HOW TO MAKE ANYTHING

How to Make

B - R - E - A - D :

PM

09.2014

This bread contains only four ingredients. The recipe is 40 pages long.

Photographs by Eric Wolfinger

Bread has nourished mankind for more than 30,000 years. It is the simplest thing you can eat, and yet the complexity of the biochemical reactions zinging through a ball of rising dough at any given moment is astonishing. Andrew Sean Greer bakes with his mother, a professor of food chemistry, and with Chad Robertson, a famous baker, to discover how bread—chewy, crusty, warm, comforting, everyday, miraculous bread—works.

I

THE STARTER

Chad's starter is better than mine. That much I can tell at a glance—a bubbling, luscious, fawn-colored batter. A starter is a baker's pride, grown from airborne yeast, flour, and water, carefully fed and tended over time, sometimes years. "We're going for yogurty," Chad Robertson, famous baker, tells me, shrugging. I smile appreciatively, not mentioning that mine, yesterday, seemed a defeated brown, smelling as sullen and sour as a teenager who has seen enough of life. A kind of goth starter. His is the homecoming queen.

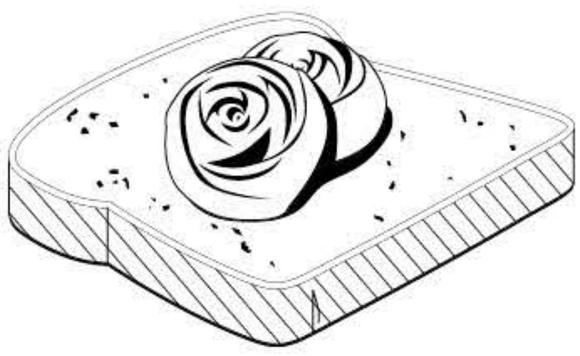
"Traditional, intuitive bread making does not lend itself naturally to a written recipe." — from *Tartine Bread,* by Chad Robertson.

Robertson is the co-owner of Tartine, the bakery and café in San Francisco. He is a star of the new wave of American baking, though he wouldn't put it that way. In his cookbooks and in person, he speaks of himself as someone merely curious about bread, the way someone else might be curious about wine or outboard motors. But many people are curious. Robertson is something different. Robertson is obsessed.

"Sorry I can't shake your hand," he says. It is 10:30 on a warm morning on Valencia Street, and he's carrying several basketfuls of dough that was shaped the night before and given its final overnight rise in the refrigerator. The mounds look soft and sweet, dappled with grain or flour, and as he walks each one shifts in the basket like a sleeping baby.

Robertson is tall and has the strong-jawed face, ruddy build, and faded blue tattoos of a sailor, but he is almost delicate in the way he treats dough. Deliberate. He seems more artist than scientist. He is in sandals, pale-green jeans, a blue button-down, and a corduroy cap, and he gives off the calm of someone who has done this so many times he knows without thinking what he wants to see and smell. And what he wants to see and smell is not always the same.

When he's brought the dough into the kitchen and can at last shake hands, his are as large and enveloping as you



How to Make a Butter Rose

A vegetable peeler and a glass tumbler are your tools. Flip the glass upside down and use the bottom as the platform on which you'll build the flower. Set out a stick of cold butter, and let it warm so that it is malleable but still hard. Use your peeler to slice off a thin strip of butter, and roll it into a cylinder. Stand the cylinder up in the center of the glass. Peel off another strip, and wrap it loosely around the cylinder, letting the top edge curl outward, like a real petal. Rotate the glass and keep adding slivers of butter, imperfectly and radiating out from the center. When you're satisfied with the size of the bloom, refrigerate it. Serve with good bread.

ILLUSTRATION BY HAISAM HUSSEIN

"Before the study of microbiology, bakers understood the subtleties of the process," says Chad Roberton. "The nature of fermentation was second nature to their own."

would imagine a baker's to be—steady, working hands. My mother taught me to ask people about the things they love. I ask about the dough.

"I'm not interested in going to the old country and bringing a tradition back intact," Robertson says as he holds a razor and begins to make cuts in the bread: long cuts in the country loaves, a square atop the rye. For a special porridge loaf, he snips along the top with shears. "This thing you hear with 'How old is your starter?'" He shakes his head. He is referring to the tradition of people handing down starters from generation to generation, as if a starter collects flavor and wisdom over time. "It doesn't matter." He's heard that Boudin, the famous old San Francisco bakery, flies its starter to Anaheim once a month so the branch down there can maintain its San Francisco essence. Robertson says he's made his bread from homemade starter in Mexico and in Europe and it tastes the same. To him the entire baking process is flexible. It isn't magic. You can do it this way, or you can do it another. As long as you understand the science, and as long as it tastes good to you.

Starter, leaven, dough, gluten, fermentation, steam, and temperature. Science.

I called my mother.

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THE

LEAVEN

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MY MOTHER IS A SOUTHERN LADY WITH short dark hair and a wary, blue-eyed smile. She is also an experimental chemist and teaches a college course entitled The Chemistry of Cooking. I thought she would be delighted by my suggestion that, in preparation for baking with Chad Robertson, we bake a loaf of bread together.

"I am not a bread expert," she wrote in her brisk email reply. "But I have found you some references." Like most scientists, my mother is unwilling to offer an opinion on something outside her area of expertise. But we bully our parents, we children, and so I arrived that morning with flour, bottled water, starter bor-

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SALT DISSOLVES INTO SODIUM AND CHLORINE, ELECTRICALLY CHARGED IONS THAT WANT TO BOND. "THAT'S ALL HAPPENING RIGHT NOW. IN THIS DOUGH," MY MOM SAYS, MANHANDLING IT.

Proteins must be plastic and elastic—capable of stretching around the carbon-dioxide gas produced by yeast, and resistant enough not to expand to the point of breaking. Proteins roll around chains of gluten, allowing them to slide past one another, providing the stretch of a good dough.

rowed from a friend, and a recipe from *Cook's Illustrated*, the wonderful home-cooking magazine that explains the science and mechanics of recipes. Robertson's recipe in his book, *Tartine Bread*, is, somewhat famously, 40 pages long. The chapter on bread in my mother's classroom textbook (Harold McGee's *On Food and Cooking*) is 30 pages. *Cook's Illustrated*'s 24-Hour Sourdough Bread is two.

"Hello, honey," she said when I arrived. "Do you want a hot dog?"

"We have to make the leaven first," I said. "Then it rises for 3 hours." The leaven is the stage between starter and dough, the prefermentation. The names for this stage can be confusing–it is called sponge, biga, poolish, or even starter–but the old French term is levain, translated as leaven. And this is the

term Robertson uses in his book.

"Bless your heart," she said, looking at my meek little starter. It is the kind of thing a Southern woman says with pity. She brought out a single sheet of lined yellow paper filled with chemical symbols.

"Mom, we have to make the leaven," I told her. "And then you can explain the chemistry to me."

"It's really biochemistry," she said. "Think of it like growing a plant to do what you want. I just wanted to explain about the electrical charges of salt dissolved in water . . ."

Growing a plant to do what you want. When I repeat this phrase to Robertson later, he says, "Yes, that's exactly right." (Although technically, yeast is a fungus, not a plant.) What yeast does is ferment. Robertson, in *Tartine Bread,* calls this "the soul of bread baking." Yeast is all around you, on your hands, on the grains of wheat–and a flour-and-water culture, left alone to sit for a few days, will begin to bubble with the activity of wild yeast. A consistent feeding schedule (more flour, more water) will produce a creature that does as you command, rising and falling on schedule, producing sweet, ripe fragrances after feeding, meaning it has the right blend of yeast and bacteria to produce delicious bread. This trained pet in your fridge, this genie, is your starter. A little of this starter, combined with flour and water and left to sit, is the leaven. A final addition of flour and water turns it into dough. What yeast does in all of these stages is perfectly simple: It grows. It does this by feeding on sugars and starches and converting them into ethanol and carbon dioxide. It ferments. By doing so, it creates the basic structure of what will become the bread.

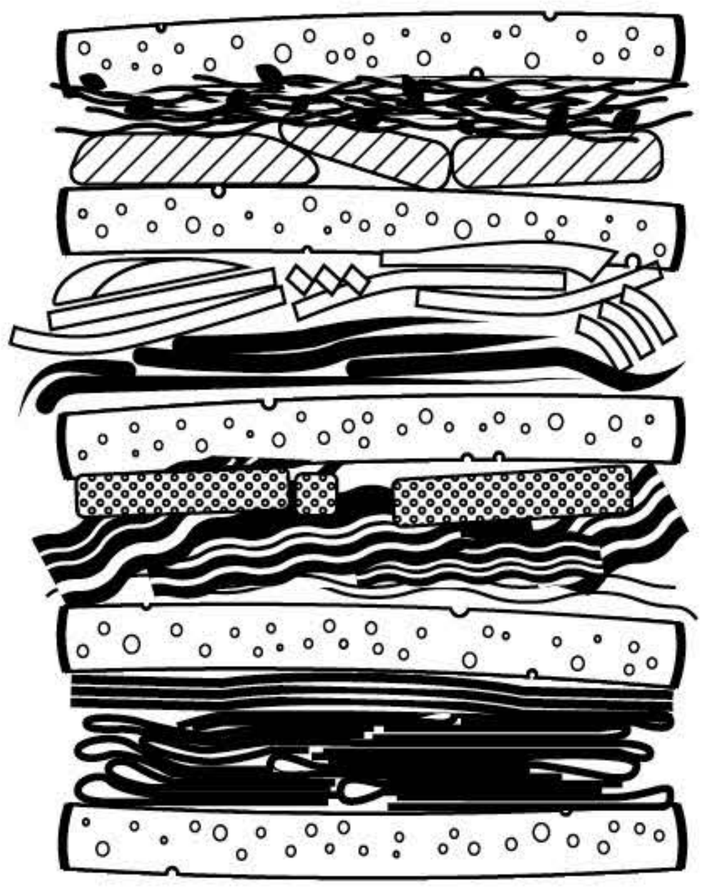
"As you gain an understanding of how bread 'works,' you will be able to make adjustments in timing and technique to achieve a broad range of results."

THE DOUGH

"WATER IS FUNNY" MY MOTHER HAD SAID WHEN WE returned to mix the leaven with the water and flour, at last creating the dough. "Its structure makes it very attractive. Once you add the water, it latches on to everything. The proteins, the starches." That was what we did, in a stand mixer: added water to the foamy leaven and then, slowly, added the flour. It mixed for a minute, then rested for 20.

Flour has two kinds of protein: loosely coiled glutenin and more tightly coiled gliadin. It's the glutenin chains that end up linking end to end, aided by water's attractive properties, bonding into coils, and these adjacent coils, weakly attracted to each other, form the beginnings of gluten. That is why the dough must rest after mixing–a process named autolyse by the French breadmaking authority Raymond Calvel. It seemed utterly magical to me that all this could happen simply with the addition of water: It was just sitting there, looking very dull in the bowl, and all the while skeins of gluten were knitting themselves together at the molecular level.

How to Make A Sandwich



Starting with the bread, build the sandwich in your head first, balancing salt, acid, heat, and texture (between crunchy and soft). Take bologna, mayo, and white bread. You have spicy meat, rich sauce, and soft bread. Mixing acidic French's yellow mustard with the mayo balances the richness, and potato chips on the sandwich add crunch.

Fold and layer meat evenly across the bread. You don't want a hump of ingredients in the middle.

And use a sharp serrated knife to cut corner to corner on sliced bread for the best display. With a hard roll, cut the sandwich into pie-wedge-shaped thirds.

With thanks to Joshua Smith, owner, Moody's Delicatessen & Provisions, Waltham, Massachusetts.

ILLUSTRATION BY HAISAM HUSSEIN

We added salt. Then came the kneading.

Stretching the dough is a crucial step. After forming their tangled chains, the gluten molecules must be arranged alongside each other, creating ribbons of protein to hold the escaping gas—this is the purpose of kneading or turning the dough. Robertson doesn't knead. Instead, he turns the dough at a later rest by pulling it up with wet fingers and folding it back on itself several times. His turning technique achieves the same end: directing the gluten and encouraging bonds. Proteins need to be both plastic and elastic, that is, both capable of stretching around the carbon-dioxide gas produced by the yeast, and resistant enough not to expand to the point of breaking. You need plenty of water to hydrate this much glutenin, as well as that elusive other protein: gliadin. The little gliadin bits roll around beside the long chains of glutenin, allowing them to slide past one another, providing the stretch of a good dough.

"And you know," my mother said, manhandling the dough like a masseuse, "salt dissolves almost immediately into sodium and chlorine, electrically charged ions, and they also want to bond with everything. That's all happening right now. In this dough."

Robertson agrees—he later tells me the only real disaster is if a baker forgets to add salt. Add it too early, before autolyse, and those little ions my mother talked about will start bonding and slow the creation of gluten. But when it's added later, the ions cluster around the gluten, preventing them from repelling each other, allowing more extensive bonds. If it's not added at all: The yeast will rise too quickly.

"I think that's enough, Mom."

She laughed because it was still a sticky mess, not the firm ball the recipe called for. But we placed the dough in a bowl and covered it with plastic wrap for the first rise, called the bulk fermentation. While the previous rests are focused on gluten formation, this rest is longer, about 3 to 5 hours.

"The key to making good bread is not the oven—any oven that can store and radiate heat, and trap steam, will work. The eventual nature of the crust is largely determined before the loaf is ever baked."

During this time the yeast is again fermenting and, in a way, working the dough from within. Carbon dioxide slowly inflates the air pockets in the dough, stretching them and continuing gluten development (this is when Robertson turns the dough). A matrix of gluten that will be the basis for the baked bread forms, and in this first, crucial rise, the dough doubles in volume.

"We let it rise for a few hours," I told my mother. "Then we're supposed to shape it into loaves, and it rests again. Then it goes in the fridge overnight." That final fermentation, or proof, used to be fairly short in the old days, but with the advent of widely available refrigeration in the 1920s, bakers discovered yeasts took 10 times longer to rise in the refrigerator than at room temperature, and thus an overnight rise became a possibility. This is how Robertson can sleep. A baker tests the dough after this rise by poking it with a finger. If it holds the shape for a while, that means the gluten has reached the limit of its elasticity and is ready for baking. For us that would not happen until the next morning.

"Well, there's certainly a lot of free time in baking!" my mother announced, her eyes sparkling. "Should we have a gin and tonic?"

4

THE BAKING →

WHAT HAPPENS DURING THE BAKING IS fascinating. The presence of steam is essential–it accelerates the heat transfer from the hot oven to the dough and prolongs the forming of crust, allowing an elastic rise called the oven spring. It is dramatic. Yeast is no longer the prime mover here. Alcohol, fermentation's other byproduct, and water vaporize within the air pockets, expanding the dough to as much as half again its initial size. After 6 minutes or so the crust begins to form, cutting off any further rise. The air pockets continue to expand, however, and burst their walls, creating an interconnected network of passageways like a sponge's. If they did not burst, those little pockets would simply deflate upon cooling. The loaf would collapse. Why

does a baker tap a loaf to see if it's done? Because only if it has cooked thoroughly, the pockets bursting to become a porous sponge, will it ring with the hollow sound of perfectly baked bread.

My mother does not have professional ovens like Robertson's. She got up at 5:30 in the morning to remove the rounds from the fridge and let them sit and rise some more, but we were left with a quandary: how to bake them. A conventional oven cannot hold the extreme temperatures long enough, and my mother doesn't own the pizza stone called for in the recipe. So she went out into the yard, pried up two bricks from the patio, wrapped them in aluminum foil, and put them in the oven. "There," she said, smiling. "It doesn't matter. It's just about heat retention."

We made shallow cuts in the rounds, slid them into the 500-degree-Fahrenheit oven, sprayed them with water, and closed the door. I was a nervous wreck; everything about them looked wrong. Even that morning, after a few hours of extra fermentation, they would not hold an indentation the way the book said. But as I watched through the little window, it happened. They grew incredibly. In about half an hour they were golden brown, with an internal temperature of 210. "Mom!" I yelled. "Mom, the bread is ready!"

They looked a little pale. I sliced one open, expecting the worst. We each took a piece, spread butter on it, and tasted. It was delicious. Not spectacular, but crusty and soft. It was my very first loaf of bread. And, it turns out, also my mother's. "Oh, I made biscuits, like your grandmother, but not *this*," she said. She stood and smiled at me, in her clear, searching way. "It's amazing," she said after a moment, "that these single-celled creatures can make such a thing. A miracle."

At Tartine, with a strongman's shove, one by one, Robertson has rolled the loaves into the oven, the doors closing automatically behind them. Then he turned and smiled as he pressed the button that injects steam. How many loaves has he baked? A

thousand? Ten thousand? There was no sign of routine, no boredom in his art. No sign of falling out of love.

The loaves come out of the oven chocolate-brown, with streaks of flour. The cuts have blossomed on top, and the snips on the porridge loaves have baked into stegosaurus spines. Robertson has been checking them throughout the morning, noting that one looked "funny," and on the last check his face became serious as he went into action: swiftly pulling them out with a long wooden paddle, placing them sideways on a black wire rack to cool. You can almost hear the crackle as their crusts contract.

"Do you ever have failures?"

He laughs and looks at the floor with a smile, adjusting his cap—a potter asked if he ever drops a bowl.

A friend had advised me to sneak my starter to Tartine and, like some wicked child in Wonka's factory, surreptitiously open it to steal a little of whatever magic is in the place. But I now know there is no magic. At Tartine Robertson is making precisely the bread I made with my mother. But while our bread was good, engineered by careful bakers to work every time, Robertson's new breads are sometimes failures, sometimes extravagant successes, and the difference is not the ingredients—there are, after all, only four—but the curiosity it takes to use them to our ends. He hands me a brown paper bag: in it, a loaf of kamut porridge. We chat for a moment about music, and then he shakes my hand and wishes me luck, then heads to the back. My mind is only on the bread. I am barely out the door before I dig in: It is warm, luscious, nutty. I can't stop eating it.

My mother was right: It is amazing that creatures could make such a thing. But not the yeast, though those creatures are amazing too. The humans. We have groped our way from discovery to discovery—from Stone Age flatbreads to Egyptian leavened ones, from mortars and pestles to Mesopotamian grinding stones—forging an arduous path toward a food that today is the embodiment of the everyday, a food any fool can make. ■