can use to improve your wood-fired oven baking skills, see pages 2:405–407.

While wood-burning ovens are prevalent in Naples and used for making traditional Neapolitan margherita pizzas, bread deck ovens are more commonly used for making pizzas with thicker crusts, such as the pizza here at Panificio Menchetti.

pizzas in the oven because the floor can't recover its temperature as rapidly. There are some pizza ovens that try to remedy this. The temperature of the floor has little to do with conduction through the stone because the stone is an insulator. Because the floor both absorbs thermal radiation and emits it, it makes for some very counterintuitive results. Strangely, a floor with light beige masonry will get much hotter than a black floor (see page 353).

Another counterintuitive aspect of a high-heat oven is that the air temperature doesn't matter. Wood-fired and gas-fired pizza ovens typically have an open door. Because the door is open, cold air enters and feeds the fire before it is removed from the chamber. This makes it hard to measure the temperature of air in a pizza oven, but we tried in one of our experiments (see page 360).

In principle, these flat-top ovens should be ideal for making pizza. Broadly we agree, but the fact that these ovens get so hot means that depending on how many pizzas are being made, making pizza is not a set-it-and-forget-it affair. You have to check on the pizza and move it. Inventive pizza makers have come up with other approaches, like

rotating-floor gas ovens (see page 384), which make the temperature more even. Unfortunately, rotation occurs around a central axis. You'd still need to spin the pizza on its axis while it rotates around the oven for it to bake evenly.

Equipping a pizza deck oven with a heat source from the top and bottom is a more modern approach to building a high-temperature pizza oven. By including a large flat radiative surface on the top, heat distribution is much more even (see page 383). The floor can then be heated separately. These high-temperature deck ovens usually use electric heat, but they don't have to be electric; it's just convenient.

Most electric and gas deck ovens don't get hot enough to make Neapolitan pizza because they top out around 300–370°C / 570–700°F. And, as discussed, most electric ovens are flawed enough that you have to tend to the pizzas like a gas- or wood-fired oven. That being said, for us, the simplest oven to learn on is the electric or gas deck oven with even top and bottom heat. A wood-fired oven is the most difficult of all. In the hands of an expert it can yield great results, but it's not better than an electric or gas deck oven.



Wood-Fired Pizza Ovens

Wood-fired pizza ovens have become more common in pizzerias in recent decades, and they are regarded as a return to old-fashioned traditions and artisanal quality (though some of this nostalgia is misplaced; see page 118). The theory is that because it's challenging to use a wood-fired pizza oven, the pizza maker must have learned how to make good pizza. But lots of people who own them don't know how to use them. It's also unclear how traditional these wood-fired pizza ovens were even in Italy, where many are currently made and then shipped to the United States to fuel the popularity of Neapolitan-style blistered pizzas.

As far as quality goes, it's possible to make superb pizzas in these ovens (we certainly found delicious pizza all over Italy; see pages 154–189), but these ovens are time consuming to preheat and require close attention and regular maintenance. Some wood-fired pizza ovens can reach temperatures up to 600°C / 1,100°F, which is hot enough to burn any food within seconds.

For pizza making, we typically use these ovens at temperatures of 455–480°C / 850–900°F. It's very tricky, however, to maintain constant heat with a wood-fired pizza oven (in fact, this is one of the most unreliable ovens for maintaining a consistent temperature). In every pizzeria we visited that used wood as fuel for their ovens, we asked the pizzaioli what temperature they like baking their pizzas at. It never matched up with the actual temperature of the oven. Another challenge is that you have to closely monitor when to replenish the fuel and using the

wrong type of wood or improperly cured wood can cause a lot of problems.

Using these ovens for pizza requires expert timing, a close familiarity with the quirks of your particular oven, and virtuoso skills when wielding a peel. Proponents would have you believe that it's like learning to ride a bicycle—it's hard but once you learn it, it's great. We think it's really more like riding a unicycle. It's always hard, and there are better options for making pizza. If you don't have the expertise required to use this type of oven, we recommend using a pizza deck oven (see page 383). The qualities of a wood-fired oven can also make it hard to yield reproducible results, a drawback that, for businesses, has to be balanced against the marketing benefits of the Old World appeal they hold in the public mind. And for some styles of pizza, such as those baked in pans, we flat out don't recommend using a wood-fired pizza oven. You'll be able to fit only a couple of pans in at a time, and rotating the pans quickly leads to complications.

The convenience and cleanliness of a gas-fired oven might prompt you to wonder if wood is only being used as a historical curiosity, and it really is the result of marketing efforts. In the mid-1990s, the AVPN started espousing wood-fired pizza ovens as the only traditional choice. "Wood-fired" then became a buzzword in the pizza industry and the general public. There is also the popular myth that the wood imparts flavor to pizza (see page 388). Businesses that specialize in pizza might instead consider investing in an oven that is fueled by gas rather than wood (see page 382).

Always use untreated woods that are properly dried (15%–20% moisture). Don't use treated woods or resinous ones like pine as they produce an unpleasant odor when burned.

There is one effect of the flame from a wood-fired pizza oven: the marketing effect. The customer likes the look and smell of a wood-burning oven. Anthropologists say this is because we've spent millions of years in front of a fire. A wood fire evokes powerful things in us, both through its smell and the way that it looks. Does this transfer anything to the pizza, however? The short (but true) answer is no.

The beautiful wood-fired oven (right) that was already in place at Nomad Roman couldn't get as hot as some other styles of wood-fired ovens used for Neapolitan pizzas (left). So they got creative and decided to offer their version of pizza tonda, a thin-crust pizza said to have originated in Rome. Their innovative thinking makes for some delicious results.



THE MANY FORMS OF PIZZA OVENS

Modern pizza ovens come in all shapes and sizes, from electric counter-top versions that heat up to 240°C / 465°F to freestanding wood- or gas-fired models whose temperature can get up to 480°C / 900°F and above. Thanks to their intense heat, the latter ovens can cook a Neapolitan pizza in less than 2 minutes. And while wood-fired pizza ovens are commonly seen in places making Neapolitan and artisanal pizzas, we don't recommend them for all types of pizzas (in fact, they are difficult to bake pizzas in consistently; see page 354). Pizzerias that serve medium-crust or bread-like pizzas, such as New York, al taglio, or Detroit-style, would be better off buying a pizza deck oven or bread

deck oven. Quick-serve pizzerias (and especially larger chains) rely on energy-efficient impinger ovens using radiant heat. Conveyor belts move products through the heated space, producing consistent results for large quantities of a single type of food. Here, we group the ovens on the next few pages by what you'll see in a pizzeria compared to what's more common in a bakery or a home environment. We offer specific oven recommendations for each style of pizza on page 380. You'll also notice that these are powered by different types of fuel, such as wood or propane gas; for more details on these fuels and other options, see page 388.

The Major Kinds of Ovens

A wide range of oven designs can be used to make pizza. For simplicity's sake, we divided them into several classes according to the main modes of heat transfer they use during baking. In the table below, the more check marks in each column, the greater the role played by that mode of heating. Each of these oven classes is covered in detail in this chapter.

Class	Hot floor	Hot air	Radiant heat	Steam
pizza deck oven see page 383	✓✓✓	✓✓	✓	X
bread deck oven see page 387	✓✓✓	✓✓	✓	✓
wood-fired pizza oven see page 377	✓✓✓	X	✓✓	X
gas-fired pizza oven see page 382	✓✓✓	X	✓✓	X
convection oven with steam see page 389	X	✓✓✓	X	✓
convection oven without steam see page 389	X	✓✓✓	X	X
home oven see page 390	X	✓✓	✓✓	X



Wood- and gas-fired pizza oven



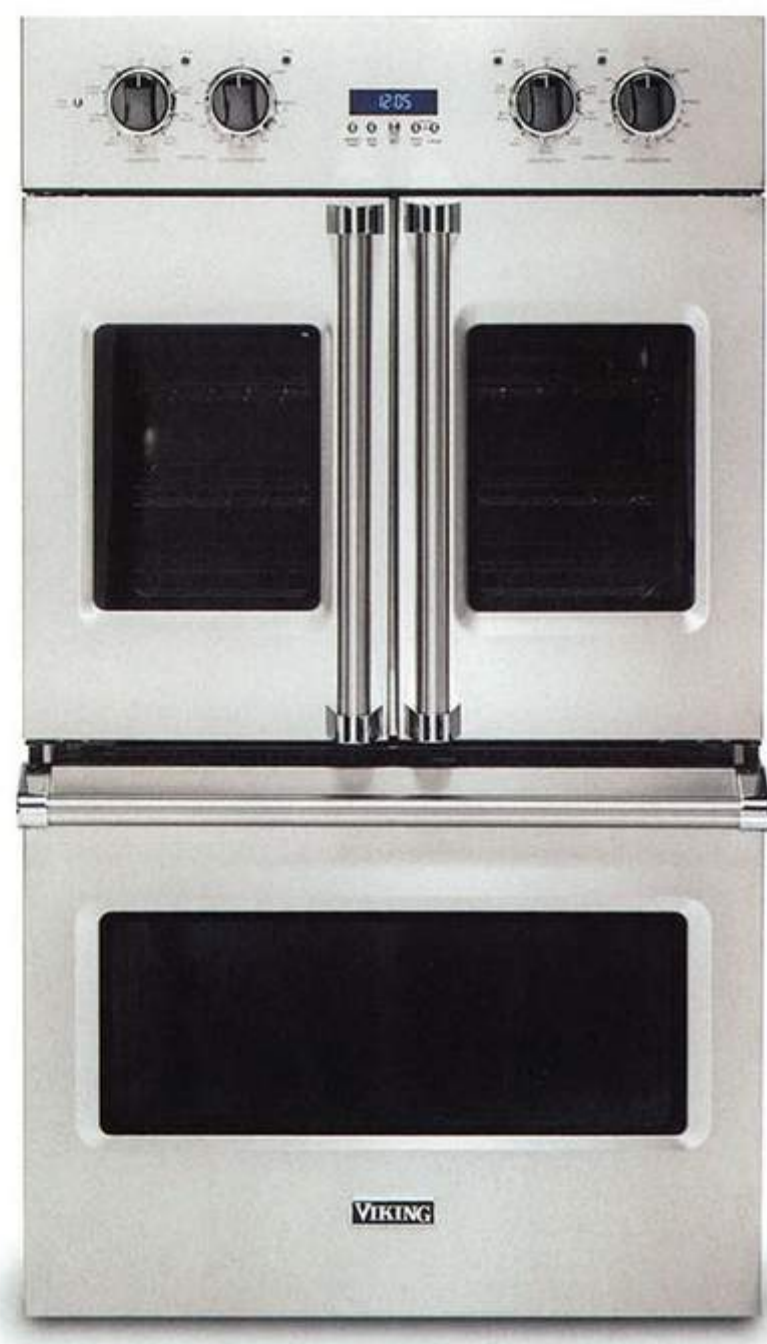
Pizza deck ovens



Restaurant deck oven



Bread deck oven



Convection oven without steam



Home oven



Combi oven



Portable outdoor pizza oven



Impinger oven



Countertop home pizza oven

STRATEGIES FOR BEST OVEN PERFORMANCE BY STYLE

With the sizeable investment that you are making in your oven, you need to know which pizzas will perform the best. The table below outlines our recommendations for each style of pizza (and the ones that aren't suited for certain styles). The column in between offers the ovens that might compromise some aspect of your pizza, but ultimately, after you've practiced the style multiple times, you can adapt the different styles to these

ovens with a little skill. Ovens like the wood-fired pizza oven require a lot of skill to master; for more on why we recommend gas-fired pizza ovens over wood-fired pizza ovens, see page 354. For pizzas that should be baked on baking steels, the number of pizzas that you can bake is limited only by the number of baking steels that you have and the size of your oven.

PIZZA STYLE/BAKING TEMPERATURE RANGE	BEST OVEN	COMPROMISE	NOT RECOMMENDED	NOTES
High-heat oven pizzas				
Neapolitan Pizza see page 3:47 (455–480°C / 850–900°F)	Gas-fired pizza oven	Wood-fired pizza oven Pizza deck oven Impinger oven	Bread deck oven Combi oven Convection oven Home oven	<p>No two fires are alike in a wood-fired pizza oven, so the temperature can vary. You need considerable skill to bake pizzas in this oven.</p> <p>Make sure that your pizza deck oven can get to a high-enough temperature. You have to spin the pizza even though it's not a gas-fired pizza oven. Typically, the deck ovens are stacked, so it might be hard to rotate these pizzas (although you can typically bake only two at a time).</p> <p>A bread deck oven won't get hot enough and neither will the other ovens that we don't recommend. For the combi, convection, and home ovens, you can put in a baking steel to help get a crispy bottom, as well as use a heat gun to get a char on the rim; the resulting pizza will be crispy, not soft.</p>
Artisan Pizza see page 3:77 (250–315°C / 480–600°F)	Pizza deck oven Bread deck oven Impinger oven	Wood-fired pizza oven Gas-fired pizza oven	n/a	<p>For the gas-fired pizza oven, the pizza can only be as big as the mouth of the oven, and you need to spin the pizza 2–3 times as it bakes.</p> <p>No two fires are alike in a wood-fired pizza oven, so the temperature can vary. You need considerable skill to bake pizzas in this oven.</p>



Neapolitan pizza,
high-heat oven



New York pizza,
medium-heat oven



Detroit-style pizza,
low-heat oven

PIZZA STYLE/BAKING TEMPERATURE RANGE	BEST OVEN	COMPROMISE	NOT RECOMMENDED	NOTES
Medium-heat oven pizzas				
Thin-Crust Pizza see page 3:19 (250–285° C / 480–550° F)	Pizza deck oven Bread deck oven Gas-fired pizza oven Impinger oven	Combi oven Convection oven Wood-fired pizza oven Home oven	n/a	For the combi and convection ovens, you need to give the pizzas a 180° turn and put them on a baking steel to get a crispy bottom. Monitor the temperature of the wood-fired pizza oven closely and bake the pizza as far from the burning wood as possible. The rim can burn quickly. Use a baking steel in the home oven and turn the temperature up as high as you can go.
Brazilian Thin-Crust Pizza see page 3:25 (250–285° C / 480–550° F)	Pizza deck oven Bread deck oven Gas-fired pizza oven Impinger oven	Combi oven Convection oven Wood-fired pizza oven Home oven	n/a	For the combi and convection ovens, you need to give the pizzas a 180° turn and put them on a baking steel to get a crispy bottom. For the home oven, you need to put the pizza on a baking steel to get a crispy bottom. You can only bake a pizza as big as your baking steel.
New York Pizza see page 3:71 (290–315° C / 550–600° F)	Pizza deck oven Bread deck oven Gas-fired pizza oven Impinger oven	Combi oven Convection oven Wood-fired pizza oven Home oven	n/a	For the combi and convection ovens, you need to give the pizzas a 180° turn and put them on a baking steel to get a crispy bottom. For the home oven, you need to put the pizza on a baking steel to get a crispy bottom. You can only bake a pizza as big as your baking steel.
Artisan Pizza see page 3:77 (250–315° C / 480–600° F)	Pizza deck oven Bread deck oven Impinger oven	Combi oven Convection oven Home oven	n/a	
Low-heat oven pizzas				
Focaccia see page 3:117 (205–260° C / 400–500° F)	Pizza deck oven Bread deck oven Impinger oven Home oven	Combi oven Convection oven	Wood-fired pizza oven Gas-fired pizza oven	For the combi and convection ovens, you need to give the pizzas a 180° turn and put them on a baking steel to get a crispy bottom. For the home oven, you need to put the pizzas on a baking steel to get a crispy bottom. You can only fit the half-size pan of the al taglio pizza in the home oven.
New York Square Pizza see page 3:133 (205–260° C / 400–500° F)	Pizza deck oven Bread deck oven Impinger oven	Combi oven Convection oven Home oven	Wood-fired pizza oven Gas-fired pizza oven	It's hard to move pan-baked pizzas in a wood-fired or gas-fired pizza oven. You can put in a couple pans at a time side by side (especially the long al taglio pans) but rotating is very difficult. The erratic temperatures in a wood-fired oven also make it difficult to bake pan-baked pizzas; you can maintain a lower temperature but the baking may be uneven.
Al Taglio Pizza see page 3:141 (250–315° C / 480–600° F)	Pizza deck oven Bread deck oven Impinger oven	Home oven	Combi oven Convection oven Wood-fired pizza oven Gas-fired pizza oven	
Detroit-Style Pizza see page 3:109 (250–275° C / 480–525° F)	Pizza deck oven Bread deck oven Impinger oven	Combi oven Convection oven Home oven	Wood-fired pizza oven Gas-fired pizza oven	For the combi, convection, and home ovens, you need to put the pizzas on a baking steel to get a crispy bottom. For the combi and convection ovens, have the fan at medium to low speed, or cover the top with a ring of foil to keep the rim crust from burning. It's hard to move pan-baked pizzas in a wood-fired or gas-fired pizza oven. You can put in a couple pans at a time side by side but rotating is very difficult. The erratic temperatures in a wood-fired oven also make it difficult to bake deep-dish pizzas; you can maintain a lower temperature but the baking may be uneven.
Deep-Dish Pizza see page 3:93 (250–290° C / 480–550° F)	Pizza deck oven Bread deck oven Impinger oven	Combi oven Convection oven Home oven	Wood-fired pizza oven Gas-fired pizza oven	



This gas-fired pizza oven at Kesté clearly shows gas flames shooting up toward the ceiling, which will in turn radiate heat down to the oven floor to raise the temperature high enough to bake pizzas. The gas flame itself doesn't have all that much to do with baking the pizza (see page 354).

For a traditional “black” oven, the fire is built inside the baking chamber and then either removed or pushed to one side. In contrast, some pizza makers use wood to fuel a continuous fire underneath the baking hearth that sends heat into the chamber from below. This type, known as a “white” oven because there is no buildup of ash in the baking chamber, is essentially a deck oven.

We visited a pizzeria that used a gas-assist oven, and the pizzaiolo told us that he used the wood fire solely for show for the customers. Indeed, the oven was positioned in such a way that you saw only the wood burning on one side while the gas flame did all the heavy lifting.

Gas-Fired Pizza Ovens

Also known as gas-assist pizza ovens, these ovens look like traditional wood-fired pizza ovens, but they are hooked up to gas. The gas-fueled flame is emitted from one side of the oven floor (for most models you can pick which side it comes out of). It's called “gas assist” because, if you choose, you can build a wood fire within the cavity to work in tandem with the gas burner.

This oven produces superior results for Neapolitan pizza, New York pizza, artisan pizza, and thin-crust pizza. The gas burner function produces the most consistent temperature and the fastest oven floor temperature recovery when compared to other types of pizza ovens. The fact that you can also burn wood in them seems pointless to us because the gas does a much better job of producing consistent temperatures. But if you insist on using both, just be aware that you'll have less oven floor space to work with than if you used just the gas function.

One aspect of the oven that is easy to work around is that the gas flame will fluctuate in order to maintain the oven temperature, and this means

that the oven will sometimes be illuminated enough by the flame and other times it will be dark. This is resolved by hanging a high-intensity lamp outside the oven and pointing it directly inside.

MEDIUM-HEAT OVENS

We like to bake most of our medium-crust pizzas, such as New York and artisan pizzas, in medium-heat ovens (typically around temperatures of 260–315°C / 500–600°F). In this medium-heat range, infrared heat is the dominant form of heat that bakes the pizza. The simplest and most common version of this category of ovens is the pizza deck oven, which is a traditionally inexpensive, higher-heat replica of a bread deck oven, but with metal ceilings and floors and not masonry.

The pizza deck oven is typically heated from above and below. In theory, this should allow you to leave the pizzas in the same place while they cook, but the oven will still have hot spots. You won't have to rotate them as much, however, as in a wood-fired oven. We've even seen pizzerias turn off the top heat, but in our experience it's hard to make pizza this way.

One of the most popular pizza deck ovens is the Blodgett oven (or similar models). Gas-fired ovens can be made with more precise temperature control and evenness. We found this in European deck ovens made for bread, which have a circulating oil that is heated from the gas flame. Simply having a gas burner isn't as precise.

There is a very unconventional type of oven in this medium-heat category that cooks with air instead of infrared heat: the impinger. This is a very high-intensity convection oven that blows hot air straight up and down while the pizza is moved through these air streams on a mesh conveyor belt. A virtue (and a curse) of this oven is that you can set it and forget it. Not to worry, however. A side door does exist in case of emergency.

Once you have time and temperature figured out, these ovens are very reliable. The impinger is also economical. Fewer people are needed to make the pizzas because you don't need someone dedicated to supervising the oven. In many pizzerias, managing the oven is typically a separate full-time job from making the pizzas.

Convection ovens and combi ovens aren't quite as successful at baking pizzas as the impinger—the airflow can blow toppings off and the intensity of heat on the bottom crust is usually insufficient. But these can be used in combination with a baking steel (see page 2:410).

Thicker bread-like pizzas really only have the same oven requirements as those that are used to make bread (with the exception of steam injection). They don't do well in high-heat wood-fired ovens



because they bake unevenly and are awkward to rotate due to being baked in pans (baking a large New York pizza is also difficult in a wood-fired oven). Any of the ovens that you use for medium-crust, medium-heat pizzas will work just fine for bread-like pizzas.

Pizza Deck Ovens

The pizza deck oven is a relatively new addition to the world of pizza baking. It has gained enormous popularity and is considered by some to be the best oven for baking al taglio pizza (see page 3:130). We recommend this oven for every style of pizza except Neapolitan pizza (see page 3:34), although some models of this oven can reach higher temperatures. Pizza deck ovens radiate heat from the oven floor as well as the oven ceiling. The higher-end models have

Frank Mastro is one of the unsung heroes of the pizza industry. He worked with the manufacturer Blodgett to mass produce the first gas deck ovens starting in the 1930s. He is also believed to have invented the first pizza box.

For more on the history of pizza ovens, see page 59.



Blodgett deck ovens have long been the standard-bearer for slice shops and pizzerias all over the United States. Their even heat makes them well suited for both baking and reheating pizzas (sometimes at different temperatures).

The gas deck oven is ubiquitous in New York pizzerias. At Best Pizza, in Brooklyn, New York, they have both a gas deck oven and a wood-fired oven since they make more than one style of pizza.

In some pizza deck oven models, you can control the intensity with which the heat radiates, from 0% to 100%, using a temperature intensity distribution button. This percentage relates to the fraction of a minute that the heat will cycle on. So if it is set to an intensity of 100%, it will pulse once every second. If you set it to 50%, it will pulse once every two seconds, and so on.

Although some manufacturers might make only electric or only gas, the different types of deck ovens are broadly available.



Gas and electric pizza deck ovens have narrower mouths than bread deck ovens since you don't need as much headroom to bake a pizza. This allows you to stack more decks on top of each other in the same amount of space.

separate temperature controls for the bottom and top of the oven. This essentially creates a high-temperature version of a bread deck oven used for baking crusty breads, but there are a few key aspects that make the pizza deck oven different. Features like steam injection, which is vital for a crispy crust in breads, aren't as important for a pizza crust (see page 389). Additionally, the distance from the oven floor to the oven ceiling is much closer in a pizza deck oven than in a bread deck oven. This allows for a much faster and more concentrated bake.

The fact that most pizza deck ovens have a narrow opening (i.e., the oven floor is closer to the ceiling than in bread deck ovens) can be a problem if you have separate temperature controls for the top and the bottom. Why? Because if you set the ceiling to a high temperature, such as 455°C / 850°F, and the bottom to a lower temperature, such as 90°C / 200°F (or vice versa), there is no way the bottom will stay at 90°C / 200°F. With enough time, it will also reach 455°C / 850°F simply by absorbing the heat radiating from the top.

There are different types of pizza deck ovens. Most of these ovens have a glass door, which, while useful and practical because you can see how the pizza is baking without having to open the oven, presents a

design flaw. This window causes the front of the oven to be much cooler than the back. If you load four pizzas in the oven in a two-by-two grid, the pizzas in the back will be done first and be harder to remove. To resolve this, we fashioned a reflective stainless-steel door for our pizza deck oven that improved the oven performance greatly (see page 353).

In our lab, we have two types of pizza deck ovens. One is similar to the type described previously. From the outside, the other one looks like a classic Neapolitan pizza oven with a domed roof, but it is in fact an electric oven. Our mock Neapolitan oven has separate top and bottom heat controls, but we noticed that when they are set to very high temperatures, such as those used for baking Neapolitan pizza, the bottom of the pizza scorched too quickly.

Pizza deck ovens typically take longer to heat than gas-fired pizza ovens but not as long as wood-fired pizza ovens. On the plus side, electric ovens are more convenient. They are often easier to get approved by restaurant or building inspectors than wood- or gas-fired pizza ovens. This is especially useful if your restaurant is in a tall building in which you'd have to vent a wood- or gas-fired pizza oven through the roof.

MAKING PIZZAS ON A ROTATING FLOOR OVEN

As you might have guessed from the name, a rotating floor oven has a floor that spins around in circles, powered by an electric motor. Like an impinger oven, you set two parameters: the temperature and the speed at which the floor spins. (This applies to gas-assist models. It is up to you to maintain the temperature in wood-fired rotating ovens.)

The better models have an oven floor that is made up of a single piece of a composite material (typically refractory cement). Based on our experience with regular gas-burning pizza ovens, we believe that gas-burning rotating ovens will give you the most consistent temperature and oven floor temperature recovery. In the gas-assist versions, the gas flame as well as the wood flames are positioned in the back of the oven next to the rotating oven floor.

The pizza should be fully baked once it has completed a 360° rotation. How long this takes is up to you since you will be setting the speed. We recommend having an extra-long peel on hand, however, to be able to reach the pizza at the farthest side of the oven floor in case you missed your window for getting it out on time or to spin the pizza if it's baking unevenly. There is an emergency stop button as well, so not all is lost if your pizza passes you by.

While you generally need to manually rotate the pizza in an electric deck oven or wood-fired pizza oven, in this oven the rotating floor does all the work for you while you can tend to other business. This will help the pizzaiolo produce more pizzas with a consistent quality using less staff or even less well-trained staff.



Although it seems like a rotating floor oven would take up a huge amount of space, you can find models with a relatively small footprint and a 90-120 cm / 3-4 ft chamber.

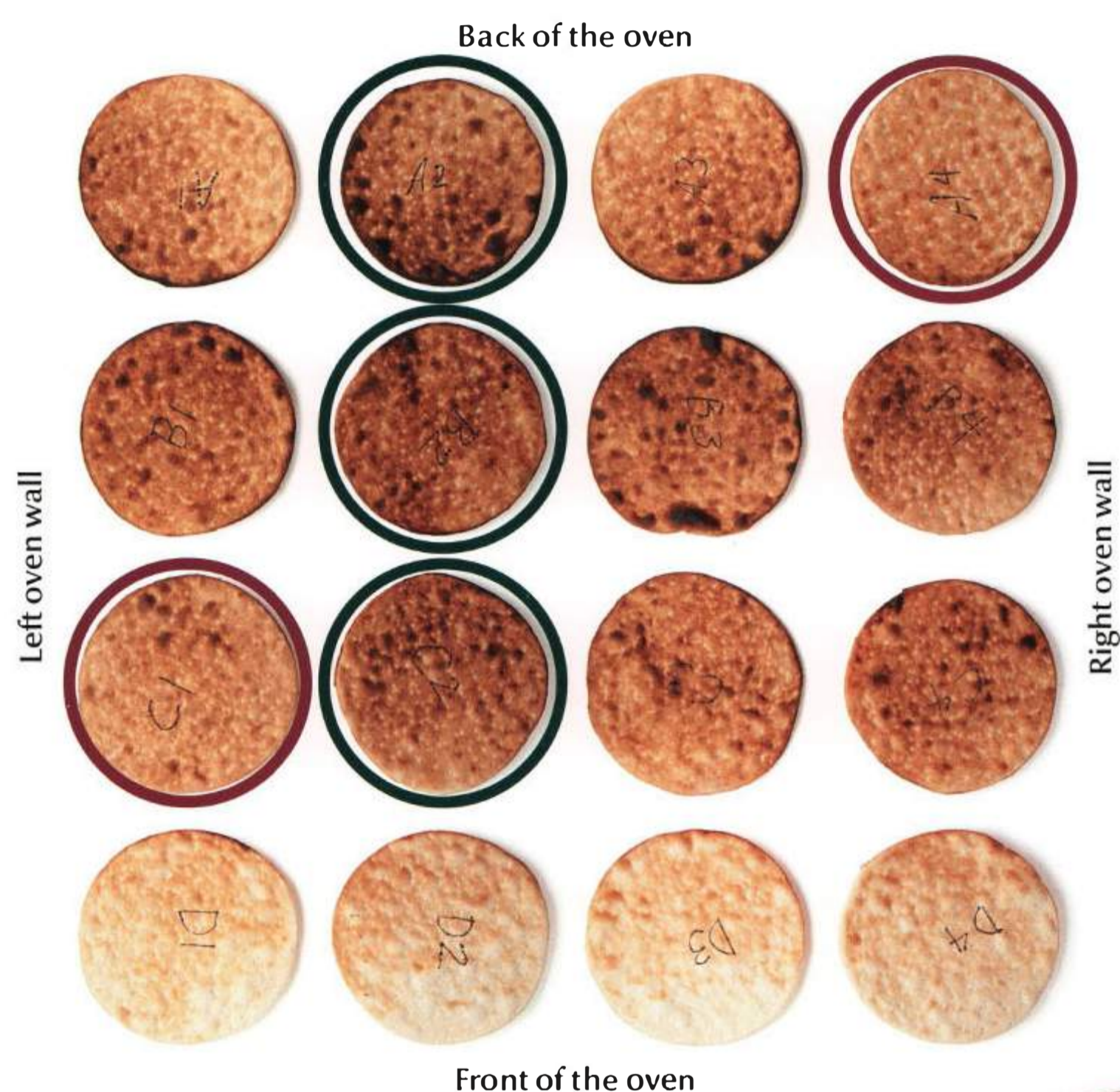
OVEN HOT SPOTS

Let's say you've preheated your deck oven to 315° C / 600° F to bake a New York pizza. A pizza placed in the center of the oven might bake flawlessly. But if you bake two identical pizzas side by side, you may experience uneven browning, burned bottoms, or underbaked edges. The cause? Oven hot spots.

Wood- and gas-fired ovens have very uneven heat distribution by design; in the case of wood it changes every minute that it burns (see page 356). In contrast, pizza deck ovens are not supposed to have hot and cold spots, but they are all too often made cheaply and thus have plenty. The technology used in most pizza deck ovens is not as good

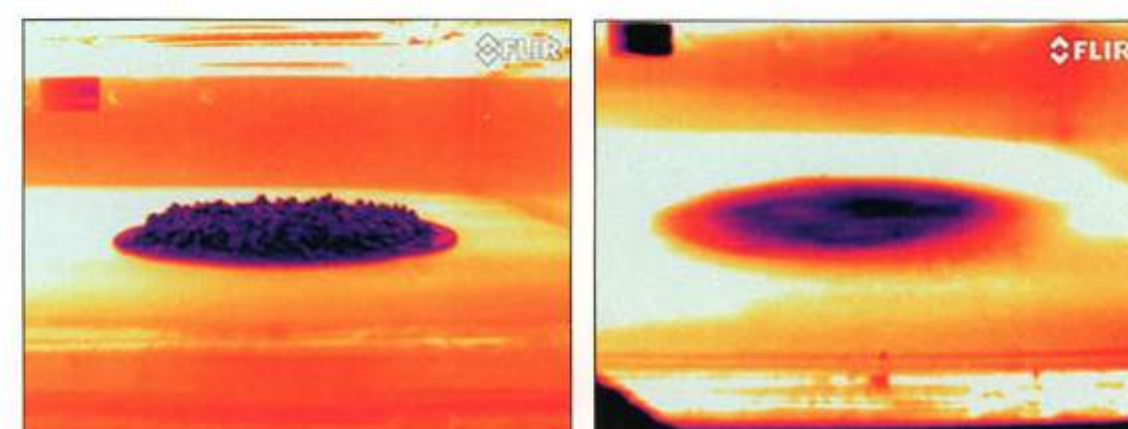
as the technology used in bread deck ovens, which often involves the use of circulating hot oil inside the floor or shelves. No matter the oven type you use, however, oven temperature recovery is critical for baking consistent pizzas.

We wish the pizza oven industry would take this to heart and upgrade how they make their ovens. Until then, it's up to the pizzaiolo to understand the hot and cold spots. We recommend selecting an oven that's as even as you can get. The best way to determine this is by testing through baking, although an infrared thermometer can help to some extent.

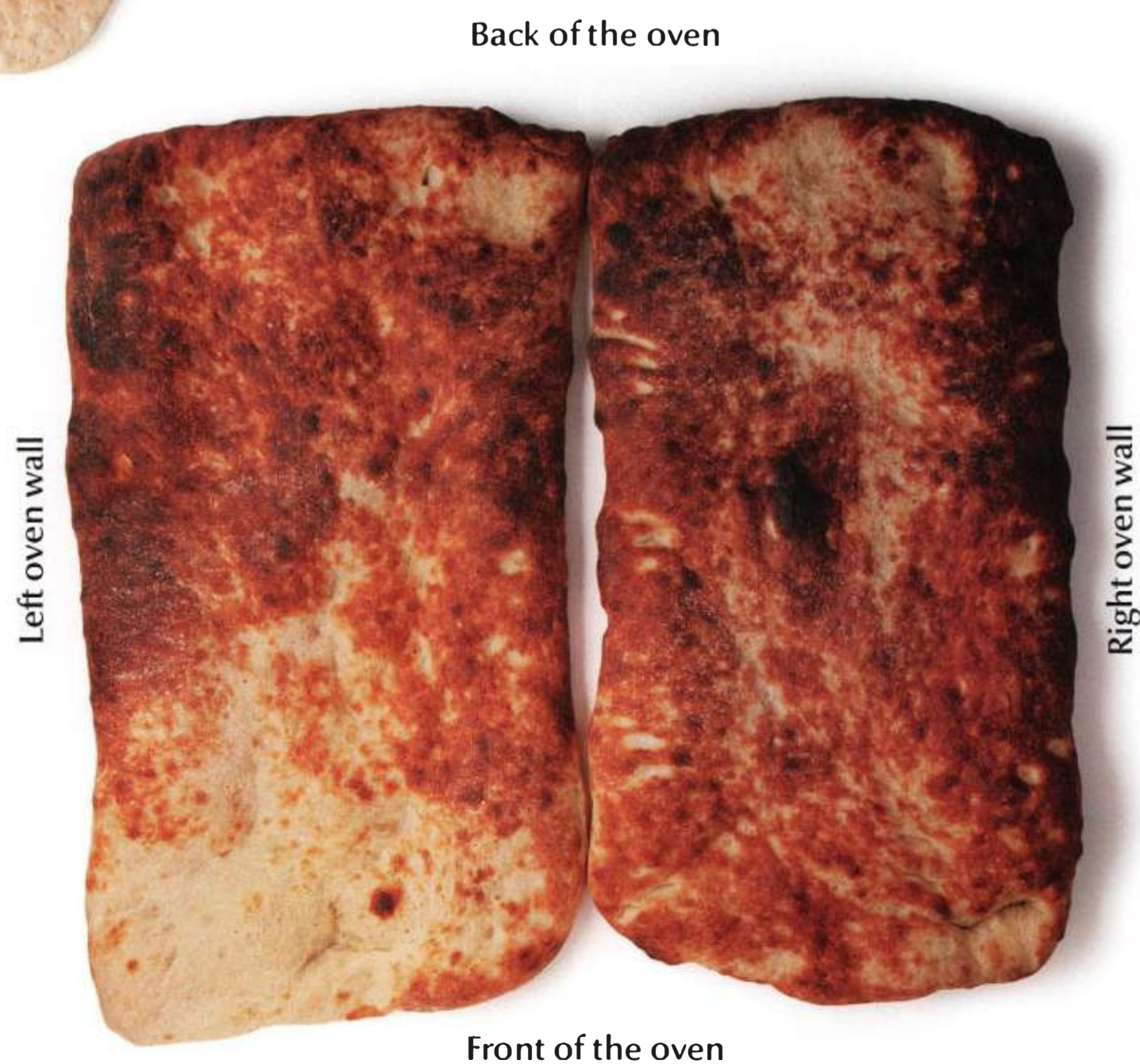


- Doughs in these positions were the most satisfying and evenly baked.
- The bake of these three crusts show the hot spots in the oven.

We baked two sets of dough in two different electric pizza deck ovens. Both exhibited hot spots toward the back of the oven, although one oven's hot spots were more prevalent on the right side (photo at right) rather than the left (photo above).



These thermal images show the cool spot that is left in the oven after you remove a baked pizza. Be sure to bake your next pizza in a different spot while the oven floor recovers its heat.



The heat output is measured in watts or BTUs, not in temperature (see page 390).

Impinger Ovens

The impinger oven is a type of convection oven that utilizes a conveyor belt to move the pizza through an open-ended oven that blows forced hot air from the top and the bottom. When the pizza comes out on the other end, it is fully baked. Its greatest benefit is by far an increase in productivity and a savings in labor, which is why it is often used at chain pizzerias like Pizza Hut or Domino's.

Regular convection ovens use a fan to blow heat across the food in a fairly gentle fashion. High-end versions will frequently switch direction of the air-flow to ensure even heating. In contrast, an impinger oven uses very intense heat with a very high fan (it's essentially a convection oven with two fans and two heat sources). One blows straight down on the pizza and the other blows straight up from the bottom. The direct impingement of these jets of air allows for a higher heat transfer than in a conventional convection oven. The resulting baking speed is very fast.

The pizzaiolo has control over the speed of the conveyor belt and the baking temperature (that is, the forced air temperature). Once you have dialed in the right combination of speed and temperature, it basically takes the guesswork out of baking each pizza. It sounds too good to be true, but it isn't. The impinger oven allows a pizzeria to produce a consistent product, and the person who oversees the baking can do something else while the pizzas bake rather than babysitting them. Some might say that it takes the craft and skill away from pizza making, but we can certainly see the benefits for business

An impinger oven is one of our favorite ovens for pan pizzas, especially Detroit-style pizza, like the one here from Emmy Squared. An impinger oven cooks the pizzas quickly and evenly without having to rotate them.

In addition to these cost savings, our average baking time was cut in half for all of the pizzas that we tested using this oven.

The downside is that the quality of these ovens can vary wildly. There are some that are a few hundred dollars and others that are well into four to low five figures. Impinger ovens are built to deliver not only high temperatures but also a large volume of air at that temperature. This is what allows the pizza to bake quickly. An underpowered impinger oven may reach a certain temperature, but the flow of air is insufficient for it to transfer heat quickly enough to do the job. You need to make sure that the impinger oven you buy has the heat capacity for the pizza you're making. The ovens that reach higher temperatures require more power. Keep these factors in mind if you decide to buy one.

Some of the brilliance in its design is that you can purchase multiple impinger ovens and stack them on top of each other. This allows you to make not only more pizzas but also different styles of pizzas within the same pizzeria because you can set each oven to different temperatures and conveyor belt speeds. Some of these ovens have a stopper at the end of the conveyor belt, but not all, so always make sure there is something at the exit of the conveyor belt to catch the pizza. Some pizzerias position their oven in such a way that the end of the conveyor belt is in contact with a wall so that even though the conveyor belt is still running, the baked pizza can exit the heating zone but not go anywhere.



LOW-HEAT OVENS

These ovens come in many varieties, but it's useful to split them into four groups: bread deck ovens, combi ovens, convection ovens, and home ovens. To be clear, while we call these low-heat ovens, this is only when compared to the medium-heat and high-heat pizza ovens. These ovens typically operate at 205–230°C / 400–450°F and up to 285–315°C / 550–600°F. As the overview of oven types on page 378 shows, you can now buy multifunction models that combine features from more than one category of oven, but for the sake of clarity, we will cover each type separately in the following pages.

Anyone who bakes both pizza and bread should consider buying a bread deck or combi oven; even serious amateur pizza makers sometimes decide to invest in one. Some commercial ovens for baking bread-like pizzas usually take up a substantial amount of floor space, although the smallest models are no bigger than a consumer-grade double-wall oven. These low-heat ovens are ideal for baking thicker-crust bread-like pizzas, but they can also be used for thin- and medium-crust pizzas (except for Neapolitan-style pizzas).

The main benefit of some low-heat ovens is more control over the results. Compared with even a high-end home oven, you are likely to find that a bread deck oven maintains a more constant temperature and transfers heat more predictably. And because these ovens are designed for the rigors of commercial use, they work best when fully loaded, have no problem running all day every day, and use durable, heavy-duty parts.

Combi, convection, and home ovens use heat that either rises upward through natural convection or comes from the side via a fan driven by convection. Either way, you will need to bake on a shelf of

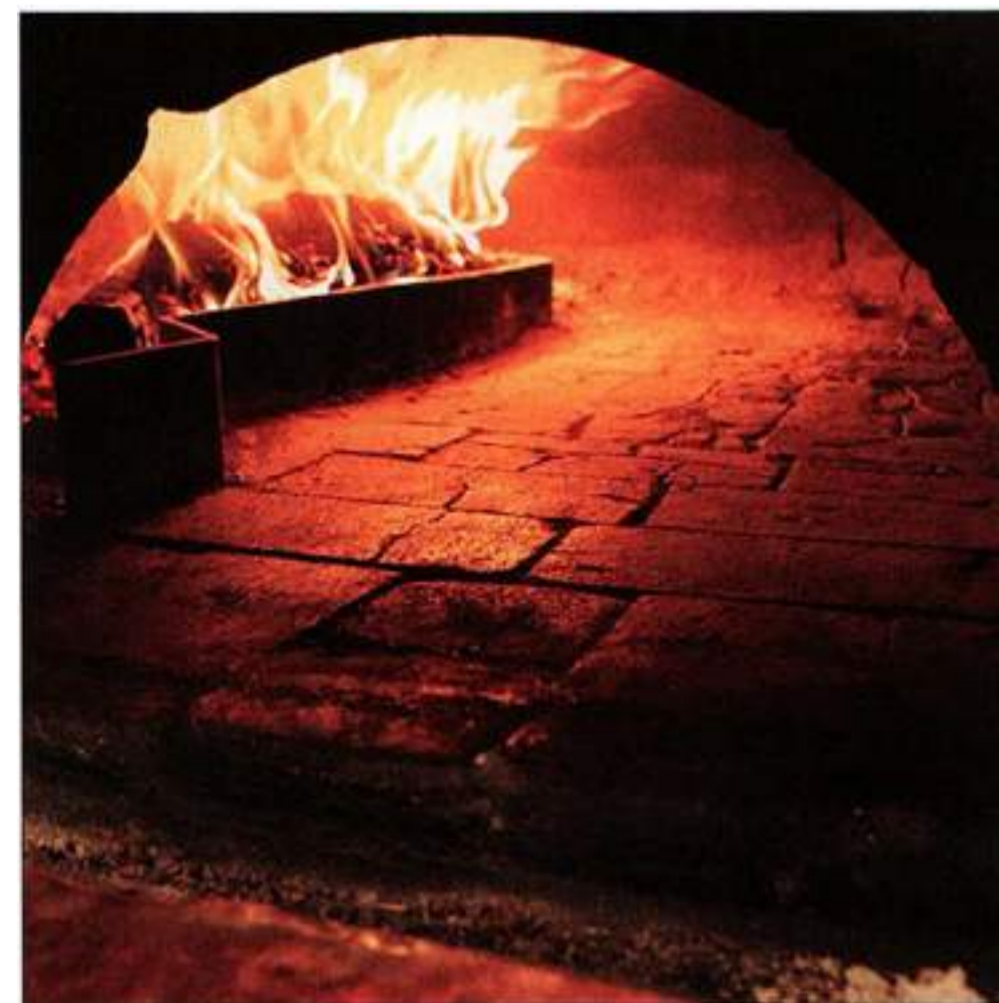
some sort, so we strongly recommend a baking steel (see page 2:410) to achieve a crispy bottom on your pizza. Most home ovens have a maximum temperature of 260–285°C / 500–550°F, which restricts the kinds of pizzas that you can make. Home ovens are basically low-wattage equivalents of bread deck ovens (without the hearth).

Bread Deck Ovens

The deck oven is the workhorse of most small- to medium-scale commercial pizzerias because it combines the high heat retention of a wood-fueled oven with a high capacity and the reliability and reproducibility that comes from advanced electronic control. Bread deck ovens owe their consistent baking largely to their high thermal mass and their thick, heavy floors. The pizza maker typically places raw dough directly onto the oven floor (also called the hearth or deck, although “deck” is also used to refer to one entire stackable cooking unit). A modern deck oven floor is likely to be made from stone or composite materials such as refractory cement, which is heavy but relatively well matched to the low thermal conductivity of thicker pizzas (see page 365). The low conductivity (but high heat capacity) of the hearth allows it to store a lot of heat—more than enough to bring the bottom surface of the pizza up to the boiling point almost immediately. But low conductivity also restrains the rate at which heat pours into the bottom of the pizza once the crust starts to form.

A floor made of aluminum has a thermal conductivity roughly 100 times as great as that of a hearth made from refractory cement or firebrick; for a stainless-steel hearth, the multiple is about 30 times. Metal floors are thinner, so they cool off faster, and they also conduct heat so rapidly that they risk overbaking the bottom of your pizzas, especially

The floors of a bread deck oven (left) are most often made of composite materials such as refractory cement and not firebrick. Refractory cement is typically made with a combination of aluminum oxide (alumina), silicon oxide (silica), and magnesium oxide (magnesia), which have a very strong resistance to high temperatures. Firebrick (right) is about the size of its namesake and thus can have nooks in between the bricks, which can be problematic when loading and unloading with a peel. Refractory cement can be made into any shape or size, creating a smooth, even surface on an oven floor.



The highest temperature that you can get in a combi oven is 300°C / 575°F, but it won't let you stay there for long. Preheat the oven to this temperature but then turn it down to 290°C / 550°F when you are baking.

if they are bread-like. This is why, when shopping for a deck oven, it's important to pay attention to both the thickness of the hearth and the material it is made from. A thicker hearth is usually worth the extra cost.

Heat retention is another important feature, and it depends in large part on the amount and kind of insulation used to keep the heat of the oven inside, where it is useful. Good ovens vent hot air only when and where you want them to. If the outside of your oven gets so hot that you worry about getting burned or if you feel hot air leaking from every joint, you can be sure that you're paying a price in both energy efficiency and temperature stability.

The ways in which the oven pipes move heat into the chamber matter, too. Pretty much every deck oven radiates heat from the oven floor. In some, a gas burner or electric element lies directly beneath the deck; in others, heaters in the back or

bottom of the oven produce hot gas or liquid that then circulates through channels or pipes below the oven floor.

It's important for the pizza to receive radiant heat from the chamber ceiling as well. A heated top—preferably one that you can control independently of the oven bottom—can reduce baking times and improve the quality of the crust. In ovens with only bottom heat, the top of the pizza takes a long time to brown, producing pizzas with uneven cooking on the rim crust. Often the base will be generously cooked while the top might be just lightly browned or not browned at all. To us this is a defect, but some pizza makers that we met during our travels like the way the pizza turns out using only bottom heat. The best way to resolve this issue is to spend a little more on an oven that radiates heat from the top as well as the bottom. Even with top and bottom heat, most pizzas need to be rotated during baking to

TYPES OF OVEN FUEL

Pizza ovens are fueled by one or a combination of the following: wood, charcoal, coke, gas, fuel oil, and electricity. There are few other areas of cooking where people brag about what makes their oven hot than with pizza. This is because the pizzaiolo is so concerned with controlling the application of heat to food.

When it comes to pizza, the fuel really doesn't matter, however, as long as it provides consistent heat. This is anathema to those who believe wood is the only correct fuel source. But wood is a very difficult fuel source to control because no two fires are the same and no fire is even the same minute to minute. While wood has the ability to impart delicious smoky flavors to food, this doesn't happen in a wood-fired pizza oven because the smoke rises to the top of the dome and then exits through the vent (some pizzaioli think that this smoke at the top of the dome can contaminate the pizza but we're not so sure; see page 2:405). If the wood is flavoring the pizza, there's something wrong with either the pizza maker's technique or oven hygiene.

Other forms of solid fuel, such as charcoal, coal, and coke, are not really an improvement over wood. In parts of the Eastern Seaboard, some pizzerias market themselves as making "coal-fired pizza," but coal is a terrible fuel source. It's sooty and produces coal tar, which is full of carcinogenic compounds. This is why, even in the 19th century, the

industry switched to coke, which is a form of coal that burns cleaner.

Liquid fuel oil, which is the same thing as kerosene or diesel, is what's used in many of the old-school pizzerias in New Haven and other parts of the East Coast because it's used for home heating (they originally used coke but then switched to fuel oil). Be warned, though, that it does have a strong chemical smell.

Charcoal is to wood as coke is to coal; it's an improved version of the fuel that produces less soot. It will certainly fire an oven and do so with less sooty cleanup than wood, but it still has all of the same variability. Combine that with the fact that you need to have an excellent exhaust and ventilation system to extract all that smoke, which doesn't come cheap. With other types of fuel, only heat and steam need to be vented. With charcoal, the hood housing the exhaust system needs to be cleaned frequently because soot will accumulate and can produce a fire if it is not cleaned on a regular basis.

Natural gas, propane, and butane are the cleanest-burning fuels and can be easily metered by valves and temperature control. These are vastly better than coke, wood, or charcoal but still not as convenient as electricity. In our experience, electric ovens are the quietest, but they also take the longest to get up to temperature and take longer to recover temperature after a bake.



Wood



Coal / coke



Electricity

Getting a gas hookup in your kitchen, whether for a professional or home kitchen, requires the installation of special pipes and, in the case of commercial kitchens, an inspection before they will turn on the gas.

ensure even cooking. This practice produces better results since even the best ovens will not produce a perfectly browned crust without rotating the pizza at least once (see our exception on page 355).

These ovens have a wider separation between the ceiling of the oven and the oven floor because they are intended to bake bread, which is typically thicker than pizza. Some bread deck ovens have glass doors and some have insulated metal doors. There is obviously a trade-off here. On the one hand, a door that is made of clear glass or that contains a large window lets you see what's going on inside. On the other hand, metal doors retain heat better than glass doors.

Bread deck ovens can be heated with electricity, gas, or thermal oil. Thermal oil–heated ovens are a rather recent addition to the pizza-making and bread-baking landscape. Thermal oils are low-viscosity fluids that are heated and circulated through the floor of the oven. This type of oven gets up to temperature very quickly and recovers quickly as well. Many pizza makers who have embraced this technology swear by it.

Note that many bread deck ovens have a steam injection function, which is useful for bread but not for pizza. We tested injecting steam into the deck as soon as we loaded the oven to see if there was any benefit to the pizza. Instead, the much shorter bake for a pizza resulted in a soft crust with reduced volume and wet toppings.

Combi Ovens

“Combi” is short for “combination,” meaning the combined use of hot air (forced convection) and water vapor (steam). Unlike most bread deck ovens, combi ovens include humidity sensors. Because of this, in addition to setting a temperature, the baker can set a desired level of humidity, and the oven will automatically adjust the injection of steam to maintain that level. That is the intention, at least. In practice, humidity sensing is far from perfect, but luckily humidity and steam are not as important when making pizza.

Because combi ovens use high-power forced convection, they can be highly responsive to temperature swings and recover from temperature shocks faster than comparable bread deck ovens can. This makes them well suited to holding hot food and for cooking environments, such as restaurants, where the door is opened frequently. Combi ovens also do a better job than bread deck ovens of distributing heat evenly because their strong fans prevent hot spots from forming. While the fan speed is

adjustable, it has a lower limit: the heat is delivered via moving air, so the fan cannot be turned off.

A combi oven lacks the thick walls and hot floor of a deck oven, so in principle it is not the ideal tool for making pizzas that require strong radiant heat or a hot hearth, like Neapolitan pizza. Most combi models aren't designed for baking directly on the floor, and their shiny oven walls don't get hot enough to bake via radiation.

Combi ovens have circulating hot air rather than radiant heat from the oven floor, which means they work the same as convection ovens for pan-baked pizzas but won't provide the fast oven spring or browning that we get from pizza deck ovens. While they will make good pan-baked pizzas, they are not ideal because the lack of oven floor makes it hard to produce a crispy bottom.

Convection Ovens

Essentially all ovens offer convection as a heating mode, whether they have a button labeled “convection” or not. Convection simply means hot air (or other fluids) moving around, and that happens naturally whenever pizza is baked in air. Hotter air rises, cooler air descends, and the result is a constant gentle breeze inside the oven.

Forced convection ovens add a fan, usually placed on the back wall, that helps to stir things up, essentially turning that gentle breeze into a stiff wind. This hastens evaporation, which is not always best for baking pizza. A terrific feature, if you can find it, is adjustable fan speed. Unfortunately, even very pricey home convection ovens usually offer just two settings: on and off.

The hot air being circulated will bake whatever is inside the oven faster, which is usually seen as a major benefit of convection ovens. With pizzas, though, this will cause the crust to set faster than normal, which limits the pizza's ability to expand. You can preheat the oven 30–35°C / 55–65°F hotter than for a typical bake, with a baking steel or baking stone inside.

More expensive models do now come with “true convection” (also called European convection), which means that the oven has a third heating element, typically of only moderate power, placed near the fan so that you have more direct control over the temperature of the air blown into the oven. In principle, this could be useful for baking thin-crust pizzas, such as Brazilian thin-crust, or medium-crust pizzas, such as New York or artisan, without having to wait for the oven to fully preheat the walls.



We like to use a baking steel for making almost all pizza styles in both combi and convection ovens. Be sure to allow the baking steel (or a pizza stone, if using) to preheat for at least 30 minutes before baking your pizza.

Most convection ovens get only as high as 250°C / 480°F. Some might go higher, but our recipes were written with this as the highest possible temperature achievable. If you have a convection oven, it will take only about 10–15 minutes to preheat (see page 392).

The thermal conductivity of a baking steel is more than five times higher than that of a baking stone. The steel can help quickly bake a thin-crust pizza and produce a moderate amount of the leoparding that is characteristic of a Neapolitan pizza (see page 366).

For more on baking pizza in a home oven, see page 2:409.

A convection oven's temperature drops significantly when its door opens. To compensate, you can set your oven to a much higher temperature to load it (at least 30–35°C / 55–65°F hotter than the desired baking temperature). Just don't forget to adjust the setting once the oven catches up to the baking temperature.

Home Ovens

Home pizza makers sometimes share a despairing suspicion that their oven is out to get them. The anthropomorphism is uncalled for, yet it's true that several common limitations of home ovens combine to make consistent results difficult when baking pizza. With the techniques described in *How to Bake Pizza in a Home Oven* on page 2:409 and the willingness to bake a few extra pizzas if the first ones are not perfect, you can overcome these difficulties.

The problems with most consumer ovens start as soon as you turn them on. Preheating often seems to take an unreasonably long time, for reasons we explain on page 392. In short, you must wait for the walls to heat up to full temperature, which takes so long because that's not where the heating elements are. The time it takes a home oven to reach its set point, however, is the least of the problems.

Home ovens are primarily designed to work at an even lower temperature than what we call “low-heat ovens.” As a result, many hallmarks of high-temperature pizzas are mere afterthoughts in home ovens. In addition, the oven walls will radiate heat unevenly because they vary in thickness and in their proximity to the heating elements. Most home ovens include a very cheap and often inaccurate temperature sensor. At the high end of the oven's temperature range, it can be especially inaccurate, which is why it's important to calibrate your oven temperature so that you have a more accurate picture of how it heats.

Most oven doors have a window, which is handy for keeping an eye on the pizza but contributes to uneven heating because the window will radiate a lot less infrared energy into the oven cavity than the walls. The temperature of the oven lining can fluctuate by tens of degrees from one spot to another. The back corners of the oven tend to be quite a bit hotter than the average temperature. The power of radiant heat emitted from part of an oven wall at 250°C / 480°F is 27% more intense than the power coming from part of a wall that is slightly cooler, at 215°C / 420°F. At low temperatures, these fluctuations in radiant power don't matter much because radiant heat is weak compared with the heat transferred through natural convection. But at the

higher temperatures often used to bake pizza, the unevenness matters more.

Then there is the problem of opening the door of a typical home oven—this effectively removes one entire wall, so the air temperature in the cavity drops within moments. If the door is opened midway through baking, the drop in temperature is made worse by the cool air flowing in, which often contains much less humidity than the hot air escaping out to the kitchen. Many home ovens have only crude temperature controls. Few models offer any real control over the humidity and thus over the wet-bulb temperature that the pizza actually experiences. All these problems add up to a pizza-making experience that is too often frustrating for home pizza makers, especially those just getting to know a new oven. But there are several steps you can take to minimize the frustration.

First, do your research before you buy an oven so that you understand which features will be truly useful to you, and then select a model that best matches your needs. Many home ovens today offer a built-in temperature probe, a half-dozen rack positions, concealed heating elements, “smart” preset programs, and timers. With a few exceptions, such features add very little to the oven's ability to bake pizza well. If your main use for the oven is to make high-quality pizza frequently and in quantity, then the features that matter most are ones that marketers rarely advertise.

Power and thermal mass are at the top of that list. The higher the power of the oven (its actual heat output in watts or BTUs per hour), the faster it will both preheat and recover from a dip in temperature when you open the door. The thermal mass of the oven is a function of both the weight of the walls (which depends in turn on their thickness, density, and overall dimensions) and the kind of metal in them. Home ovens, as well as all other consumer ovens and appliances built to make a decent pizza at home, are trying to mimic the types of power and thermal mass found in professional ovens.

The thickness, placement, and quality of the insulation that surrounds the oven cavity can also make a big difference in preheating times, energy efficiency, and temperature stability. If an oven model offers both high power and high efficiency, odds are that it is very well insulated. There is no way to get consistent results in baking if the temperature takes large excursions above and below the set point, or drifts routinely too high or too low and then stays there. The absolute accuracy of the oven's controls is less important than the stability and reproducibility of the temperature.



If your home oven is properly calibrated, you'll set it to the temperature called for in the recipe and not worry about it. If you want to check to see if your oven is calibrated, however, you'll need to test it to see which temperature setting will actually generate that target temperature. In this scenario (above), you would set your oven to 245°C / 475°F to produce a true temperature of 260°C / 500°F.

Once you know which oven you will be working with, put in the time and effort to get to know it and to keep it in good running order. Even identical models behave differently from kitchen to kitchen. The elevation, local climate, and voltage or gas pressure—and myriad other factors unique to your kitchen—can influence the performance of your oven.

Finally, embrace the workarounds that will result in better pizza. By using hacks we have learned from others or developed ourselves, we have made some of our best pizzas in a home oven. Try placing a heavy baking steel (see below) in the top third of the oven before you preheat it and then sometimes

using it in combination with the broiler to achieve a crispy crust and perfectly cooked toppings. You can try setting your oven 15°C / 25°F higher than you need it to be. This can compensate somewhat for the temperature drop that will happen when you load the oven. Don't forget to turn it back down once it reaches the ideal temperature. Most home ovens' highest temperature setting is between 260–290°C / 500–550°F. Go as high as you can. We describe other such work-arounds in our chapter *Baking Pizza* on page 2:387, and offer strategies for a standard electric home oven on page 2:410.

THE IMPORTANCE OF USING A BAKING STEEL OR BAKING STONE

Conduction of heat into the bottom crust is an important form of heating for most types of pizzas, whether pan pizzas or pizzas baked directly on the oven floor. In a home, convection, or combi oven, the primary means of heating is either forced or natural convection of hot air. This convection can't deliver enough heat to the bottom of the pizza to cook it properly. We have to add a mechanism to store the heat—the best way to do this is with a baking steel.

Baking stones are sold for this purpose and their one advantage is they are lighter, but the use of stone in a home oven is more of a nod to the stone used in a masonry pizza oven, which can be heated to much higher temperatures. Stone is not better in the context of the home oven. We recommend a baking steel over the baking stone because the baking steel is denser and gives its heat up more quickly to the pizza. You'll get a better result with the steel.

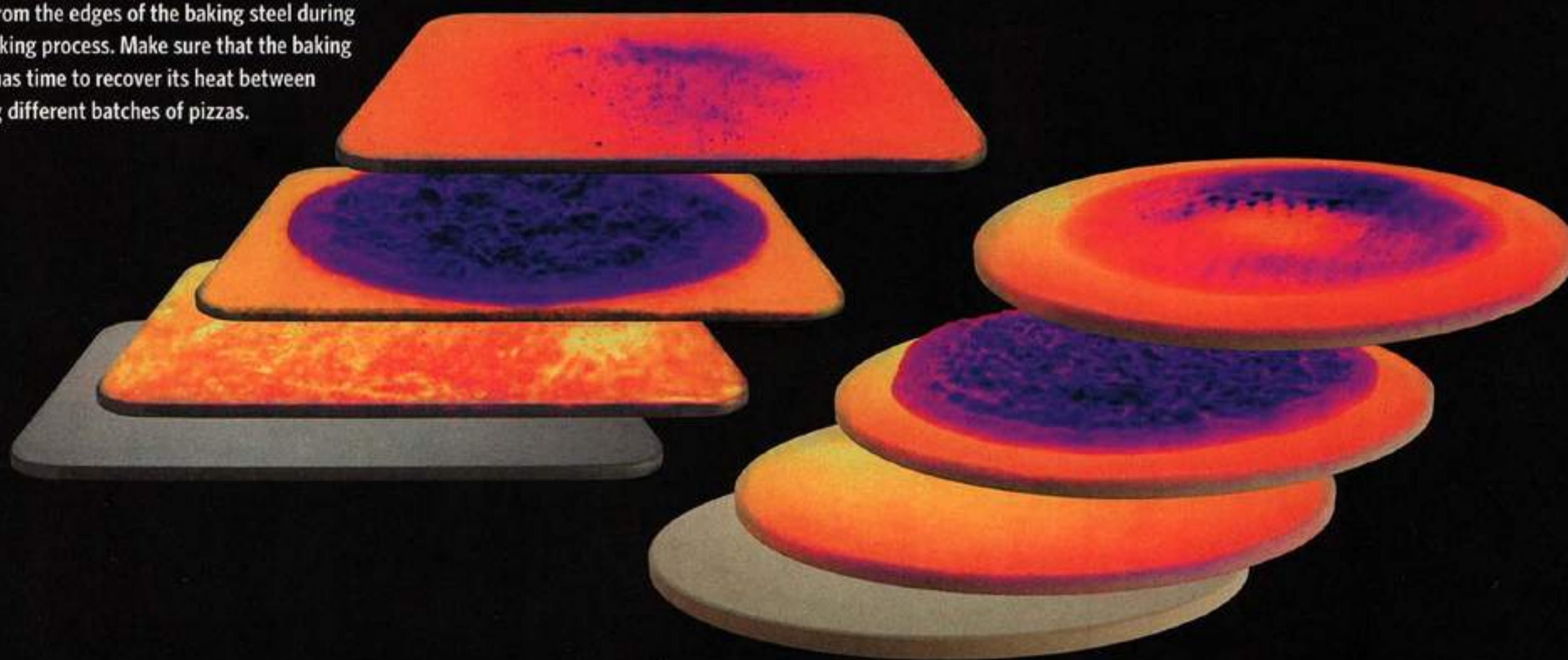
If you have only a home, combi, or convection oven to bake pizzas, we always recommend baking your pizzas on a baking steel or baking stone, regardless of the type of pizza. The bottom heat it provides will

give you a crispier crust, faster bake, and larger volume than if you didn't use it. If you want to make the best possible pizza at home, buy two baking steels and stack them on top of each other when you are preheating the oven. Not only will this produce great crust results but you can also cook pizzas continually without worry about the steel getting too cold.

Although there are baking steels on the market (see Resources, page 3:377), it's also not difficult to have one cut custom for your oven. There are online metal suppliers or shops that will make you one. We recommend 1 cm / $\frac{3}{8}$ in mild steel or 1¼ cm / $\frac{1}{2}$ in aluminum. They can be super heavy and hard to move, but they don't compromise the oven for other purposes, so you can just leave them in the oven.

There is a size limitation with baking steels if you purchase them commercially (and also, they are remarkably heavy). Baking stones are available in larger sizes and can be much cheaper. The baking steel also requires special cleaning and curing, since it is not stainless steel. If you do not have a baking steel, we have found that baking pizza in cast-iron pans and planchas works just as well and is more economical (see page 2:410).

These thermal images show the heat distribution as a pizza bakes. Note how the pizza draws heat from the edges of the baking steel during the baking process. Make sure that the baking steel has time to recover its heat between baking different batches of pizzas.



YOU'VE GOT TO PREHEAT YOUR OVEN

Preheating the oven is slow and boring—it's tempting to cut it short. Don't. The only time during baking that you actually have full control over the temperature inside your oven is when the oven has finished preheating, before the dough goes in. Preheating is crucial to consistent baking because it charges the oven with a large reservoir of heat energy. The more energy in that reservoir, the faster the oven can recover from the shocks you are about to inflict by opening the door and loading in one or more cold, wet pizza doughs.

Why does preheating seem to take so unreasonably long? After all, 40–50 kJ is sufficient to heat the air in a standard-size oven to 245°C / 475°F, and the element in a typical home oven supplies this much energy in a mere 21 seconds. But you want to preheat the oven walls as well as the air. The heavy metal walls can store a far larger amount of heat than the thin air does. The trade-off is that they warm up more slowly. Indeed, even if you build a very hot fire in a brick pizza oven, it can take hours to fully preheat hundreds of pounds of firebrick—so long that businesses that use these kinds of ovens sometimes keep them going 24 hours a day.

The benefit of such massive ovens is that they retain that heat exceptionally well.

Home ovens, in contrast, preheat much faster because their metal walls are far thinner and lighter. As you would expect, they also lose heat more quickly when you open the door. It's easy to check how long you must preheat your oven to bring its lining up to full temperature. Simply point an infrared thermometer at whichever corner tends to be coolest. When the thermometer reads within 5°C / 9°F of the temperature you set, preheating is probably complete. If you know that your home oven isn't good at recovering its temperature, preheat it 15°C / 25°F hotter than the temperature called for in the recipe if possible. When you load the dough, the temperature of the oven will have dropped to the temperature you need. Turn the temperature down to the baking temperature the recipe calls for once you close the oven door. Note that we recommend using a baking steel in a home oven for virtually all styles of pizza, and this can take at least 30 minutes to fully preheat.

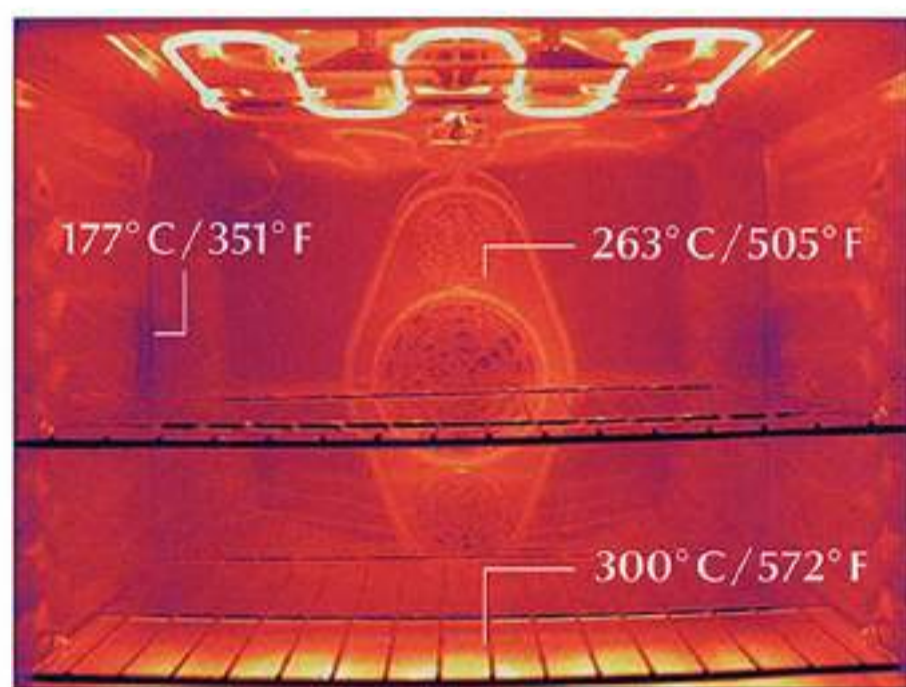


5 minutes

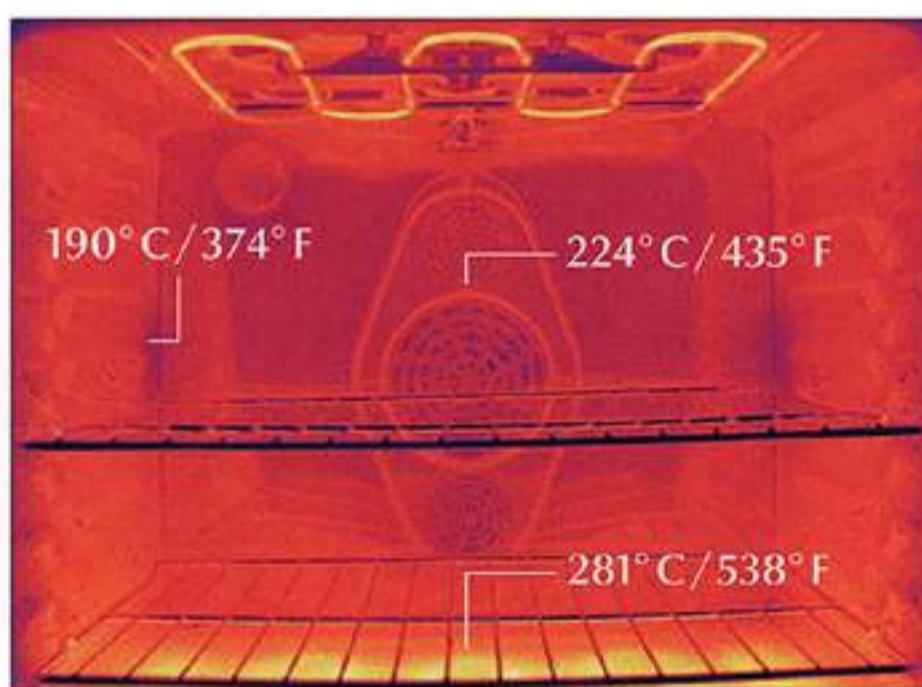


10 minutes

These infrared photos demonstrate how an oven heats up—and why preheating is necessary. After 10 minutes of preheating, the oven still has a significant number of cold spots. Infrared photos of an oven preheated for 22 minutes—when it signaled that it had reached its set point of 245°C / 475°F—and for 75 minutes illustrate the importance of preheating for at least 30 minutes so that the oven has a more even temperature (the photo at 22 minutes is clearly going through a heating cycle). Even after full preheating, the oven has hot spots (yellow) and cold spots (purple), but the temperature differences between them are much less pronounced than they were when the oven beeped to indicate that it was ready for use.



22 minutes



75 minutes

300°C / 572°F



130°C / 266°F

HOW TO Preheat Your Home Oven

- 1 Make sure that your oven is calibrated. Keep an oven thermometer in your oven at all times to verify that the temperature is accurate within a few degrees.
- 2 If you are using any baking equipment, such as a baking steel or stone, place it in the oven before you turn it on to preheat it.
- 3 Position your oven rack in the top third of the oven.
- 4 Turn the oven on. If your oven has a convection fan, turn it off. You need to have static heat.
- 5 How long it takes to bring the oven up to temperature will depend on the type of oven you have.

IMPROVING PIZZA BAKED IN A HOME OVEN

Pizza enthusiasts have long supplemented their home ovens to try to approximate the high heat of a pizza oven. One of the main ways is preheating a pizza stone under a broiler in order to mimic the pizza oven's floor. The large mass of the preheated stone helps moderate the dip in oven temperature that occurs when the pizza goes in. And stones do conduct heat into the crust much faster than air, thanks to their far higher thermal conductivity.

Baking steels work even better than stones for baking pizza. Thick baking steels hold their preheated temperature better than thin ones, but they also take longer to preheat and to recover from a drop in temperature. Our bottom-line conclusion: a dark (not shiny) steel plate 12 mm / ½ in thick produces the best crust, although it is staggeringly heavy. A steel plate 10 mm / 0.4 in thick also works very well, is a lot more manageable, and preheats faster. We offer other tips for making your best pizza in a non-pizza oven on page 2:410.

- Home ovens vary a tremendous amount. None of them are really designed for even medium-crust pizzas.
- The most common type of home oven has gas or electric heat from below. It relies on natural convection to have the heat rise up through the baking chamber.
- Some home ovens also have top heat, which is an advantage for pizza if it can be controlled.
- A more modern design for a home oven is a forced convection oven. This uses powerful fans to blow air around, which improves the heat transfer between the hot air and the food. Adjustable fans are the most useful, rather than on/off models.
- The latest thing in home ovens is to combine convection with steam injection modeled after the highly successful restaurant/commercial combi ovens. Regular maintenance is required to avoid scale buildup. This is a great feature for many types of cooking but doesn't help with pizza.
- Convection ovens and home ovens alike typically lack the thick floors of deck or stone ovens, so they have lower heat retention and less thermal stability.
- The oven's temperature drops sharply when the door opens. Some bakers set the oven to a higher temperature before loading it, then drop the setting once the oven catches up to the desired baking temperature.

We recommend baking pan pizzas in a home oven because they are baked at lower temperatures than Neapolitan or even New York pizzas. Even though pan pizzas don't come into direct contact with the baking steel, we still recommend baking these pizzas on a baking steel to get a crispy bottom crust.





This portable pizza oven, the Rocbox, can be fueled by either wood chips or a propane tank. While a propane tank can be a pain to lug around, this oven works well in the great outdoors, as pictured here on the Snoqualmie River in Washington State.

SPECIALTY OVENS

There is a fourth category of ovens that has less to do with specific temperature ranges—specialty ovens. These include countertop ovens that can be used to make pizzas at relatively high temperatures without having to invest in a gas-fired pizza oven or a pizza deck oven. Others have a larger footprint but are useful for pizzerias looking to add more styles of pizzas to their menus without taking up too much space. There are also specialty pizza grills that can get up to extremely high temperatures (you can use a standard grill to make pizza too; see page 2:414). And then there are portable pizza ovens that will allow you to make pizza in almost any location.

Breville Pizza Ovens

The world is awash with various countertop appliances. There are way too many models at the low end of the market for us to test them all, so we decided to focus on one of them—the Breville. This company is a well-known cookware brand with a range of countertop ovens, including pizza-specific ones. The brand is widely touted by home and professional pizza makers alike, which piqued our interest. We chose three Breville ovens to compare: the Smart Oven Pizzaiolo, the Crispy Crust Pizza Maker, and the Compact Smart Oven.

The Smart Oven Pizzaiolo is a countertop home appliance that has a small footprint, can be used indoors, and is built specifically to bake pizzas. It

gets up to very high temperatures for a home device (400°C / 750°F). If you want an oven this small that can get very hot using just the power from a regular outlet, then this fits the bill.

Some might find it limiting that you can fit only a 30 cm / 12 in pizza in it. But that limitation stems from a basic fact: countertop appliances are limited in their wattage. As with other high-temperature ovens, however, it bakes the pizza very fast, so you can get the next one going quickly. It performed well in our tests, yielding a Neapolitan pizza that looked like it was baked in a larger, hotter commercial pizza oven.

All thin-crust and medium-crust pizzas that were baked at lower temperatures (including New York, artisan, thin-crust, and Brazilian thin-crust pizzas) turned out very well, so long as they did not exceed the maximum diameter. You can also make pan-baked pizzas in this oven, but you will need to use a 30 cm / 12 in round pan (which is included with the model). A sturdy pie tin also works well.

The Crispy Crust Pizza Maker is also built specifically for making pizza and is the least expensive of the three options. We discovered that it makes exceptional thin-crust pizzas as well as New York-style pizzas, giving the crust a good char and crispy texture. The third oven option, the Compact Smart Oven, is a multifunction oven, so it didn't perform as well in our specific pizza tests, but it would work well for a variety of other purposes.

For more on baking in portable ovens, see page 2:416.



Breville Smart Oven Pizzaiolo



Breville Crispy Crust Pizza Maker



Breville Compact Smart Oven

If you are a pizza enthusiast and are looking for value in a home pizza oven, the Breville Crispy Crust Pizza Maker will produce great pizzas for the price. If you are really serious about making pizza at home, we definitely recommend the Smart Oven Pizzaiolo.

TurboChef Pizza Oven

The TurboChef pizza oven is small enough to fit in some home kitchens and can reach high enough temperatures (up to 450°C / 840°F) to bake Neapolitan-style pizzas. Of course, you can also use the lower settings to bake other styles. This is a valuable piece of equipment if you want to be able to bake Neapolitan-style pizzas in your home, one at a time.

Although it's home-friendly, you will also likely find it in a professional kitchen environment where pizza is not the main type of food being served but is rather an option on the menu. The TurboChef can bake up to a 35 cm / 14 in pizza (see page 3:355 for scaling options), but nothing larger than that. A benefit of this oven is that it is self-contained and does not require venting.

Portable Outdoor Wood and Gas Pizza Ovens

Here, we are mostly referring to the Gozney Rocbox and Ooni Koda pizza ovens. These ovens, which you can literally carry around like a briefcase, are the definition of portable. The Rocbox allows you to burn wood chips or use a propane tank for fuel, while the Koda is fueled by propane gas. We tested both types of fuel on the Rocbox and were frankly happier with the propane tank, since it produced a more consistent heat and got hotter quicker than it did with the wood chips.

The disadvantage of using gas rather than wood is that you have to cart around a propane tank if you are using the oven away from your home. Even so, it is one way to get a very good Neapolitan-style pizza. The fact that it can only be used outdoors may or

may not bother you. These ovens are great for any sort of small-scale outdoor pizza baking, whether on the balcony of your apartment or camping in the wilderness. While you can bake only one pizza at a time, each one takes a mere 60–90 seconds to bake.

We want to note that both Gozney and Ooni make not only portable pizza ovens but also commercial wood-fired pizza ovens. Ooni also makes a nonportable pizza oven that is larger (but not large enough to be considered for professional use); it can use wood, pellets, or propane gas as fuel.

Otto Grill

When we first saw the Otto Grill, we realized its potential almost immediately. This is a small grill (really, a broiler) that is portable and fueled by propane gas. Astonishingly, it can heat up to 815°C / 1,500°F. Obviously, this maximum temperature is too high for any kind of pizza, but all we had to do was turn the intensity of the heat down to produce some very convincing Neapolitan-style pizzas. One drawback is that there isn't a temperature dial, just a flame-intensity knob, so you don't have precise control over the temperature at which the pizza bakes.

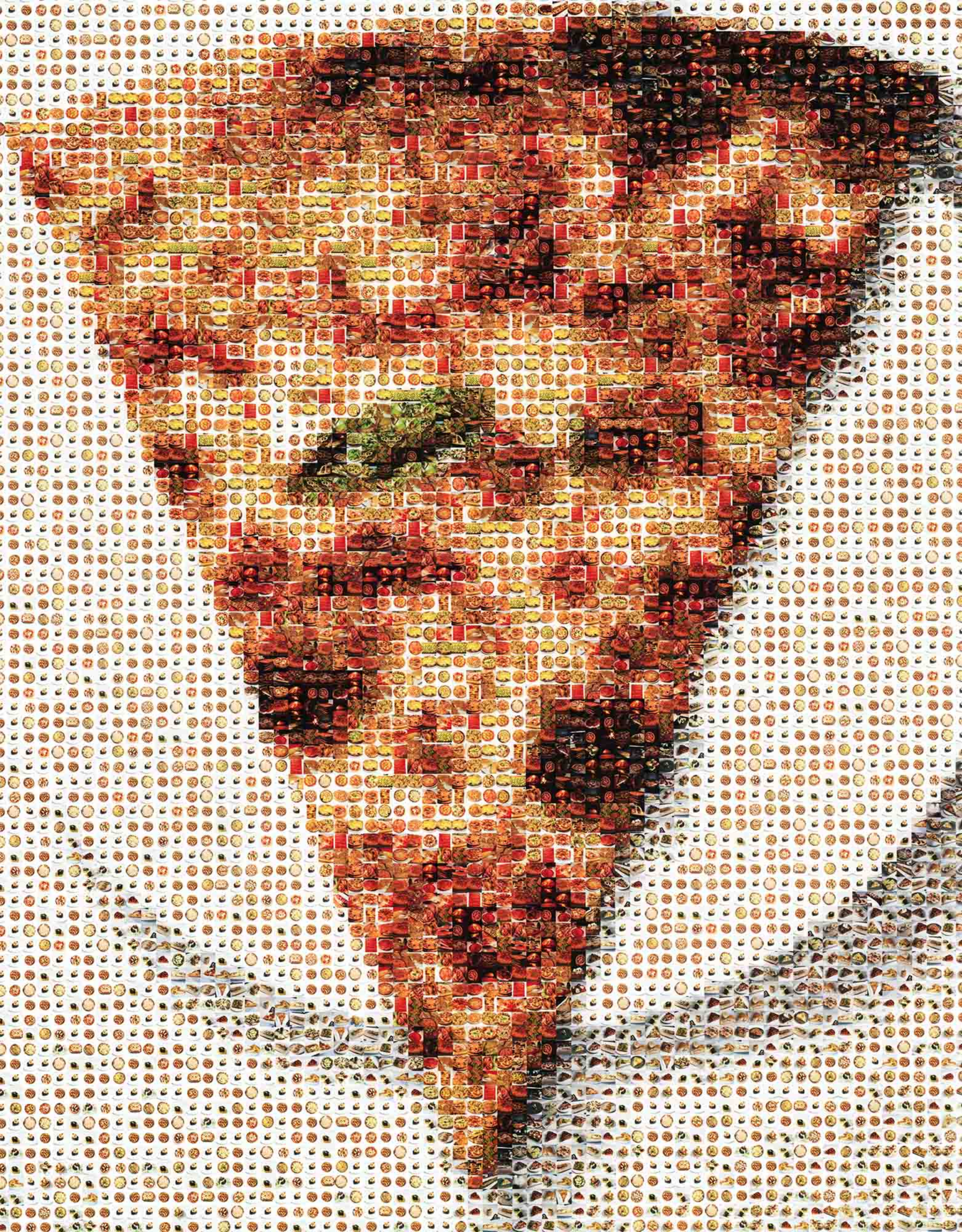
The pizza sits on a grate that you can adjust to get closer or farther from the broiler. Because of the high heat, this grill is a little trickier to manage compared to the other small ovens, but the results are very good. It is also limited by its size and the fact that it is an outdoor-only appliance. You can't have it all, but what we like about this grill is that it can be used for anything you would cook on a grill, including pizza. We cover how to cook pizzas on a grill on page 2:414, and we note there that one of the downsides of grilling a pizza is that you don't get any top heat to brown your cheese or other toppings (it melts them and heats them, but there is no browning). With this grill, you can brown the top of your pizza because it functions like a broiler.



TurboChef Pizza Oven



Otto Grill Original



INDEX

- A**
- A Casa da Pizza Estufada (São Paulo, Brazil), 192
- “a la parrilla”-style pizza, 200
- “a la piedra”-style pizza, 42, 144
- A Tal da Pizza (São Paulo, Brazil), 192
- ABC Montecchia (Veneto, Italy), 184
- absorption, 317, 351
- Accademia della Pizza Napoletana, 111
- acetic acid, 302
- active dry yeast
- blooming (dispersing into water), 296
 - overview of, 293
 - recommendations for working with, 294
 - substituting, for different types of yeast, 295
- adjaruli khachapuri, 96
- adsorption, 317
- Aeneid*, 4
- air temperature, in wood- and gas-fired pizza ovens, 360–361
- Al Solito Posto (Tuscany, Italy), 180
- al taglio pizza
- See also High-Hydration Al Taglio Pizza Dough
 - attributes of, 140
 - compared to other pizza styles, 99, 125
 - Iezzi- vs. Bonci-style, 140
 - “Roman-style” pizza and, 109–111, 112, 140
- Alajmo, Massimiliano, 141, 185
- Alajmo, Raffaele, 185
- Albana, John, 29–30, 33
- Albano, Giovanni, 33
- alcohol and pizza, link between, 61
- Alfieri’s Italian Grocery Store, 58
- all-purpose flour, 277–278, 280
- Alleva Dairy, 14
- alveograph test, 278
- amaranth, 286, 332, 333
- American GIs, myth linking popularization of pizza to, 54
- American “melting pot,” illusion of, 28–29
- Amo (Veneto, Italy)
- map, 184
 - our visit to, 185
- AMOR (Lombardy, Italy)
- map, 184
 - our visit to, 185
- amylases, 275, 324, 328
- amylopectin, 274, 275
- amylose, 274, 275
- Anaconda flour, 277
- ancient grains, 325, 332–333
- ancient Rome, 4, 6, 15
- anti-immigrant sentiment, 28, 61
- Antica Pizza Fritta da Zia Esterina Sorbillo (Naples, Italy)
- map, 157
 - our visit to, 165
- Antica Pizzeria (Los Angeles, CA.), 85
- Antica Pizzeria Port’Alba (Naples, Italy), 14, 39
- map, 157
 - our visit to, 167
- Antica Pizzeria Port’Alba (New York, NY.), 36
- Antico Forno Campo di Fiore (Rome, Italy), 108
- Antico Forno Roscioli (Rome, Italy), 108, 133
- map, 171
 - our visit to, 172
- Apicius*, 6
- apizza. See New Haven-style pizza
- Apizza Scholls (Portland, OR.), 120
- map, 256
 - our visit to, 257
- APN (Associazione Pizzaiuoli Napoletani), 75, 85
- Apollonia’s Pizzeria (Los Angeles, CA.), 120
- our visit to, 263
- applesauce, as inclusion, 339
- Arcimboldo, Giuseppe, photo homage to, 270
- Argentina, pizzerias visited in. See Buenos Aires
- Argentinean-style “al molde” pizza, 40, 125, 129, 200
- Arizona. See Phoenix
- Armour & Company, 52
- artificial flavorings, 323
- artisan pizza
- attributes of style, 138–139
 - compared to other styles, 99, 125
 - recipes for, compared to New York pizza, 321
 - rise of, 82–84
- Artisan Pizza Dough
- experiment to determine optimal hydration levels in, 289
 - experiment using dough relaxers in, 327
 - experiment with varying fat types and percentages in, 319
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - ovens recommended for, 380, 381
- Artusi, Pellegrino, 8, 19
- ascorbic acid (vitamin C), 281, 323, 324
- ash content (flour classification system), 279, 282
- Associazione Pizzaiuoli Napoletani (APN), 75, 85
- Associazione Pizzerie Italiane, 109
- Associazione Verace Pizza Napoletana (AVPN), 74–75, 85, 125, 133, 154–155
- AtoZ Produce and Bakery (Wisconsin), 139
- Aurelio’s Pizza Homewood (Chicago, IL.), 237
- Authentic Detroit Style Pizza Maker Program, 111
- “authenticity,” 33, 74–75, 84, 85, 87, 130
- autolysis, 293
- AVE Pizza Romana (Paris, France), 107
- AVPN (Associazione Verace Pizza Napoletana), 74–75, 85, 125, 133, 154–155
- B**
- Babbili (São Paulo, Brazil), 192
- Baby Blue Pizza (Portland, OR.), 256
- Baby Doll Pizza (Portland, OR.), 256
- Bachetti, Attilio, 163
- Bacin, Dan, 238
- Bacino’s (Chicago, IL.)
- map, 237
 - our visit to, 238
- “backslopped” levains, 302–303
- baker’s percentage, xxiv
- Bakers Pride, 60
- baking pizza
- See also physics of baking; pizza ovens
 - gel layer problem, 370–371
 - pizzaiolo equation, 372–373
- baking steels, effectiveness in uniformly baking pizza, 355
- baking steels/stones, importance of using, 391
- Ball, Lucille, 78
- balloon test for dough, 322
- Balzano, Antoinette, 38
- Banchero Pizzeria (Buenos Aires, Argentina), 42
- map, 202
 - our visit to, 207
- “Bandit’s Roost, The” (photo), 29, 30
- BAR (New Haven, CT.), 230
- “bar pie.” See “tavern-style” pizza
- Barbati, Ludovico, 227
- Barbiero’s (Chester, PA.), 53
- barley, 332, 333

- See also* malted flour
- Basile, Giambattista, 14
- Basile, Nick, 37
- Batmanglij, Najmieh, 93
- “Battle of Wheat,” 67
- bean flours, 286–287, 328–329
- Beddia, Joe, 266
- beer and pizza, relationship between, 61
- Beghi, Nerio, 141
- Bellenger, Sylvain, 75
- Bellucci, Filomena, 32
- Berberè (Lombardy, Italy)
- map, 184
 - our visit to, 186
- Bertucci, Bruno, 196
- Bertucci, Giuseppina, 196
- “best pizza” lists, 152
- Best Pizza (New York, NY.), 84, 383
- map, 217
 - our visit to, 218
- beta-glucans (β -glucans), 286
- Bianco, Chris, 83–84, 266, 267
- bigas, 298
- Bimonte, Gary, 113, 118
- Birdseye, Clarence, 58
- Bisogno, Pasquale, 162
- bisteeya, 8
- “black” vs. “white” ovens, 382
- blackbody radiation, 355
- bleached/unbleached flour, 280
- Blodgett deck ovens, 383
- blooming yeast, 296
- Bocca di Dama (“lady’s lips pizza”), 8
- Boglio, Efred, 241
- Boglio, Joseph, 241
- Boiardi, Hector, 55
- boiling point, bringing dough to, 365
- boiling zone, 363
- Bonci, Gabriele, 4–5, 110–111, 125, 140, 176, 239
- Bonci Pizzeria (Chicago, IL.)
- map, 237
 - our visit to, 239
- Boni, Ada, 69, 70
- Bosco, Renato, 124, 141, 188
- Boston, first pizzerias in, 37
- boundary layer, 350
- Bourdain, Anthony, 240
- Bowerman, Cristina, 107, 173
- Boyé, Mario, 204
- bran, 273, 285, 324, 325
- Brandi, Giovanni, 23
- Bráz Elettrica (São Paulo, Brazil)
- map, 192
 - our visit to, 193
- Bráz Quintal (São Paulo, Brazil)
- map, 192
 - our visit to, 194
- Brazil, pizzerias visited in. *See* São Paulo
- Brazilian thin-crust pizza
- See also* São Paulo-style pizza
 - attributes of style, 126
 - compared to other pizza styles and types, 98, 125
 - design flaws, 114
- Brazilian Thin-Crust Pizza Dough
- experiment to determine optimal hydration levels in, 289
 - experiment using cake flour in, 277
 - experiment using dough relaxers in, 327
 - experiment with varying fat types and percentages in, 318
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - ovens recommended for, 381
- bread deck ovens
- considerations for selecting
 - about low-heat ovens, 387
 - heating modes, compared to other ovens, 378
 - overview of, 387–389
 - pizza styles recommended for, 380–381
 - visual guide, 379
- bread flour, 277–278, 280, 282
- bread-like pizza doughs
- experiment to determine optimal hydration levels in, 289
 - improving volume in, 324, 325
- bread of Tuscany, saltless, 118
- Breville Pizza Ovens, 394–395
- bromated/nonbromated flour, 281
- bromelain, 326, 327
- Brooklyn Pizza Crew (New York, NY.)
- map, 217
 - our visit to, 220
- brown rice flour, 287
- browning zone, 363
- Bruni, Frank, 75, 84
- Brussell, Abraham W., 54
- buckwheat, 286, 332, 333
- Buddy’s Rendezvous (Detroit, MI.), 65, 250
- map, 251
- Buenos Aires, Argentina
- history of pizza in, 40–42
 - pizzerias visited in, 203–207
 - about pizza/pizza styles in, 200
 - historic pizzerias, 207
 - key takeaways, 201
 - map of, 202
 - by the numbers, 201
- Buenos Aires-style pizza, 200–201
- See also* Argentinean-style “al molde” pizza
 - range of types, 41–42, 144
 - similarities to ancestral Neapolitan pizza, 39
 - thick-crust, design flaws in, 114
- Buitoni (frozen pizza brand), 58
- bulgur, 332
- Burt’s Place (Chicago, IL.)
- map, 237
 - our visit to, 240
- ## C
- Cacialli, Ernesto, 211
- Café Benisica (Tokyo, Japan), 210
- Caiazzo, Italy. *See* Pepe in Grani
- cake flour, 277, 280
- Calabrian, Matteo, 186
- Calabrian, Salvatore, 186
- California Pizza Kitchen, 83
- California, 262
- See also* artisan pizza
 - first pizzerias in, 37
 - pizzerias visited in
 - Los Angeles, 263–264
 - San Francisco and the Bay Area, 265
 - rise of pizza chains in, 79–80
- Callegari, Stefano, 177
- calzone, 123, 124
- Campania. *See* Naples and Campania
- Camposano, Ignazio, 50
- Camposano’s Apizza (New Haven, CT.), 50
- “Canadian” bacon, 100
- canchera, 41, 42, 144
- canotto-style pizza, 99, 125, 135, 226
- Cantina Castelões (São Paulo, Brazil), 44–45
- map, 192
 - our visit to, 199
- Capatti, Alberto, 7
- Capello, Carlo, 71
- Capitani, Cecilia, 175
- Caplan, Colin M., 48, 49, 50, 153
- Caporuscio, Giorgia, 85, 220
- Caporuscio, Roberto, 85, 220
- Caputo, Antimo, 75, 86
- Caputo, Carmine, 75
- Caputo Cup, 122

- Caputo flour, 75, 279
- Carlo Sammarco Pizzeria 2.0 (Campania, Italy)
map, 157
our visit to, 159
- Carlos Pizza (São Paulo, Brazil)
map, 192
our visit to, 195
- Carney, Dan, 80
- Carney, Frank, 80
- carotenoids, 275
- Carracciola Hotel, 36, 61
- caryopsis, 273
- Casa, Giancarlo, 175
- Castelões. *See* Cantina Castelões
- Catupiry, about, 191
- chain pizza, 79–81, 125, 145
- Chang, David, 208, 211
- Checkerboard Pizza (Portland, OR.)
map, 256
our visit to, 257
- cheese
history of pizza and, 14, 15, 70–71
science of baking and, 372–373
- Chef Boyardee, 55
- chef-inspired pizza. *See* artisan pizza
- chemical changes in food, during cooking, 346–348
- chemical terms, common endings for, 275
- Chez Panisse (Berkeley, California), 82
- Chicago, Illinois
history of pizza in, 62–64
pizza tours, 153
pizzerias visited in, 238–246
about pizza in, 234–235
key takeaways, 236
map of, 237
by the numbers, 236
- Chicago Pizza and Oven Grinder Co. (Chicago, IL.), 237
- Chicago-style pizza, 234–236
See also deep-dish pizza; stuffed-crust pizza
development of, 62–64
pizza design flaws, 114
tavern-style pizza, 105, 106
thin-crust pizza, 114, 125, 126–127, 234, 236
- chickpea flour, 286–287
- childhood pizza, coming to terms with, 115–116
- chlorine, in water, 290, 291
- Ciardullo, Lena, 222
- Cinotto, Simone, 61
- Cipriano, Mario, 181
- Ciriaci, Fabio, 186
- Claiborne, Craig, 77
- Cloverleaf Pizza (Detroit, MI.), 65, 118
map, 251
our visit to, 252
- coal/coke, as oven fuel, 52, 388
- coca, 96
- Coccia, Andrea, 75
- Coccia, Ciro, 75
- Coccia, Enzo, vii, 75, 86, 111, 135, 164, 246
- Coccia, Marco, 75
- Cocco, Fortunato, 48
- coke/coal, as oven fuel, 52, 388
- Collodi, Carlo, 18, 19
- Colony Grill (Stamford, CT.), 106
- combi ovens
considerations for selecting
about low-heat ovens, 387
overview of, 389
pizza styles recommended for, 380–381
visual guide, 379
- combination fermentation, 299
- commercial starter cultures, 302–303
- commercial yeast, 293
best options for pizza dough, 297
blooming (dispersing into water), 296
vs. commercial levain cultures, 302–303
forms of (fresh, active dry, and instant), 293–294
preferments made with, 299
combination fermentation, 299
vs. direct doughs, 298
vs. levains, 302
Neapolitan pizzaioli and, 303
poolish, 299–301
recommendations for working with, by type, 294
substitutions, between types, 295
- computer, first pizza ordered using, 78
- condensation zone, 363
- conduction, 349, 352, 358–359, 362, 365
- Condurro, Michele, 167
- Coniglio, Nino, 220
- Connecticut, 106, 247
See also New Haven
- Consiglio, Salvatore, 51
- convection, 349, 352, 362, 363, 365
- convection cells, 349
- convection ovens
considerations for selecting
about low-heat ovens, 387
heating modes (with/without steam), compared to other ovens, 378
overview of, 389–390
pizza styles recommended for, 380–381
visual guide, 379
science of, 349, 350
- cookbooks, historical. *See* recipes for pizza, historical
- cooking grains, 336–337
- cooling pizzas, science of, 348, 364
- copper cookware, 350
- corn/cornmeal, 287, 332
- Corner Slice (New York, NY.), 217
- Costco, 81
- countertop ovens, 379, 394–395
- Cracco Café (Lombardy, Italy), 184
- Cretella, William “Butts,” 232
- Crimmins, J. D., 27
- Crocker, Betty, 78
- cross-linking, 346, 367
- Crown, The (Portland, OR.), 256
- crumb and crust
See also pizza dough ingredients; pizza dough, physics of baking
as central element of pizza styles, 97, 98–99
flour components affecting color of, 275
gel layer problem, 370–371
improving volume by using baking steels, 355
improving volume in bread-like pizzas, 324–325
leoparding, of Neapolitan pizzas, 366
modifying texture of, 328–329
- crystalline fats, 317
- “Cuban” pizza, 100
- culinary journeys, viii–x
- Cuneo, Antonio, 29
- Cuomo, Ralph, 77
- Cuomo, Salvatore, 213
- ## D
- Da Remo (Rome, Italy), 107–108, 172
- database, pizza, 320–321
- De Leon, Justin, 120, 263
- De Lorenzo’s Tomato Pies (New Jersey), 104, 120
- de’ Medici, Cosimo, 9
- De Re Coquinaria*, 6
- De Rosa, Bruno, 133, 188
- De Sica, Vittorio, 38
- De Vita, Vito, 165
- deactivated yeast, 326
- Dean, James, 78
- deck ovens. *See* bread deck ovens; pizza deck ovens
- deep-dish pizza, 128–129
See also stuffed-crust pizza
Chicago-style pizza, 81

- attributes of style, 128, 234, 236
 - design flaws, 114
 - invention of, 64
- compared to other pizza styles and types, 98, 99, 125
- Deep-Dish Pizza Dough
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - ovens recommended for, 381
- DeGenero, Louisa, 64, 242
- dehydrating levains, method for, 309
- Delbosque, Natalia, 198
- Delbosque, Renata, 198
- Dell'Amura, Gigino, 162
- DeMarco, Domenico, 119, 227
- DeRiso, Ernie, 231
- DeRiso, Pat, 231
- Detroit, Michigan
 - history of pizza in, 65
 - pizza school in, 111
 - pizzerias visited in, 252–253
 - about pizza/pizzaioli in, 250
 - key takeaways, 250
 - map of, 251
 - by the numbers, 250
- Detroit-style pizza, 250
 - attributes of style, 142–143
 - compared to other pizza styles and types, 98, 99, 125
 - development of, 65
 - old-school disease and, 120
 - referred to as “red top,” 65
- Detroit Style Pizza Company (Detroit, MI.)
 - map, 251
 - our visit to, 253
- Detroit-Style Pizza Dough
 - experiment to determine optimal hydration levels in, 289
 - experiment using dough relaxers in, 327
 - experiment with varying fat types and percentages in, 318
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - ovens recommended for, 381
- DevilCraft Hamamatsucho (Tokyo, Japan), 210
- Di Biase, Ivana, 118
- Di Buono family, 62
- Di Fara (New York, NY.), 119
 - map, 217
 - our visit to, 227
- di Marco, Corrado, 108–109
- diastatic malt powder, 324
- Dickie, John, 18, 21
- “digestibility,” Italian obsession with, 133
- direct doughs, 298
- Divine Comedy* (Dante), 118
- Domino's, 80–81, 145
- Don Antonio (New York, NY.), 220
- “double crunch” pizza, 124
- 00 flour, 278–279
 - Caputo flour, 75, 279
 - essential numbers for, by brand, 282
 - particle size differences in, 284
 - reading flour labels, 280
- dough. *See* pizza crumb and crust; pizza dough ingredients; pizza dough, physics of baking
- Dough Bros Pizza (Chicago, IL.)
 - map, 237
 - our visit to, 238
- dough conditioners (or improvers)
 - benefits of using, 323
 - improving dough handling and shaping with, 326–327
 - improving volume in bread-like pizzas with, 324–325
 - measuring purified ingredients, 328
 - misconceptions about, 323
 - modifying texture in crumb and crust with, 328–329
- dough inclusions. *See* inclusions
- dough relaxers (reducing agents), 326–327
- dry-bulb temperature, 365
- Dry Milano (Lombardy, Italy)
 - map, 184
 - our visit to, 187
- Dues, Shardell, 260
- Duje (formerly Santarpia; Tuscany, Italy)
 - map, 180
 - our visit to, 182
- Dumas, Alexandre, 16, 86
- E**
- Eat, Pray, Love* (Gilbert), 118, 167
- Eddie's Pizza (New Hyde Park, NY.), 106
 - 1893 (Buenos Aires, Argentina)
 - map, 202
 - our visit to, 203
- einkorn, 332, 333
- Eisenhower, Dwight D., 74
- El Cuartito (Buenos Aires, Argentina)
 - map, 202
 - our visit to, 203
- El Imperio de la Pizza (Buenos Aires, Argentina)
 - map, 202
 - our visit to, 203
- El Mazacote (Buenos Aires, Argentina)
 - map, 202
 - our visit to, 204
- El Rincon Restaurante Mexicano (Sedona, AZ.), 124
- elasticity of dough, 322
- electric ovens, 60, 376, 384, 388
- Ellis Island, 28
- Emilia-Romagna, Italy
 - pizzeria visited in, 189
 - map of, 184
 - by the numbers, 179
- Emily (New York, NY.), 222
- emissivity, 351–352, 353–354, 372
- Emma (Rome, Italy), 107–108
 - map, 171
 - our visit to, 172
- emmer, 332, 333
- Emmy Squared (New York, NY.), 386
 - map, 217
 - our visit to, 222
- emulsifiers, 323
- endosperm, 273, 285
- enriched flour, 280
- enzymes
 - as flour component, 275
 - improving pizza dough with, 323, 324–329
 - method for measuring, 328
- equipment, xxi
- Era Ora (Campania, Italy)
 - map, 157
 - our visit to, 159
- Ernie's Pizzeria (New Haven, CT.)
 - map, 230
 - our visit to, 231
- Esposito, Raffaele, 23, 167
- ethanol, 292
- etymology of word “pizza,” 7
- evaporation, 348, 350, 367, 368
- experiments
 - best yeast for making pizza dough, 297
 - determining optimal hydration levels in our master doughs, 289
 - effectiveness of baking steels in uniformly baking pizza, 355
 - examining particle size differences in flours, 284
 - freezing and using Second-Chance Levain, 310
 - gel layer problem, 370–371
 - how sauce keeps the center of the pizza low and flat, 369

improving dough handling and shaping with relaxers, 327
improving volume in bread-like pizzas, 325
making pizza dough without added yeast, 297
reflectivity in oven walls, importance of, 353
role of radiative heat in baking pizza (how light bakes pizza), 357
sauce reflectivity, effect of, on pizza, 369
using cake flour in Brazilian Thin-Crust Pizza Dough, 277
varying fat types and percentages in our master doughs, 318–319
water type, effect of, on pizza dough, 291
extensibility (stretchiness) of dough, 278, 322, 326–327
extraction rate (flour classification system), 279

F

F&F Pizzeria (New York, NY.), 84, 217
Fain, Will, 258
fainá, 40–42, 144
Famous Ben's Pizza (New York, NY.), 217
Farotto's (St. Louis, MO.), 66
fats and oils
as flour component, 275
as pizza dough ingredient, 316–317
crystalline fats and liquid fats, 317
experiment varying fat types and percentages in our master doughs, 318–319
fat percentages in our master doughs, 316
fava bean flour, 328–329
Federici's (Freehold, New Jersey), 105–106
Ferdinand IV, King of Naples, 14
fermentation. *See* preferments; yeast
fermented flour, 298
Ferraz, Danilo, 203
Fierro, Aurelio, 68
50 Kalò (Naples, Italy), 133
map, 157
our visit to, 158
"50 Top Pizza" list, 152
53½ Spring Street pizzerias, 31, 32, 36
Fiore, Amedeo, 66, 105
Fiore, Elizabeth, 66
firebricks, 353, 387
Five Points, New York, 25–30
flammkuchen (or flammekueche), 96
flatbreads, 4–5, 7, 96
flavored liquids and purees for inclusions, 339–341
Fleischmann's Active Dry Yeast, 293
Flo & Santos (Chicago, IL.), 237
float test, for preferments, 301

Florapan, 303
flour, 273
components of, 274–275
essential numbers for, by flour type and brand, 282
experiment examining particle size differences in, 284
experiment using cake flour in Brazilian Thin-Crust Pizza Dough, 277
fermented flour, 298
gluten-free, 286–287, 325
gluten potential and, 274, 282
"Manitoba" flour, 39, 68
"Neapolitan pizza man" (Arcimboldo, Giuseppe, photo homage to), 270
protein content and, 277–278, 279, 280
reading flour labels, 280–281
recommended types and brands, by pizza style, 283
rye, 286, 325
starch damage, 274
wheat kernel, parts of, 273
wheat, types of, 277
all-purpose, bread, and high-gluten bread flours, 277–278, 280
00 flour, 278–279, 280, 282, 284
refined flour (white flour), 277
specific pizza flours, 278–279, 282
whole wheat flour, 285, 324
flour mill spec sheets, 278
flour particle size, 279, 284
fluoride, in water, 290, 291
foam structure, 348
foam zone, 363
focaccia, 17
definition of pizza and, 4–5
fugazza and fugazzeta, 41, 200
pizza gourmet and, 141
pizza rossa and pizza bianca, 108, 124
regional differences in Italy and, 19
"Roman-style" pizza and, 108, 109–110, 112
sfincione as type of, 96
Focaccia Dough
experiment to determine optimal hydration levels in, 289
experiment to improve volume in, 325
experiment using dough relaxers in, 327
experiment with varying fat types and percentages in, 319
fat percentages in, compared to other styles, 316
fermented flour in, 298
flours recommended for, 283

ovens recommended for, 381
fonio, 332
forced convection, 349, 350
forced convection ovens, 389
Forkish, Ken, 120, 257, 258
Forneria Urbana (São Paulo, Brazil)
map, 192
our visit to, 196
Forno e Pizzeria (first pizzeria in New York), 29–30
fortified flour, 281
450 Gradi Pizza e Fritti (Campania, Italy)
map, 157
our visit to, 159
Franceschini, Dario, 75
Frank Pepe Pizzeria Napoletana (New Haven, CT.)
map, 230
New Haven's pizza history and, 50, 51, 52
our visit to, 231
pizza design flaws, 113, 117, 118
similarities to ancestral Neapolitan pizza, 39
Frank's Pizzeria (Quad Cities), 248
freekeh, 332
freezer-tolerant yeast, 294
fresh yeast
blooming (dispersing into water), 296
downsides to using, 297
overview of, 293
recommendations for working with, 294
substituting, for different types of yeast, 295
Freyre, Gilberto, 45
fried pizza. *See* pizza frita
frozen food revolution, 58, 81
fruit and vegetable purees for inclusions, 339–341
fruit juices
improving pizza dough with, 326, 327
use in starters, myths about, 308
fruit protease enzymes, 326, 327
fugazza, 41, 144
fugazzeta, 41, 144
G
G. S. Blodgett Company, 59
Gaeta, Italy, 6
Galen (Greek physician), 9
Galli, Camillo, 23
Galozzi, Enrico, 19
Gambero Rosso ratings, 152
Gangs of New York (film), 25
garbanzo bean flour, 286–287
gas, as oven fuel, 388
gas-fired pizza ovens

- considerations for selecting
 - about high-heat ovens, 375–376
 - heating modes, compared to other ovens, 378
 - overview of, 382
 - pizza styles recommended for, 380–381
 - rotating floor ovens, 384
 - visual guide, 378
 - invention of, 59–60
 - science of baking in, 354, 356–357
 - air temperature and baking environment of, 360–361
 - uneven distribution of heat in, 354, 356–357
 - gas grills, 354, 356
 - See also* Otto Grill
 - Gattorna, Nestor, 207
 - gel layer problem, 370–371
 - gelatinization of starch, during baking, 346, 348
 - gelation vs. gelatinization, 274
 - Gemignani, Tony, vi, xv, 84, 122, 265
 - General Mills, 78
 - Genoa, Italy, 40–41
 - Gentile, Angelo, 50
 - GENU pectin, 324, 325
 - germ, 273, 285, 325
 - Ghigiarelli, Grandma, 66, 249
 - Giannone, Paul, 224, 244
 - Gilbert, Elizabeth, 167
 - Gino's East (Chicago, IL.), 64, 234
 - map, 237
 - our visit to, 241
 - Giordano, Luigi, 70–71
 - Giordano's (Chicago, IL.), 234
 - map, 237
 - our visit to, 241
 - Giotto Pizzeria-Bistrot (Tuscany, Italy)
 - map, 180
 - our visit to, 181
 - Giulietta (Rome, Italy), 107
 - map, 171
 - our visit to, 173
 - Gleason, Jackie, 78
 - gliadin, 274
 - glutathione, 293
 - gluten
 - improving pizza dough and, 322, 324–327
 - protein content in flour and, 274
 - wet/dry numbers for, by flour type and brand, 282
 - gluten-free flours, 286–287, 325
 - glutenin, 274
 - glutinous rice flour, 286, 287
 - Goldberg's Pizzeria (Chicago, IL.), 81
 - Goldsmith, Jonathan, 246
 - golondrinas (swallows), 40
 - grains. *See* inclusions
 - Granato's (Chicago, IL.), 62
 - Grancaffè Quadri (Veneto, Italy)
 - map, 184
 - our visit to, 185
 - "Grandma Ghigiarelli," 66, 249
 - "Grandma-style" pizza, 101, 102, 114, 125
 - grilled pizza, 97, 144
 - Guerra, Gus, 65, 250, 252
 - gum line. *See* gel layer problem
 - Gusto Madre (Piedmont/Valle D'Aosta, Italy)
 - map, 184
 - our visit to, 186
- ## H
- Hadley, Ruth, 64
 - Handsome Pizza (Portland, OR.)
 - map, 256
 - our visit to, 258
 - Happy Joe's (Quad Cities), 248
 - "hard water," 290, 291
 - hard wheat vs. soft wheat, 274, 277, 333
 - Harris, Leonard, 248
 - Harris, Mary, 248
 - Harris Pizza (Quad Cities), 248
 - "Hawaiian" pizza, 100
 - heat flux, 365
 - heat pipe, dough as, 362–364
 - heat rays, 351–352
 - heat transfer. *See* physics of baking
 - heat transfer coefficient, 349, 350
 - Hell's Pizza, 203
 - Helstosky, Carol, 87
 - high-gluten bread flour, 277–278, 280
 - high-heat ovens, 375–377, 380, 382
 - High-Hydration Al Taglio Pizza Dough
 - experiment to determine optimal hydration levels in, 289
 - experiment to test effect of water type on, 291
 - experiment using dough relaxers in, 327
 - experiment with varying fat types and percentages in, 319
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - ovens recommended for, 381
 - high-methoxyl (HM) pectin, 324, 325
 - historic pizzerias
 - See also specific city*
 - Buenos Aires, 207
 - Naples and Campania, 118, 167
 - New York, 119–121, 227
 - old-school disease, 118–121
 - pizzas closest to ancestral Neapolitan pizza, 39
 - São Paulo, 199
- ## history of pizza, 3–4
- See also* United States, history of pizza in
 - Argentina, 40–42
 - Brazil, 43–45
 - definition of pizza and, 4–5
 - Italy
 - earliest "pizza" in, 6
 - bisteeya and, 8
 - etymology of word "pizza," 7
 - first appearance of word "pizza" in print, 6
 - as sweet tart, 6, 8, 11
 - timeline of, 10–11
 - hyperlocality of food in, 19
 - Italian water buffalo and, 15
 - mozzarella, history of, 14
 - Naples, origins of modern pizza in, 12–14
 - definition of pizza and, 4–5
 - foreign visitors, described by, 16–19
 - lazzaroni and, 18
 - map of pizzerias operating in 1861, 17
 - as 19th-century street food, 16–17
 - pizza fritta, origin of, 38
 - pizza margherita, real history of, 23
 - pizzas closest to ancestral Neapolitan pizza, 39
 - Pulcinella and, 13
 - timeline for, 10–11
 - 19th century, mass emigration during
 - birth (unification) of Italy, 20, 21
 - Risanamento (urban renewal project), 21–22
 - pizza recipes, historical, 6, 8, 46–47, 69, 70
 - tomatoes arrive in, 9
 - 20th-century developments, 67–75
 - campaign to elevate Neapolitan pizza, 74–75
 - Mussolini's "Battle of Wheat," 67
 - myth of pizza-proselytizing American GIs, 54
 - spread of pizza outside Naples, 69–71
 - timeline of, 72–73
 - World War II, 68–69
 - 21st century (Italy today), 86–87
 - HM (high-methoxyl) pectin, 324, 325
 - Holt, Jane, 54, 62
 - home convection ovens, 389

- home ovens
- calibrating temperature, 390
 - considerations for selecting
 - about low-heat ovens, 387
 - heating modes, compared to other ovens, 378
 - overview of, 390–391
 - pizza styles recommended for, 380–381
 - visual guide, 379
 - improving outcome of pizzas baked in, 393
 - preheating method for, 392
- Honeymooners, The* (TV show), 78
- Hormel Foods, 52
- hot spots
- in deck ovens, 385
 - in gas- and wood-fired ovens, 354, 356–357
 - using baking steels to compensate for, 355
- hydration, improving pizza dough with, 326
- hydration levels in master doughs, experiment on, 289
- hydrocolloids, 287, 323, 324, 325
- hygroscopic ingredients, 313, 315
- Hyland, Emily, 222
- Hyland, Matt, 222
- I**
- I Love Lucy* (TV show), 78
- I Tigli (Veneto, Italy)
- map, 184
 - our visit to, 188
- Iacono, Mark, 221
- Iervolino, Gianfranco, 159
- Iezzi, Angelo, 109–110, 125, 133, 140, 177
- Il Cuoco Galante*, 8
- Il Grottino a Testaccio Dal (Rome, Italy), 108
- Il Re dei Cuochi*, 69
- Il Talismano della Felicità (The Talisman of Happiness)*, 69, 70
- Il Vecchio e il Mare (Tuscany, Italy)
- map, 180
 - our visit to, 181
- Il Ventre di Napoli (The Belly of Naples)*, 21
- Il viaggio per l'Italia di Giannettino*, 19
- Ilitch, Marian, 80
- Ilitch, Michael, 80, 250
- Illinois. *See* Chicago; Quad Cities
- Imo's Pizza (St. Louis, MO.), 105
- impinger ovens
- considerations for selecting
 - about medium-heat ovens, 382–383
 - overview of, 386
 - pizza styles recommended for, 380–381
 - visual guide, 379
- inclusions, 331
- flavored liquids and purees, 339–341
 - ingredient types and suggested amounts, 331
 - overview of grain types, 332–333
 - preparing grains and seeds, 334
 - best bets for, 335
 - biteability, 334–335
 - common cooking problems, 337
 - cooking grains
 - for porridge, 337
 - pressure-caramelizing, 336–337
 - for puree, 337
 - soaking grains and seeds, 336
 - sprouting grains and seeds, 336
- Industrial Revolution, 27, 28, 48–50
- infrared rays, 351
- ingredients. *See* pizza dough ingredients
- ingredients, measurements of, xxiv
- instant yeast
- advantages of using, 297
 - blooming (dispersing into water), 296
 - overview of, 293–294
 - poolish and, 299, 300
 - recommendations for working with, 294
 - substituting, for different types of yeast, 295
- International Pizza Expo, 122
- Iorio, Teresa, 122
- Iowa. *See* Quad Cities
- irreversible and reversible reactions, 346–348
- Italian food, hyperlocality of, 19
- Italian immigration
- to Argentina, 40–41
 - to Brazil, 43–45
 - to the United States, 37, 66
 - Chicago, 62–63
 - New Haven, 48–50
 - New York, 24, 25–30
- Italian obsession with digestion, 133
- Italian water buffalo, 15
- Italy, history of pizza in
- See also* Naples; Neapolitan pizza
 - earliest “pizza” in, 6
 - bisteeya and, 8
 - etymology of word “pizza,” 7
 - first appearance of word “pizza” in print, 6
 - as sweet tart, 6, 8, 11
 - timeline of, 10–11
 - hyperlocality of food in, 19
 - Italian water buffalo and, 15
 - mozzarella, history of, 14
 - 19th century, mass emigration during
 - birth (unification) of Italy, 20, 21
 - Risanamento (urban renewal project), 21–22
 - pizza recipes, historical, 6, 8, 46–47, 69, 70
 - tomatoes arrive in, 9
 - 20th-century developments, 67–75
 - campaign to elevate Neapolitan pizza, 74–75
 - Mussolini's “Battle of Wheat,” 67
 - myth of pizza-proselytizing American GIs, 54
 - spread of pizza outside Naples, 69–71
 - timeline of, 72–73
 - World War II, 68–69
 - 21st century (Italy today), 86–87
- Italy, pizzerias visited in
- Naples and Campania, 158–167
 - about pizza/pizza styles in, 154–155
 - historic pizzerias, 167
 - key takeaways, 156
 - map of, 157
 - by the numbers, 156
 - Northern Italy, 181–189
 - about pizza/pizza styles in, 179
 - key takeaways, 179
 - maps of, 180, 184
 - by the numbers, 179
 - Rome, 172–177
 - about pizza/pizza styles in, 168–169
 - key takeaways, 170
 - map of, 171
 - by the numbers, 170
- Ivo a Trastevere (Rome, Italy), 107–108
- J**
- Jackson, Keith, 243
- Jacobson, Matt, 260
- Japan. *See* Tokyo
- Jeno's (frozen pizza brand), 58
- Jersey City, New Jersey. *See* Razza
- Jet's Pizza (chain), 142
- Job's tears, 332
- Joe's Pizza (New York, NY.)
- map, 217
 - our visit to, 219
- Joe's Tomato Pies (Trenton, New Jersey), 37
- Johnson, Sherwood “Shakey,” 79–80
- K**
- Kakinuma, Susumu, 212
- Katz, Burt, 240, 243
- kebab pizza, 144
- Ken's Artisan Pizza (Portland, OR.), 120

- map, 256
our visit to, 258
- Kesté (New York, NY.), 85, 124, 382
map, 217
our visit to, 220
- Kesté Pizza School, 111
- khachapuri, 96
- khorehsh ghormeh sabzi, on pizza, 93
- khorsan, 332, 333
- King Umberto (New York, NY.), 101
map, 217
our visit to, 227
- kitchen equipment, xxi
- Kitchen Salvatore Cuomo Ginza, The (Tokyo, Japan)
map, 210
our visit to, 213
- Kuban, Adam, 32
- L**
- L&B Spumoni Gardens (New York, NY.)
map, 217
our visit to, 227
- La Divina Pizza (Tuscany, Italy), 180
- La Gatta Mangiona (Rome, Italy), 107
map, 171
our visit to, 175
- La Grotta Azzura (Boston, MA.), 37
- La Guitarrita (Buenos Aires, Argentina)
map, 202
our visit to, 204
- La Masardona (Naples, Italy), 123
map, 157
our visit to, 160
- “La Pizza” (song), 68
- La Reale Tenuta di Carditello, 14
- La Scienza in Cucina e L’Arte di Mangiar Bene (The Science of Cooking and the Art of Eating Well)*, 8
- LAB (lactic acid bacteria), 302
- Labriola (Chicago, IL.)
map, 237
our visit to, 242
- Labriola, Rich, 242
- lactic acid bacteria (LAB), 302
- LaDou, Ed, 82, 83, 264
- “lady’s lips pizza” (Bocca di Dama), 8
- lahmacun, 96
- L’Antica Pizzeria da Michele (Naples, Italy), 107, 118, 119
map, 157
our visit to, 167
- latent heat of fusion, 350
- latent heat of vaporization, 350, 369
- Latini, Antonio, 9
- Laveglia, Massimo, 222
- Lazaroff, Barbara, 82, 83
- lazzaroni, 18
- Le Colonne Marziale (Campania, Italy), 157
- Le Corricolo* (Dumas), 16
- Le Follie di Romualdo (Tuscany, Italy)
map, 180
our visit to, 181
- legume flours, 286–287, 328–329
- leoparding, of Neapolitan pizzas, 366
- Lesaffre yeast, 293–294
- levain de pâte, 299
- levains, 302–303
basic method for starting a liquid levain, 304
best bets for, 305
vs. commercial yeast–based preferments, 302
common problems, 311
comparison of strategies for making, 303
considerations for using as a fermentation method, 299
dehydrating, method for, 309
feeding and using, 307
myths about speeding up development of, 308
Second-Chance Levain, 310
stages (readiness) of, 306
storage, 304, 309
- Levenstein, Harvey, 78
- Lewis, Norman, 68–69
- Liberace, 78
- Liberto, Helga, 165
- Lievito Naturale, 303
- lifeboat-style pizza. *See* canotto-style pizza
- Liguria, Italy, 40–41, 96
- Lincoln, Abraham, 26
- L’Industrie Pizzeria (New York, NY.), ix
map, 217
our visit to, 222
- Lipen (Lombardy, Italy), 184
- lipids, 275, 317
- lipoxidases (lipoxygenases), 275, 328–329
- liquid fats, 317
- liquid fuel oil, 388
- Little Caesars, 80, 145, 250
- “Little Italies,” 25, 27, 48–49
- Lo Pinto, Maria, 103
- Lo Scalco alla Moderna (The Modern Stewart)*, 9
- Loeb, August, 69
- Lombardi, Filomena, 32
- Lombardi, Gennaro, 25, 31–32
- Lombardi, Simone, 187
- Lombardi’s (New York, NY.), 33
map, 217
our visit to, 227
true history of, 31, 32
- Lombardy, Italy
margherita pizza in, 134
pizzerias visited in, 185–188
map of, 184
by the numbers, 179
- Loren, Sophia, 38, 39, 78, 166
- L’Oro di Napoli* (film), 38
- Los Angeles, California, 262
pizza schools in, 111
pizzerias visited in, 263–264
rise of artisan pizza in, 82–83, 84
- Los Inmortales (Buenos Aires, Argentina), 42
map, 202
- L’Osteria di Birra del Borgo (Rome, Italy)
map, 171
our visit to, 174
- Lou Malnati’s Pizzeria (Chicago, IL.), 63, 64, 234
map, 237
our visit to, 242
- Louie & Ernie’s (New York, NY.), 118
map, 217
our visit to, 227
- Loui’s Pizza (Detroit, MI.), 65
map, 251
our visit to, 252
- Louisa’s Pizza and Pasta (Chicago, IL.), 64
map, 237
our visit to, 242
- Lovely’s Fifty Fifty (Portland, OR.), 84
map, 256
our visit to, 259
- low-heat ovens, 381, 387–393
- Lucali (New York, NY.), 124
map, 217
our visit to, 221
- Lucano Manuscript*, 6
- Luigi’s Restaurant (St. Louis, MO.), 66, 105
- Lupo’s (San Francisco, CA.), 37
- Lynwood Café (Randolph, MA.), 106
- M**
- Macedo, Antônio, 197
- Machado de Siqueira, João, 196
- Maillard reactions, 315, 365
- Majello, Gennaro, 12–14
- Malnati, Jean, 242

- Malnati, Lou, 242
- Malnati, Rudy, 63, 64, 242
- Malnati, Rudy, Jr., 243
- malted barley syrup, 315
- malted flour, 281
- Mama's TOO! (New York, NY.), 217
- Mandara, Giovanni, 189
- Mangano, Rosolino, 77
- Mangieri, Anthony, 85, 226
- "Manitoba" flour, 39, 68
- Manuelina (Lombardy, Italy), 184
- Manzi, Marco, 181
- map of etymological links between Mediterranean flatbreads, 7
- map of Italy made from margherita pizza (photo), 90
- map of Italy made from regional ingredients (photo), 19
- maps of pizzerias
- Buenos Aires, 202
 - Chicago, 237
 - Detroit, 251
 - Naples and Campania, 157
 - New Haven, 230
 - New York, 216, 217
 - in 19th-century Naples, 17
 - Northern Italy, 180, 184
 - Portland, OR., 256
 - Rome, 171
 - São Paulo, 192
 - Tokyo, 210
- MARGHE (Lombardy, Italy), 184
- margherita pizza
- canotto-style, 135
 - map of Italy made from (photo), 90
 - real history of, 23
 - in Rest-of Italy, 134
 - in Southern Italy, 130–131
- Margherita, Queen of Italy, 23
- marinara pizza, "invention" of, 14
- Marra Forni, 111
- Marta (New York, NY.), 107
- map, 217
 - our visit to, 222
- Martin, Dean, 77
- Martucci, Francesco, 160
- masa harina flour, pregelatinized, 328
- Massachusetts, 37, 106, 247
- master recipes and variations, about, xxv–xxvii
- Mastro, Frank, 59–60, 383
- mastunicola pizza, 14
- Mattioli, Pietro Andrea, 9
- Mattozzi, Antonio, 12–13, 17
- Maxwell's equations, 351
- McKennedy, Mikey, 260
- measurements for recipes, about, xxiv
- measuring small amounts, method for, 328
- meat tenderizer, 326, 327
- media masa, 200
- Medici, Cosimo de', 9
- medium-heat ovens, 381, 382–386
- Medrano, Luis J., 41
- Meeker, Rich, 248
- Melrose Pizzeria (St. Louis, MO.), 66, 105
- Menchetti family, 182
- menus, too many choices on, 107
- Messisbugo, Cristoforo di, 6
- Meyer, Danny, 107, 222
- Meyer, Laura, x, 122, 265
- Michelin Guide, xiv
- Michiel, P. A., 9
- Middle Ages, 6
- Midwest and Northeast, thin-crust pizzas of, 126–127, 247
- Mie scattering, 348
- Mileto, Anna, 162
- millet, 287, 332, 333
- Milone, Filippo, 36, 61
- Minnesota, and the frozen-pizza explosion, 81
- Minnick, Sarah, 259
- Miriello, Guglielmo, 187
- Missouri. *See* St. Louis–style pizza
- Mitgang, Herbert, 32, 77
- Modern Apizza (New Haven, CT.), 51
- map, 230
 - our visit to, 232
- Modernist Neapolitan Pizza Dough, determining optimal hydration levels in, 289
- Modernist pizza doughs, using dough relaxers in, 327
- Modernist Pizza*, story of, xi–xix
- guide to, xviii–xix
 - photographs, about, xvii
- Modernist recipes, about, xxv
- Molina, Matt, 264
- Monaghan, Jim, 80–81
- Monaghan, Tom, 80–81
- montanara, 124, 220
- Morse, Samuel, 18
- mortar and pestle, method for using, 328
- Mortati, Fred, 75
- Mosley, Kathleen, 248
- Mostaccioli, Raffaele, 194
- Mozart, 18
- mozzarella, in history of pizza, 14–15, 52, 70–71
- Mr. Pizza (chain), 145
- Mulberry Bend, New York, 24, 25–30
- Mulino Caputo, 75, 276, 279
- Munao, John, 240
- Mussolini's "Battle of Wheat," 67
- N**
- Naples and Campania, pizzerias visited in, 158–167
- See also* Neapolitan pizza
 - about pizza/pizza styles in, 154–155
 - historic pizzerias, 167
 - key takeaways, 156
 - map of, 157
 - by the numbers, 156
- Naples 45 Ristorante e Pizzeria (New York, NY.), 75, 217
- Naples, history of pizza in
- See also* Neapolitan pizza
 - mass emigration of 19th century, 20, 21–22, 33
 - mozzarella, history of, 14
 - origins of modern pizza in, 12–14
 - definition of pizza and, 4–5
 - foreign visitors, described by, 16–19
 - lazzaroni and, 18
 - map of pizzerias operating in 1861, 17
 - as 19th-century street food, 16–17
 - pizza frita, origin of, 38
 - pizza margherita, real history of, 23
 - pizzas closest to ancestral Neapolitan pizza, 39
 - pulcinella and, 13
 - timeline for, 10–11
 - Renaissance Italy and, 8
 - tomato recipes first printed in, 9
 - 20th-century developments, 67–68
 - campaign to elevate Neapolitan pizza, 74–75
 - "La Pizza" (song), 68
 - Mussolini's "Battle of Wheat," 67
 - myth of pizza-proselytizing American GIs, 54
 - timeline of, 72–73
 - World War II, 68–69
 - 21st century, 86–87
- Nardelli, Luciano, 195
- Natali, Sergio, 175
- natural convection, 349
- "Navajo pizza," 124
- Neapolitan pizza, 130–135
- See also* AVPN; Naples; *specific pizzeria*

- attributes of style, 130
 - in Rest-of-Italy, 134
 - in Southern Italy, 130–131
 - topping variations in Italy and all over the world, 132–133
 - “authenticity” and, 33, 74–75, 85, 87, 130
 - best representations of, 118–119
 - canotto variant. *see* canotto-style pizza
 - compared to other pizza styles and types, 98, 99, 125
 - definition of pizza and, 4–5
 - “digestibility” of, 133
 - 00 flour and, 278–279, 280, 282, 284
 - historic recipes for, 8, 46–47, 69, 70
 - leoparding of crust, about, 366
 - map of Italy made from margherita pizza (photo), 90
 - pizza competitions and, 122
 - pizza frita. *see* pizza frita
 - pizza-like dishes related to, 123–124
 - pizza margherita, real history of, 23
 - “Roman-style” pizza and, 107, 112
 - Neapolitan Pizza Dough
 - experiment to determine optimal hydration levels in, 289
 - experiment using dough relaxers in, 327
 - experiment with varying fat types and percentages in, 318
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - leoparding of crust, about, 366
 - ovens recommended for, 380
 - “Neapolitan pizza man” (photo homage to Giuseppe Arcimboldo), 270
 - Nevin, Ira, 60, 74
 - New Haven, Connecticut
 - history of pizza in, 48–52
 - pizza tours, 153
 - pizzerias visited in, 231–233
 - about pizza/pizza styles in, 228
 - key takeaways, 229
 - map of, 230
 - by the numbers, 229
 - New Haven–style pizza, 228–229
 - ancestral Neapolitan pizza, similarities to, 39
 - “apizza” as local name, origin of, 51
 - attributes of style, 52
 - design flaws, 114
 - pizzas with similarities to, 125
 - New Jersey
 - See also* Razza
 - earliest pizzerias in, 37
 - “tavern-style” pizza, 105–106
 - thin-crust pizzas of the Midwest and Northeast and, 247
 - “tomato pie”–style, 104
 - New York, New York
 - history of pizza in, 25
 - early descriptions of pizza in, 38
 - first pizzeria in, 29–30
 - influx of Italian immigrants to Five Points and Mulberry Bend, 24, 25–27
 - link between beer and pizza, 61
 - Lombardi’s pizzeria, true story of, 31, 32
 - melting pot, illusion of, 28–29
 - Milone, Filippo and, 36, 61
 - mozzarella and, 14
 - padrone system, 27
 - pizza gains momentum in, 33
 - “Ray’s” pizza joints in, 77
 - Riis, Jacob, and “The Bandit’s Roost,” 29, 30
 - timeline for, 34–35
 - pizza schools in, 111
 - pizza tours, 153
 - pizzerias visited in, 218–227
 - about pizza/pizza styles in, 214–215
 - historic pizzerias, 119–121, 227
 - key takeaways, 216
 - maps of, 216, 217
 - by the numbers, 216
 - New York pizza, 214–216
 - attributes of style, 136
 - in New York City, 136
 - in rest of the United States, 137
 - best representation of, 120–121
 - compared to other pizza styles and types, 98, 99, 125
 - cost of, 136
 - “New York Sicilian pizza,” 101–103, 114, 125
 - old-school disease and, 119–121
 - recipes for, compared to artisan pizza, 321
 - similarities to ancestral Neapolitan pizza, 39
 - “tavern-style” pizza, 106
 - thin-crust pizzas of the Northeast and, 247
 - New York Pizza Dough
 - experiment to determine optimal hydration levels in, 289
 - experiment using dough relaxers in, 327
 - experiment with varying fat types and percentages in, 319
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - ovens recommended for, 381
 - “New York Sicilian pizza,” 101–103, 114, 125
 - New York square pizza, 103
 - compared to other pizza styles and types, 98, 99, 125
 - design flaws in, 114
 - New York Square Pizza Dough
 - experiment to determine optimal hydration levels in, 289
 - experiment using dough relaxers in, 327
 - experiment with varying fat types and percentages in, 319
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - ovens recommended for, 381
 - Nickerson, Jane, 55
 - nightshade plants, 9
 - Nomad Roman (Philadelphia, PA.), 107, 377
 - Nonna Nannina (Campania, Italy)
 - map, 157
 - our visit to, 162
 - Northeast and Midwest, thin-crust pizzas of, 126–127, 247
 - Northern Italy
 - pizzerias visited in, 181–189
 - about pizza/pizza styles in, 179
 - key takeaways, 179
 - maps of, 180, 184
 - by the numbers, 179
 - Nostrana (Portland, OR.), 256
 - Novaretti, Richard (Ric Riccardo), 63–64, 245
 - Nowak, Zachary, 23, 118
 - nut and seed flours, 286
 - nuts. *See* inclusions
 - Nuvola flour, 279, 284
 - NY Pizza Suprema (New York, NY.), 217
- ## O
- oats/oat flour, 287, 332, 333
 - oils. *See* fats and oils
 - Old Forge, Pennsylvania
 - about pizza/pizza styles in, 121, 249
 - development of style, 66
 - “Pizza Capital of the World,” 66, 121
 - pizza design flaws, 114
 - Old Man and the Sea, The*, pizzeria named after, 181
 - old-school disease, 118–121
 - oldest pizzerias. *See* historic pizzerias
 - olive oil, use in pizza dough, 316
 - Opera dell’arte del cucinare*, 8
 - Opera of Bartolomeo Scappi*, 8, 14
 - Ops (New York, NY.)
 - map, 217
 - our visit to, 223

- organic flour, 281
- Orlando Foods, 75
- osmotolerant instant yeast, 294
- Otto Grill, 395
- Ottuso, Ernie, 227
- Ottuso, Louie, 227
- outdoor pizza ovens, 379, 395
- oven fuel, types of, 52, 59–60, 388
- oven mitts, 349
- oven spring, 348, 362, 363
- ovens. *See* physics of baking; pizza ovens
- P**
- Pace, Antonio, 74–75
- Padoan, Simone, 141, 188
- padrone system, 27
- Palace of Capodimonte, 2
- pane sciocco, 118
- Panificio Davide Longoni (Lombardy, Italy), 184
- Panificio Menchetti (Tuscany, Italy), 376
 - map, 180
 - our visit to, 182
- Papa, Joe, 37
- Papa John's, 145
- papain, 326, 327
- Papa's Tomato Pies (Trenton, New Jersey), 104
- parametric recipes, about, xxv
- Parente's (St. Louis, MO.), 66
- Parisi, Pietro, 159
- "party cut," 105, 126, 247
- pasta filata cheeses, history of, 14
- "pasted" dough, 274
- pastry flour, 280
- Paulie Gee's Logan Square (Chicago, IL.), 120
 - map, 237
 - our visit to, 244
- Paulie Gee's Slice Shop; Paulie Gee's (New York, NY.), 84
 - map, 217
 - our visit to, 224
- Pearce, Cheryl Zuppari, 233
- pectin, 323
 - improving dough volume with, 324, 325
 - water quality and, 290
- Pelican Tap (Chicago, IL.), 63
- Pennsylvania. *See* Old Forge; Philadelphia
- Pentamerone*, 14
- pentosanase, 275
- pentosans, 286
- Pepe, Filomena, 50
- Pepe, Francesco "Frank," 48, 50, 51
- Pepe, Franco, 161
- Pepe in Grani (Campania, Italy)
 - map, 157
 - our visit to, 161
 - path leading to (photo), 148
- pepperoni, origin of, 52
- "pepperoni pizza," 100
- Pequod's Pizza (Chicago, IL.)
 - map, 237
 - our visit to, 243
- Pero, Antonio, 32, 38
- Persano, Louis, 232
- Persistence of Memory, The*, (photo recreation), about, xvii
- Petrow, Jerry, 240
- Pezzetta, Luca, 174
- pH, of water, 290
- phase changes, 350
- Philadelphia, Pennsylvania, 83, 262
 - pizzeria visited in, 266
 - "Roman-style" pizza in, 107, 111
 - "tomato pie"-style pizza, 104
- Phoenix, Arizona, 262
 - artisan-style pizza in, 83–84
 - pizzeria visited in, 267
- photographs, about, xvii
- physics of baking, 346
 - chemical changes in food, 346–348
 - heat, flow of, 348–350
 - cooling pizzas, 348, 364
 - in deck ovens, 353, 358–359
 - emissivity, role of, 351–352, 353–354, 372
 - enormous energy required to boil water, 350
 - experiments
 - effectiveness of baking steels in uniformly baking pizza, 355
 - importance of reflectivity in oven walls, 353
 - role of radiative heat in baking pizza, 357
- forms of heat transfer, 348–350
- heat rays, 351–352
- pizzaiolo equation, 372–373
- reflectivity, effect of, 351, 353, 354, 369
- Stefan-Boltzmann law and, 372
- toasting bread and, 354
- in wood-fired and gas-fired pizza ovens, 354, 356–357
 - air temperature and baking environment of, 360–361
 - clean vs. dirty wood-fired pizza oven floors, 353–354
 - uneven distribution of heat in, 354, 356–357
- pizza dough and, 362
 - bringing dough to a boil, 365
 - chemical changes in, 346–348
 - drying of crust, 365, 367
 - heat pipe effect, 362–364
 - leoparding of Neapolitan pizzas, 366
 - oven spring, 348, 362, 363
 - reflectivity of crust, changes in, 351
- pizza sauce and, 367–368
 - evaporation, 367, 368
 - how sauce keeps the pizza center low and flat, 369
 - reflectivity, effect of, 369
 - sauce consistency and, 368
 - temperature, definition of, 346
- phytase enzymes, 275
- phytate, 275
- phytic acid, 334
- Piccirillo, Vincenzo, 160
- Piccola Piedigrotta (Emilia-Romagna, Italy), 71
 - map, 184
 - our visit to, 189
- pie dough-style crust, 64, 125, 128
- Piedmont/Valle D'Aosta, Italy
 - pizzeria visited in, 186
 - map of, 184
 - by the numbers, 179
- Pinello, Frank, 84, 218
- Pinsa Romana, 108–109
- Pintos, Gustavo, 206
- Piscatore, Agostino, 29–30
- pissaladière, 96
- pita (or pide), 7
- Pius V, Pope, 8
- Pizano's Pizza & Pasta (Chicago, IL.), 64
 - map, 237
 - our visit to, 243
- pizza a caballo, 41–42
- Pizza a Metro da "Gigino" L'Università della Pizza (Campania, Italy), 108
 - map, 157
 - our visit to, 162
- Pizza a Portafoglio (Naples, Italy)
 - map, 157
 - our visit to, 165
- pizza al molde. *See* Argentinean-style "al molde" pizza
- pizza al taglio. *See* al taglio pizza; High-Hydration Al Taglio Pizza Dough
- pizza alla campofranco, 124

- pizza alla pala, 181
 pizza, availability of, in every country on earth, 93
 pizza bianca, 6, 108, 124
 pizza boxes, invention of, 48
 Pizza Brain (Philadelphia, PA.), 262
 “Pizza Capital of the World.” *See* Old Forge, Pennsylvania
 pizza chains, 79–81, 125, 145
 pizza competitions, 122
 pizza cousins, 96, 123–124
 pizza crumb and crust
 See also pizza dough ingredients; pizza dough, physics of baking
 as central element of pizza styles, 97, 98–99
 flour components affecting color of, 275
 gel layer problem, 370–371
 improving volume by using baking steels, 355
 improving volume in bread-like pizzas, 324–325
 leoparding, of Neapolitan pizzas, 366
 modifying texture of, 328–329
 pizza database, 320–321
 pizza de muzzarella, 42
 pizza deck ovens
 considerations for selecting, 376
 about medium-heat ovens, 382–383
 heating modes, compared to other ovens, 378
 hot spots, problem of, 385
 overview of, 383–384
 pizza styles recommended for, 380–381
 visual guide, 378
 science of baking in, 353, 358–359
 pizza, definition of, 4–5
 pizza degustazione. *See* pizza gourmet
 pizza design flaws, styles with, 113–121
 pizza dough, gel layer in, 370–371
 pizza dough ingredients, xxi, 271
 See also inclusions
 fats and oils, 316–317
 crystalline fats and liquid fats, 317
 experiment varying fat types and percentages in our master doughs, 318–319
 fat percentages in our master doughs, 316
 flour, 273
 components of, 274–275
 essential numbers for, by flour type and brand, 282
 experiment examining particle size differences in, 284
 experiment using cake flour in Brazilian Thin-Crust Pizza Dough, 277
 gluten-free, 286–287, 325
 gluten potential and, 274, 282
 protein content and, 277–278, 279, 280
 reading flour labels, 280–281
 recommended types and brands, by pizza style, 283
 rye, 286, 325
 starch damage, 274
 wheat kernel, parts of, 273
 wheat, types of, 277
 all-purpose, bread, and high-gluten bread flours, 277–278, 280
 00 flour, 278–279, 280, 282, 284
 refined flour (white flour), 277
 specific pizza flours, 278–279, 282
 whole wheat flour, 285, 324
 improving pizza dough, 322–323
 benefits of, 323
 improving dough handling and shaping, 326–327
 increasing volume in bread-like pizzas, 324, 325
 measuring purified ingredients, 328
 misconceptions about purified ingredients, 323
 modifying texture in crumb and crust, 328–329
 pizza database and, 320–321
 preferments, 298
 choosing your fermentation method, 299
 vs. direct doughs, 298
 fermented flour, 298
 levains, 299, 302–303
 basic method for starting a liquid levain, 304
 best bets for, 305
 vs. commercial yeast-based preferments, 302
 common problems, 311
 comparison of strategies for making, 303
 dehydrating, method for, 309
 feeding and using, 307
 myths about speeding up development of, 308
 Second-Chance Levain, 310
 stages (readiness) of, 306
 storage, 304, 305, 309
 poolish, 299
 benefits of using, 300
 determining ripeness (readiness) of, 301
 float test for, 301
 method for making, 300
 strategies for using, 300
 salt, 313
 amount to add to dough, 314
 sourcing, 313
 substitutions, between types, 314
 substitutions for, xxii–xxiii
 sugar, 315
 water, 288
 concerns about quality and purity, 290
 experiment on effect of water type on dough, 291
 experiment to determine best hydration levels in our master doughs, 289
 improving dough handling and shaping with, 326
 myths about, in dough preparations, 288
 yeast, 292–293
 commercial yeast, 293
 best options for pizza dough, 297
 forms of (fresh, active dry, and instant), 293–294
 recommendations for working with, by type, 294
 strategies for incorporating (blooming), 296
 substitutions, between types, 295
 making pizza dough without added yeast, 297
 optimizing dough volume and, 324
 use by pizzaioli in Naples vs. rest-of-Italy, 294
 pizza dough, modifying texture of, 328–329
 pizza dough, physics of baking, 362
 bringing dough to a boil, 365
 chemical changes in, 346–348
 drying of crust, 365, 367
 heat pipe effect, 362–364
 leoparding of Neapolitan pizzas, 366
 oven spring, 348, 362, 363
 reflectivity of crust, changes in, 351
 pizza dough, properties of, 322
 “pizza,” etymology of word, 7
 “pizza farms,” 139
 pizza frita, 16–17, 38, 123–124
 pizza gourmet, 179
 attributes of style, 141
 compared to other styles, 98, 99, 125
 pizza history. *See* history of pizza
 Pizza Hut, 80, 142, 145
 pizza-like foods. *See* pizza cousins
 pizza menus, too many choices on, 107
 pizza mission, authors’, 92
 pizza, origins of. *See* history of pizza
 pizza oven fuels, 52, 59–60, 388
 pizza ovens, 345
 See also physics of baking; *specific type of oven*

- baking steels/stones, importance of, 391
- considerations for selecting, 375
 - best performing, by pizza style, 380–381
 - forms of pizza ovens, 378–379
 - fuel types, 388
 - heating modes, comparison of, 378
 - high-heat ovens, 375–376
 - gas-fired pizza ovens, 382
 - pizza styles recommended for, 380
 - wood-fired pizza ovens, 377
 - hot spots, problem of, 385
 - low-heat ovens, 387
 - bread deck ovens, 387–389
 - combi ovens, 389
 - convection ovens, 389–390
 - home ovens, 390–393
 - pizza styles recommended for, 381
 - medium-heat ovens, 382–383
 - impinger ovens, 386
 - pizza deck ovens, 383–385
 - pizza styles recommended for, 381
 - rotating floor ovens, 384
 - specialty ovens, 394–395
- home ovens, improving performance of, 393
- preheating, importance of, 392
- technology breakthroughs in, 59–60
- pizza parlors, 78, 79–80
- pizza ratings, 152
- pizza recipes, historical, 6, 8, 46–47, 69, 70
- pizza recipes, our database for, 320–321
- pizza rossa, 108, 124
- pizza rustica, 124
- pizza sauce, physics of baking, 367–368
 - evaporation, 367, 368
 - how sauce keeps the pizza center low and flat, 369
 - reflectivity, effect of, 369
 - sauce consistency and, 368
- pizza schools, 111
- Pizza Shackamaxon (Philadelphia, PA.), 262
- Pizza Show, The* (TV show), 218
- Pizza Strada (Tokyo, Japan), 210
- Pizza Studio Tamaki (Tokyo, Japan), 210
- pizza styles
 - See also specific style*
 - as essential feature of pizza, 94
 - characteristics defining, 97
 - parameters of, 98–99
 - provenance as insufficient for, 100–101
 - toppings as insufficient for, 100
 - how styles develop, 95
 - grouped by shared characteristics, 125
 - overview of major styles, 125–143
 - pizza design flaws, 113–114
 - culinary Stockholm effect, 115
 - emperor’s new clothes analogy, 116–117
 - old-school disease, 118–121
 - pizza you grew up on, 115–116
 - saltless Tuscan bread analogy, 118
 - pizza-like foods (pizza cousins), 96, 123–124
 - pizza mission, authors’, 92
 - pizzas most similar to ancestral Neapolitan pizza, 39
 - problematic “styles”
 - New Jersey tomato pie, 104
 - “New York Sicilian pizza,” 101–103
 - “Roman-style” pizza, 107–112
 - “tavern-style” pizza, 105–106
 - “Pizza, The” (“La Pizza;” song), 68
 - “pizza toast,” 208
 - pizza tonda, 377
 - pizza tours, 153
 - pizza travels, 149
 - about our research
 - “best” pizza lists, 152
 - how we selected pizzerias to visit, 150
 - our protocol, 150
 - what we ordered, 150
 - key takeaways, 150–151
 - by the numbers, 153
 - Buenos Aires
 - pizzerias visited in, 203–207
 - about pizza/pizza styles in, 200
 - historic pizzerias, 207
 - key takeaways, 201
 - map of, 202
 - by the numbers, 201
 - Italy, pizzerias visited in
 - Naples and Campania, 158–167
 - about pizza/pizza styles in, 154–155
 - historic pizzerias, 167
 - key takeaways, 156
 - map of, 157
 - by the numbers, 156
 - Northern Italy, 181–189
 - about pizza/pizza styles in, 179
 - key takeaways, 179
 - maps of, 180, 184
 - by the numbers, 179
 - Rome, 172–177
 - about pizza/pizza styles in, 168–169
 - key takeaways, 170
 - map of, 171
 - by the numbers, 170
- pizza tours, 153
- pizzeria menus, too many choices on, 107
- São Paulo, Brazil
 - pizzerias visited in, 193–199
 - about pizza/pizza styles in, 190
 - historic pizzerias, 199
 - key takeaways, 191
 - map of, 192
 - by the numbers, 191
- Tokyo, Japan
 - pizzerias visited in, 211–213
 - about pizza/pizza styles in, 208–209
 - key takeaways, 209
 - map of, 210
 - by the numbers, 209
- United States, pizzerias visited in
 - Chicago, 238–246
 - about pizza/pizza styles in, 234–235
 - key takeaways, 236
 - map of, 237
 - by the numbers, 236
 - Detroit, 252–253
 - about pizza/pizza styles in, 250
 - key takeaways, 250
 - map, 251
 - by the numbers, 250
 - Los Angeles, 263–264
 - Midwest and Northeast pizzerias, 247
 - New Haven, 231–233
 - about pizza/pizza styles in, 228
 - key takeaways, 229
 - map of, 230
 - by the numbers, 229
 - New York, 218–227
 - about pizza/pizza styles in, 214–215
 - historic pizzerias, 227
 - key takeaways, 216
 - maps of, 216, 217
 - by the numbers, 216
 - Old Forge, 249
 - Philadelphia, 262, 266
 - Phoenix, 267
 - Portland, OR., 257–261
 - about pizza/pizza styles in, 254–255
 - key takeaways, 255
 - map of, 256
 - by the numbers, 255
 - Quad Cities, 248
 - San Francisco and the Bay Area, 265

- PizzaArt (Campania, Italy)
 map, 157
 our visit to, 165
- pizzaiolo equation, 372–373
- pizzaiolo (pizza maker), profession of, xii, 12–14
- pizzajuoli (walking pizza sellers), 16
- pizzarello, 38
- Pizzeria Bruno (São Paulo, Brazil)
 map, 192
 our visit to, 196
- Pizzeria Camelo (São Paulo, Brazil)
 map, 192
 our visit to, 197
- Pizzeria La Notizia, 53; Pizzeria La Notizia, 94 (Naples, Italy)
 map, 157
 our visit to, 164
- Pizzeria Speranza (São Paulo, Brazil)
 map, 192
 our visit to, 199
- Pizzarium (Rome, Italy), 110–111
 map, 171
 our visit to, 176
- “pizze cavuie,” 33
- Pizzeria a Taglio Angelo e Simonetta (Rome, Italy), 109–110, 133
 map, 171
 our visit to, 177
- Pizzeria Ai Marmi (Rome, Italy), 107–108
- Pizzeria A’Marechiaro (Tramoni, Italy), 70
- Pizzería Angelín (Buenos Aires, Argentina)
 map, 202
 our visit to, 206
- Pizzeria Beddia (Philadelphia, PA.), 83
 our visit to, 266
- Pizzeria Bianco (Phoenix, AZ.), 83–84
 our visit to, 267
- Pizzeria Brandi (Naples, Italy), 118, 119
 map, 157
 our visit to, 167
 real story of margherita pizza and, 23
- Pizzeria da Attilio (Naples, Italy)
 map, 157
 our visit to, 163
- Pizzeria da Concettina ai Tre Santi (Naples, Italy), 157
- Pizzeria da Peppe Napoli Sta’ Ca” Komazawa (Tokyo, Japan), 210
- Pizzeria Due (Chicago, IL.), 63, 64
- Pizzeria e Trattoria Da Isa (Tokyo, Japan), 107
 map, 210
 our visit to, 211
- “Pizzeria Forno E.,” 29
- Pizzeria Gentile (New Haven, CT.), 50
- Pizzeria Gino Sorbillo (Naples, Italy)
 map, 157
 our visit to, 165
- Pizzería Güerrín (Buenos Aires, Argentina), 107
 map, 202
 our visit to, 207
- Pizzeria I Masanielli (Campania, Italy), 135
 map, 157
 our visit to, 160
- Pizzeria La Mezzetta (Buenos Aires, Argentina)
 map, 202
 our visit to, 205
- Pizzería Las Cuartetas (Buenos Aires, Argentina), 42
 map, 202
 our visit to, 207
- pizzeria menus, too many choices on, 107
- Pizzeria Montegrigna Tric Trac (Lombardy, Italy), 71, 133
 map, 184
 our visit to, 188
- Pizzeria Mozza (Los Angeles, CA.), 84
 our visit to, 264
- Pizzeria Napoletana (San Francisco, CA.), 37
- Pizzeria Napoletana (Trenton, NJ.), 37
- Pizzeria O’Scugnizzo (Tuscany, Italy)
 map, 180
 our visit to, 183
- Pizzeria Ostiense (Rome, Italy), 171
- Pizzeria Otto (Portland, OR.), 256
- Pizzeria Riccardo (Chicago, IL.), 64
- Pizzeria Salvo (Naples, Italy)
 map, 157
 our visit to, 167
- Pizzeria Starita a Materdei (Naples, Italy)
 map, 157
 our visit to, 166
- Pizzeria Uno (Chicago, IL.), 63–64
 map, 237
 our visit to, 245
- Pizzeria Villa Giovanna (Campania, Italy)
 map, 157
 our visit to, 167
- pizzerias, visits to. *See* pizza travels
- pizzetta, 124
- Plummer, “Big Ed,” 79–80
- polenta, 44
- Police, Pierluigi, 183
- polydextrose, 329
- polysaccharides, 275, 286
- “pomidore pizza,” 33, 38
- Ponticelli, Luigi, 37
- Pontoni, René, 204
- poolish, 299
 benefits of using, 300
 determining ripeness (readiness) of, 301
 float test for, 301
 method for making, 300
 strategies for using, 300
- popping corn, 333
- Pop’s Pizzeria (New York, NY.), 36
- porridge, for inclusions, 335, 337
- portable ovens, 379, 395
- Porter, Jonathan, 153
- Portland, OR., 120–121
 pizzerias visited in, 257–261
 about pizza/pizza styles in, 254–255
 key takeaways, 255
 map of, 256
 by the numbers, 255
- postwar era, 58, 69–71, 77–79
- Pozzuoli, Pino “Joe,” 219
- PQR (New York, NY.), 177
- preferments, 298
 choosing your fermentation method, 299
 vs. direct doughs, 298
 fermented flour, 298
 levains, 302–303
 basic method for starting a liquid levain, 304
 best bets for, 305
 vs. commercial yeast–based preferments, 302
 common problems, 311
 comparison of strategies for making, 303
 considerations for using, 299
 dehydrating, method for, 309
 feeding and using, 307
 myths about speeding up development of, 308
 Second-Chance Levain, 310
 stages (readiness) of, 306
 storage, 304, 305, 309
- poolish, 299
 benefits of using, 300
 determining ripeness (readiness) of, 301
 float test for, 301
 method for making, 300
 strategies for using, 300
- pregelatinized flour, 328
- preheating oven, importance of, 392
- presifted flour, 281

- pressure-caramelized inclusions, 336–337
- Prete, Massimiliano, 186
- Primo Basílico (São Paulo, Brazil)
map, 192
our visit to, 198
- Prince Street Pizza (New York, NY.), 217
- Prohibition, 61
- protease enzymes, 275, 326
- protein
coagulation of, during baking, 346, 348
as component of flour
gluten potential and, 274
overview of, 274
types of flour and, 277–278, 279, 280
- provatura, 14
- Provel cheese, on St. Louis–style pizza, 66, 105
- provenance, fallacy of defining pizza styles by, 100–101
- pseudocereals, 286
- psyllium husk, 286
- Puck, Wolfgang, 82–83, 94, 264
- pulcinella, 13
- purees, for inclusions, 335, 337, 338, 339–341
- purified amylase, 324
- purified ingredients, 323
See also dough conditioners
- ## Q
- Quad Cities
pizzerias visited in, 248
key takeaways, 248
- Quad Cities–style pizza
attributes of style, 248
design flaws, 114, 115–116
pizzas similar to, 125
- Quadrino (Veneto, Italy), 185
- quick-rise yeast. *See* instant yeast
- quinoa, 286, 332, 333
- ## R
- radiation, 349–361
- raisins, use in starters, 308
- Ranch PDX (Portland, OR.), 256
- Randazzo, Shawn, 250, 253
- rapid-rise yeast. *See* instant yeast
- ratings, pizza, 152
- “Ray’s” pizza joints in New York, 77
- Razza (Jersey City, NJ.), 84
map, 217
our visit to, 225
- Reale Tenuta di Carditello, La, 14
- recipes, about, xx–xxviii
giving crediting where due, xxviii
ingredients and equipment, xxi
master recipes and variations, xxv–xxvii
substitutions and general notes, xxii–xxiii
weights and measures, xxiv
- recipes for pizza, historical, 6, 8, 46–47, 69, 70
- recipes for pizza, our database for, 320–321
- recoil of dough, 322
- Red Sauce Pizza (Portland, OR.)
map, 256
our visit to, 260
- Red Star Platinum Superior Baking Yeast, 294
- Redmond, Alice Mae, 64, 245
- reducing agents (dough relaxers), 326–327
- refined flour (white flour), 277
- reflectivity, 351, 353, 354, 369
- refractory cement, 353, 387
- Regas, Peter, 36
- Regina-style pizza, 103
- Reichl, Ruth, 82, 83
- Renaissance-era “pizza,” 6, 8
- Renato Bosco Pizzeria (Veneto, Italy)
map, 184
our visit to, 188
- resistance (strength) of dough, 278
- respiration process in yeast, 292
- Rest-of Italy Neapolitan pizza, 125, 134, 135
See also Northern Italy
- Revello, Pat, 118
- reversible and irreversible reactions, 346–348
- Rey Pizza (Miami, Fl.), 100
- rheology, 323
- “Rhode Island–style” pizza, 97
- Riccardo, Ric (Richard Novaretti), 63–64, 245
- rice/rice flour, 287, 332, 333
- Richer, Dan, 225
- Riis, Jacob, 29, 30
- rim range, as element of pizza styles, 98–99
- Rione (Philadelphia, PA.), 111
- Risanamento (urban renewal project), 21–22
- Rivera, Scottie, 120–121, 261
- Rizzuti, Romualdo, 181
- Roberta’s (New York, NY.), 218
- Roberts, Julia, 118
- Rocco, Emanuele, 14, 17, 61
- Rodriguez, Mario, 204
- Roma Gardens (Hackensack, NJ.), 106
- Roman Pizza Academy, 111
- “Roman-style” pizza, 107–112
al taglio, 109–111
Iezzi- vs. Bonci-style, 140
- Neapolitan pizza and, 107, 112, 134
- Pinsa Romana, 108–109
- Rome, ancient, 4, 6, 15
- Rome, Italy
early history of pizza in, 21, 69
pizzerias visited in, 172–177
about pizza/pizza styles in, 168–169
key takeaways, 170
map of, 171
by the numbers, 170
- Roosevelt, Franklin Delano, 54
- Root, Waverley, 19, 69
- Roots Handmade Pizza (Chicago, IL.)
map, 237
our visit to, 243
- Roscino, Francesco, 172
- Roscino, Ilaria, 172
- Roscioli, Pierluigi, 133, 172
- rotating floor ovens, 384
- Rugg, Peter, 115
- Russell, Elnora, 64
- rye/rye flour, 286, 325, 332, 333
- ## S
- Saccharomyces cerevisiae*, 302
- Saieva, Massimiliano, 111
- Saint John, the Beheaded* (*San Giovanni Decolatto*; film), 39
- Sala VIP (São Paulo, Brazil)
map, 192
our visit to, 198
- Sally’s Apizza (New Haven, CT.), 51, 52, 230
- saloon pizza, 61
- salt, as pizza dough ingredient, 313
amount to add to dough, 314
sourcing, 313
substitutions, between types, 314
- Salvo, Ciro, 133, 158
- Salvo, Francesco, 167
- Salvo, Gennaro, 165
- Salvo, Salvatore, 167
- Sammarco, Carlo, 135, 159
- Samuelson, Tim, 128–129
- San Francisco, CA., 262
first pizzerias in, 37
pizzeria visited in, 265
- San Giovanni Decolatto* (*Saint John, the Beheaded*; film), 39
- Santarpia, Giovanni, 182
- Santarpia (Tuscany, Italy)
map, 180

- our visit to, 182
 - Santillo, Giovanni, 33
 - São Paulo, Brazil
 - history of pizza in, 43–45
 - pizzerias visited in, 193–199
 - about pizza/pizza culture in, 190
 - historic pizzeria in, 199
 - key takeaways, 191
 - map of, 192
 - by the numbers, 191
 - São Paulo–style pizza, 190–191
 - similarities to ancestral Neapolitan pizza, 39
 - thin-crust. *see* Brazilian thin-crust pizza
 - white-bread–style crust, 114, 125
 - Sapes, Raul, 206
 - Sarcone’s Bakery, 104
 - Sargent & Co., 49
 - Sargent, Joseph B., 49
 - sauce. *See* pizza sauce, physics of baking
 - Savoy Azabujuban (Tokyo, Japan)
 - map, 210
 - our visit to, 211
 - Sbanco (Rome, Italy), 107
 - map, 171
 - our visit to, 177
 - Scalco alla Moderna, Lo (The Modern Stewart)*, 9
 - scale deposits, from hard water, 290
 - Scalinata Pizzeria e Ristorante (São Paulo, Brazil)
 - map, 192
 - our visit to, 199
 - scaling recipes, method for, xxiv
 - Scappi, Bartolomeo, 8, 14
 - Scelzo, Francesco, 50
 - schiacciate, 17
 - Schmidt, Afonso, 45
 - schools, pizza, 111
 - Schwartz, Barry, 107
 - science of baking. *See* physics of baking
 - Scienza in Cucina e L’Arte di Mangiar Bene, La (The Science of Cooking and the Art of Eating Well)*, 8
 - Scorsese, Martin, 25
 - Scottie’s Pizza Parlor (Portland, OR.), 120–121
 - map, 256
 - our visit to, 261
 - Scuola Italiana Pizzaioli, 111
 - secalins, 286
 - Second-Chance Levains, 310
 - seed and nut flours, 286
 - seeds. *See* inclusions
 - Seirinkan (Tokyo, Japan)
 - map, 210
 - our visit to, 212
 - Serao, Matilde, 21
 - Serra, Frank, 248
 - Sewell, Ike, 63–64, 245
 - sfincione, 96, 102–103
 - Sforno (Rome, Italy), 107
 - map, 171
 - our visit to, 177
 - Shakey’s Pizza Parlor and Ye Public House, 79–80
 - Sherman, Donald, 78
 - Shield’s (Detroit, MI.), 251
 - Siamo nel Forno (Buenos Aires, Argentina)
 - map, 202
 - our visit to, 207
 - “Sicilian-style” pizza. *See* “New York Sicilian pizza”
 - Silverton, Nancy, 84, 264
 - Sinatra, Frank, 78
 - Sirani (Lombardy, Italy), 184
 - Sitko, Renata, 167
 - Sizzle Pie (Portland, OR.)
 - map, 256
 - our visit to, 260
 - Sloman, Evelyne, 32
 - soaking grains and seeds, 335, 336
 - sodium alginate, 329
 - “soft water,” 290
 - Sorbillo, Gino, 75, 86, 165
 - sorghum, 287, 332, 333
 - sourdough starter. *See* levains
 - soy bean flour, 328–329
 - soy lecithin, 323
 - Spacca Napoli (Chicago, IL.)
 - map, 237
 - our visit to, 246
 - Spago (Los Angeles, CA.), 82–83
 - our visit to, 264
 - Spangler, Kyle, 120, 257
 - Spanish coca, 96
 - specialty pizza ovens, 394–395
 - specific heat capacity, 349
 - spelt, 332, 333
 - sponges, 298
 - Spot, The (New Haven, CT.), 51
 - map, 230
 - review of, 231
 - sprouting grains and seeds, 335, 336
 - St. Louis–style pizza
 - development of style, 66
 - Provel cheese, 66, 105
 - “tavern cut,” 66
 - similarities to other thin-crust pizzas, 125, 126, 127, 247
 - tavern-style pizza and, 105, 106
 - Stamer, William J., 19
 - Star Tavern (Orange, NJ.), 106
 - Star, The (Portland, OR.), 256
 - starch
 - as component of flour, 274
 - gelatinization of, during baking, 346, 348
 - gelatinization vs. gelation, 274
 - starch damage, 274
 - starches, gluten-free, 287
 - Starita, Antonio, 75, 166, 220
 - Stefan-Boltzmann law, 372
 - Stella 34 Trattoria & Bar (New York, NY.), 217
 - stickiness of dough, 322
 - Stockholm effect, culinary, 115
 - stone-ground flour, 281
 - Stoudamire, Aldean, 64
 - street food in 19th-century Naples, pizza as, 16–17
 - strength (resistance) of dough, 278
 - stretchiness (extensibility) of dough, 278, 322, 326–327
 - Strouse, Adler Company Corset Factory, 48
 - stufas (“stoves”), 17, 41
 - stuffed-crust pizza, 114, 125, 128, 129
 - styles. *See* pizza styles
 - sugar, as pizza dough ingredient, 315
 - sweet dish, early “pizza” as, 6, 8, 11
 - Sykes, Ginny, 246
- ## T
- T rating (flour classification system), 279
 - Tacconelli’s, 104
 - take-and-bake pizza, 81
 - tapioca flour (tapioca starch), 287
 - Tarallo family, 199
 - tart, early “pizza” as, 6, 8, 11
 - tarte flambée, 96
 - Tasman, Rick, 239
 - “tavern cut,” 66
 - “tavern-style” pizza, 105–106, 125, 126
 - teenagers, 78
 - teff/teff flour, 287, 332, 333
 - Telepizza (Spain-based chain), 145
 - temperature, definition of, 346
 - temperature, dry-bulb/wet-bulb, 365
 - 10 Diego Vitagliano Pizzeria (Naples, Italy), 135
 - map, 157
 - our visit to, 158
 - tenacity of dough, 322

- tennis racket (pizza-like dish), 123
- Testa, Alberto, 68
- “That’s Amore” (song), 77
- thermal conductivity, 349
- thermal diffusivity, 350
- thermal emission scales, 351
- thermal radiation, 349–361
- thin-crust pizza
 - attributes of style, 126–127
 - compared to other pizza styles and types, 98, 125
 - grilled pizza as variation of, 97
 - Midwest and Northeast pizzerias and, 247
 - New Jersey tomato pie and, 104
 - “Roman-style” pizza and, 107–108, 112
 - “tavern-style” pizza and, 105–106, 125, 126
- Thin-Crust Pizza Dough
 - experiment to determine optimal hydration levels in, 289
 - experiment using dough relaxers in, 327
 - fat percentages in, compared to other styles, 316
 - flours recommended for, 283
 - ovens recommended for, 381
- 3 Voglie (Campania, Italy), 157
- timelines
 - early pizza in the United States, 31, 34–35
 - historical pizza recipes, 46–47
 - pizza in Italy in the 20th century, 72–73
 - pizza in Naples, 10–11
 - pizza’s march across the US, 56–57
- toasting bread, science of, 354
- tocopherols, 275
- Tokyo
 - Neapolitan pizza in, 125, 133, 208–209
 - pizzerias visited in, 211–213
 - about pizza/pizza styles in, 208–209
 - key takeaways, 209
 - map of, 210
 - by the numbers, 209
- “tomato pie,” 104
- tomatoes, and history of pizza, 9
- Tommaso’s (San Francisco, CA.), 37. *See also* Lupo’s
- Tonda (Rome, Italy), 107
 - map, 171
 - our visit to, 177
- Tony’s Pizza Napoletana (San Francisco, CA.), x, 84
 - our visit to, 265
- tools, xxi
- topped flatbreads, 4–5, 96
- topping ratio, as element of pizza styles, 98–99
- toppings, fallacy of defining pizza styles by, 100
- Totino, Jim, 81
- Totino, Rose, 81
- Totino’s frozen pizza, 81
- Totonno’s Pizzeria Napolitano (New York, NY.), 38, 39, 217
- tours, pizza, 153
- Tourtois, Louis, 65
- Traditional Specialty Guaranteed (TSG) product, Neapolitan pizza registered as, 75
- Tramonti, Italy, 69–71
- Trapani, F., 61
- Trapizzino (Rome, Italy)
 - map, 171
 - our visit to, 177
- travel-related research. *See* pizza travels
- Trenton tomato pie, 126
- Triple Beam Pizza (Los Angeles, CA.), 84, 264
- triticale, 286, 333
- TSG (Traditional Specialty Guaranteed) product, Neapolitan pizza registered as, 75
- Tufano’s (Chicago, IL.), 62–63
- Tung, Derrick, 120, 244
- TurboChef Pizza Oven, 395
- Tuscan bread, saltless, 118
- Tuscany, Italy
 - margherita pizza in, 134
 - pizzerias visited in, 181–183
 - map of, 180
 - by the numbers, 179
- U**
- Ugly Delicious* (TV show), 211
- Umberto I, King of Italy, 21, 23
- un altra pizza, 6
- Una Pizza Napoletana (New York, NY.), 85, 135
 - map, 217
 - our visit to, 226
- unbleached flour, 280
- UNESCO Intangible Cultural Heritage classification for Neapolitan pizza, 75
- United States, history of pizza in
 - earliest arrival of pizza in
 - Boston, 37
 - New Haven, 48–52
 - New Jersey, 37
 - New York, 25
 - early descriptions of pizza in, 38
 - first pizzeria in, 29–30
 - influx of Italian immigrants to Five Points and Mulberry Bend, 24, 25–27
 - link between beer and pizza, 61
 - Lombardi’s pizzeria, true story of, 31, 32
 - melting pot, illusion of, 28–29
 - Milone, Filippo and, 36, 61
 - mozzarella in, 14
 - padrone system, 27
 - pizza gains momentum in, 33
 - “Ray’s” pizza joints in, 77
 - Riis, Jacob, and “The Bandit’s Roost,” 29, 30
 - timeline for, 34–35
 - pizza recipes, timeline of, 46–47
 - San Francisco, 37- pepperoni and, 52
- pizza’s march across the country, 53–55
 - alcohol and pizza, link between, 61
 - cultural tipping point, 55
 - development of regional styles, 62
 - Chicago, 62–64
 - Detroit, 65
 - Old Forge, Pennsylvania, 66
 - St. Louis, 66
 - frozen food revolution, 58, 81
 - myth of pizza-proselytizing American GIs, 54
 - new oven technology, 59–60
 - pizza as performance, 62
 - timeline for, 56–57
- postwar era, 77–79
 - chef-inspired pizza and the rise of artisan pizza, 82–84
 - frozen food revolution, 58, 81
 - return to “real” roots and Neapolitan-style pizza craze, 85
 - rise of pizza chains, 79–81
- United States, pizzerias visited in
 - Chicago, 238–246
 - about pizza/pizza styles in, 234–235
 - key takeaways, 236
 - map of, 237
 - by the numbers, 236
 - Detroit, 252–253
 - about pizza/pizza styles in, 250
 - key takeaways, 250
 - map of, 251
 - by the numbers, 250
 - Los Angeles, 263–264
 - Midwest and Northeast pizzerias, 247
 - New Haven, 231–233
 - about pizza/pizza styles in, 228
 - key takeaways, 229
 - map of, 230
 - by the numbers, 229

New York, 218–227
 about pizza/pizza styles in, 214–215
 historic pizzerias, 227
 key takeaways, 216
 maps of, 216, 217
 by the numbers, 216

Old Forge, 249

Philadelphia, 266

Phoenix, 267

Portland, OR., 257–261
 about pizza/pizza styles in, 254–255
 key takeaways, 255
 map of, 256
 by the numbers, 255

Quad Cities, 248

San Francisco and the Bay Area, 265

Uno Pizzeria & Grill, 64

U’Pizzaiuolo, Luigi, 37

Upside Pizza (New York, NY.), 84
 map, 217

Usi e Costumi di Napoli (The Customs of Naples), 14, 17

V

Valeriani, Gaetano, 18

Valtierra, Fabián von Hauske, 226

vegetable and fruit purees for inclusions, 339–341

Veneto, Italy, 179
 pizzerias visited in, 185, 188
 map of, 184
 by the numbers, 179

Vera Pizza Napoletana, 111

Vernon Park Restaurant (Chicago, IL.), 62–63

Vernon Park Tap (Chicago, IL.), 62–63

Via Toledo (photo), 156

Vica Pota Pizzeria e Forneria (São Paulo, Brazil), 192

Victor Emmanuel II, King of Italy, 21

Vinnie’s Pizzeria (New York, NY.), 217

Virgil, 4

viscoelasticity, 278, 322

viscosity, 322

Vitagliano, Diego, 158

vital wheat gluten, 324

vitamin C. *See* ascorbic acid

vitamin E, 275

Vito & Nick’s Pizzeria (Chicago, IL.), 62, 105
 map, 237

Vituccio (São Paulo, Brazil), 192, 196

von Karajan, Florence Winchester, 49

W

W number (flour classification system), 278, 282

Washington, Booker T., 67

water
 enormous energy required to boil, 350
 as flour component, 275
 as pizza dough ingredient, 288
 concerns about quality and purity, 290
 experiment on effect of water type on dough, 291
 experiment to determine best hydration levels in our master doughs, 289
 improving dough handling and shaping with, 326
 myths about, in dough preparations, 288

water buffalo, Italian, 15

Waters, Alice, 82, 84

weights and measures, xxiv

wet-bulb temperature, 365

wheat berries, 273, 332

wheat bran, 273

wheat germ, 273

wheat kernel, anatomy of, 273

wheat shortage, in 20th-century Italy, 67–68

Wheated (New York, NY.), 217

white-bread-style crust, 114, 125, 129, 249

white flour (refined flour), 277

“white powders.” *See* purified ingredients

white rice flour, 287

“white” vs. “black” ovens, 382

Whitney, Eli, 48

“whole grain” labels, 285

whole wheat flour, 285, 324

“whole wheat” labels, 285

Wiener, Scott, 153

Williamsburg Pizza (New York, NY.)
 map, 217
 our visit to, 220

Wilson, Woodrow, 55

wood-fired pizza ovens
 considerations for selecting
 about high-heat ovens, 375–376
 heating modes, compared to other ovens, 378
 mysticism surrounding, 375, 377
 overview of, 377
 pizza styles recommended for, 380–381
 visual guide, 378
 “white” vs. “black” ovens, 382
 wood as fuel for, 388

science of baking in, 354, 356–357
 air temperature and baking environment of, 360–361

clean vs. dirty oven floors, 353–354
 uneven distribution of heat in, 354, 356–357
 wood smoke, misconceptions about, 361, 388

world of pizza, 91–145
See also pizza styles; pizza travels

World Pizza Championships, 122

World Pizza Cup, 122

World Pizza Games, 122

World War II, 54–55, 58, 68–69

X

xanthan gum, 287

Y

Yamamoto, Hisanori, 122, 211

yeast, as pizza dough ingredient, 292–293
See also preferments

commercial yeast, 293
 best options for pizza dough, 297
 forms of (fresh, active dry, and instant), 293–294
 recommendations for working with, by type, 294
 strategies for incorporating (blooming), 296
 substitutions, between types, 295
 making pizza dough without added yeast, 297
 optimizing dough volume and, 324
 use by pizzaioli in Naples vs. rest-of-Italy, 294

yogurt, use in starters, 308

Z

Zangwill, Israel, 28

Zuppari, Anthony, 233

Zuppari, Dominic, 50, 233

Zuppari, Lori, 233

Zuppari’s Apizza (New Haven, CT.), 51, 117
 map, 230
 our visit to, 233





