



**THE
DORITO
EFFECT**

**The Surprising New Truth
About Food and Flavor**

MARK SCHATZKER

Thank you for downloading this Simon & Schuster eBook.

Join our mailing list and get updates on new releases, deals, bonus content and other great books from Simon & Schuster.

[CLICK HERE TO SIGN UP](#)

or visit us online to sign up at
eBookNews.SimonandSchuster.com

THE DORITO EFFECT

The Surprising New Truth About
Food and Flavor

MARK SCHATZKER

SIMON & SCHUSTER

New York London Toronto Sydney New Delhi

Contents

Definitions

PART ONE • THE DORITO EFFECT

ONE “Things” and “Flavors”

TWO Big Bland

THREE Big Flavor

FOUR Big People

PART TWO • IF FOOD COULD TALK

FIVE The Wisdom of Flavor

SIX Bait and Switch

SEVEN Fried Chicken Saved My Life!

PART THREE • THE DELICIOUS CURE

EIGHT The Tomato of Tomorrow

NINE The Gospel According to Real Flavor

Appendix: How to Live Long and Eat Flavorfully

Acknowledgments

About Mark Schatzker

Bibliography

Notes

Index

For Laura

junk food *noun*

1. Pre-prepared or packaged food that has low nutritional value

—*Oxford English Dictionary*

2. Food that is not good for your health because it contains high amounts of fat or sugar

—*The Merriam-Webster Dictionary*

3. Food that tastes like something it is not

—*Mark Schatzker*

THE DORITO EFFECT

“Things” and “Flavors”

IN THE early autumn of 1961, a thirty-seven-year-old housewife and mother named Jean Nidetch was pushing a shopping cart through a Long Island supermarket when she bumped into a woman she knew. “You look so marvelous,” her friend said, and for a sweet moment Nidetch basked in the compliment. Unfortunately, her friend kept talking. “When are you due?”

Nidetch was not pregnant. At the time, she stood five seven and weighed 214 pounds, which marked her, in today’s parlance, as obese, although Nidetch didn’t know what that word meant, or that there were other words for obese were, at that very moment, coalescing into a demographic ripple that was on its way to becoming a wave.

Nidetch had been to see diet doctors in New York. When their advice didn’t work, she headed across the Hudson River to New Jersey, where the diet doctors proved to be just as useless. She had tried every diet there was, and every one of them worked: She always lost weight. But then she would gain it all back—and more. Jean Nidetch could stop eating, just not for very long. She loved food too much. She loved savory things like pizza and meat, and sweet things, too, like cupcakes and soft drinks. Nidetch wasn’t one for big breakfasts, but that was because she would get up at three in the morning to gorge on cold pork chops or baked beans right out of the fridge. In summer, if an ice cream, pizza, or sandwich truck zoomed by without stopping, she would take off after it. And when visions of jelly beans began dancing in her head, she would rifle through her son’s pockets looking for some. But what Nidetch especially loved were cookies. When she started eating them, she couldn’t stop. She was addicted to them.

The day Nidetch was mistaken for pregnant, she phoned the New York City Department of Health’s obesity clinic to make an appointment. Not long after, she found herself in a room full of similar overweight women. An instructor walked in who was so “slender” that Nidetch decided right there on the spot that after the class she was going to have an ice cream soda. The instructor handed out a sheet of paper with a list of foods the women were allowed to eat. Nidetch saw nothing new. She had whole albums filled with similar diets at home, none of which she’d ever been able to follow for very long. But once again, Nidetch tried. She gave up pizza, cake, and ice cream and started eating vegetables and fish. Every week, she went back to the obesity clinic, and every week she lost weight—two pounds.

It was progress, to Nidetch at least. The slender, ice-cream-soda-inducing instructor thought differently. She looked at Nidetch and said, “What are you doing wrong?” And as gallingly insensitive perhaps even abusive, as that might sound, the instructor was right. The truth is Nidetch wasn’t following orders, at least not completely. It was the cookies. She was feeding on them in secret. On the way to the clinic, she would sit there on the subway, constructing lies to explain her lack of weight loss. Lies that got more and more elaborate with each passing week—I’m constipated, I’m retaining water, I’m premenstrual. By the tenth week, the shame had gotten so bad that she couldn’t even look at the

instructor.

~~Nidetch couldn't bear it any longer. She had to get her cookie secret off her chest, so she phoned some fat friends and invited them to her home and confessed. Her friends were supportive. She had a "right" to eat those cookies, they said. They did stuff like that all the time. One friend hid chocolate chip cookies in the cupboard behind dishes. Another hid snacks behind cans of asparagus where no one would see them. All of them confessed that they, too, got up in the middle of the night to eat. Toward the end of the meeting, something seemingly insignificant happened that would change the course of Nidetch's life. One of her guests said, "Jean, can we come back next week?" The next week, they brought three more fat friends. The week after that, four additional fat friends joined them.~~

If this sounds to you like the beginnings of a true-life fairy tale of one woman fighting the odds to attain personal beauty, celebrity, and vast wealth, you're right. Within two months, the weekly meetings had swelled to forty women. A year after the "When are you due?" question, Nidetch was down to 140 pounds. One night, after one of her increasingly popular meetings, a businessman who'd lost 40 pounds thanks to Nidetch suggested she turn her "little project" into what it so clearly deserved to be—business. She did. Within five years, 297 classes were being held in New York City alone, and there were 25 franchises in 16 states. In 1978, H. J. Heinz, the company that makes the famous ketchup, bought her business for \$72 million, making Jean Nidetch the Horatio Alger of weight loss. You've probably heard of it. You may have even heard this near-mythical story before. Jean Nidetch named her company Weight Watchers.

NIDETCH'S SOLUTION to weight loss lay in collective willpower. Weight Watchers wasn't the first diet to push this method. Overeaters Anonymous, which is also based on group support, was founded three years earlier, in 1960.

Group support was just one way people could lose weight. The year after Weight Watchers launched, a high-living photographer put the opposite spin on dieting with *The Drinking Man's Diet: How to Lose Weight with a Minimum of Willpower*, which sold more than two million copies. It was joined that same year by another liquid solution to trimming down: Diet Pepsi. A few years later, a British biochemist introduced the Cambridge Diet, a tough-love, low-calorie regimen designed to promote fat burning and shed pounds fast.

The pace of diets and dieting was starting to pick up in the 1960s. People were getting fatter. According to the Centers for Disease Control, in the early 1960s, just 13.4 percent of adult Americans qualified as obese. A decade later, the percentage had ticked up more than a full point to 14.5 percent. (The increase during this period is even greater when obesity is measured by skin fold rather than the more simple body mass index calculation.) Obesity really got rolling, however, in the '80s, and by the late '90s, more than 30 percent of American adults were obese, more than double the early '60s tally.

All that dieting, in other words, didn't work. Despite Jean Nidetch's life-changing insight, and the true-life miracles behind every weight-loss regime since, we continue, year after year, to gain weight. In Jean Nidetch's day, obesity was a relatively rare condition. Now it's common. Today, obesity is holding steady at 35 percent, nearly triple what it used to be. By the mid-2000s, the 1961 Jean Nidetch, with a BMI of 33.5—squarely in the midrange of "obese"—would have looked almost normal. Today there is extreme obesity, which hardly existed in the early '60s. Back then, just a tiny slice of Americans met the qualification—0.9 percent. The "pregnant" Nidetch was herself forty-one pounds shy of that mark. Today it's at 6.4 percent.

To put this in perspective, at a sold-out Pirates-Yankees World Series game in 1960, there would have

been around six hundred fans in Yankee Stadium of a girth that verged on shocking. Today, there would be close to forty-five hundred, and no one is shocked by it. In the early '60s, well over half Americans were "slender" and of the non-slender, the vast majority was classified as "overweight"—the needed to lose a few pounds. It is now abnormal to be slender. Today, less than a third of Americans are slender, which is another way of saying more than two-thirds are either overweight or obese. Nine million Americans—the populations of greater LA, New York, and Chicago multiplied by 2—now eat so much they are at increased risk of asthma, cancer, heart attack or stroke, reduced fertility, giving birth prematurely, high blood pressure, sleep apnea, liver disease, gallbladder disease, diabetes, and arthritis. The obese make less money (particularly obese women), have higher medical expenses and lower self-esteem, and are more likely to suffer from depression. After smoking, obesity is the leading cause of preventable death. And when it comes to morbidity—"a diseased state or symptom"—obesity is surging past smoking, drinking, and poverty.

Obesity is so rampant that it seems contagious. It's an epidemic now, and it's spreading to other countries—the British are gaining, the Chinese are gaining, even the French are gaining—which makes it a pandemic. There are frantic efforts to make it stop. Weight Watchers and Overeaters Anonymous were just early tactics in a long war that would go on to include the Pritikin Principle, the Scarsdale Medical Diet, Slimfast, the Atkins Diet, the South Beach Diet, The Zone, Nutrisystem, Jenny Craig, the Blood Type Diet, the Mediterranean Diet, the Master Cleanse, the DASH diet, the Cabbage Soup Diet, the Paleo Diet, and the Raw Diet. Americans have eaten fat-burning grapefruits, consumed cabbage soup for seven straight days, calculated their daily points target, followed the easy and customizable menu plan, dialed the 1-800 number to speak to a live weight-loss counselor, taken cider vinegar pills, snacked strategically, eliminated high-glycemic vegetables during the fourteen-day induction phase, achieved a 40:30:30 calorie ratio, brought insulin and glucagon into balance, sought scientific guidance from celebrities, abstained from the deadly cultural practice known as cooking, tanned and then bleached themselves to more fully mimic the caveman state, asked that the chef please prepare the omelet with no yolks, and attained the fat-burning metabolic nirvana known as ketosis.

It has all been a terrible, amazing failure. The average American man has gained twenty-nine pounds and the average woman twenty-six. Between 1989 and 2012, according to the market report "The U.S. Weight Loss & Diet Control Market," Americans collectively spent more than \$1 trillion on weight loss. In that same period of time, obesity grew by more than 50 percent and extreme obesity doubled. The long battle against weight gain hasn't been much of a battle—more like trying to put out a forest fire with a garden hose.

What a strange problem. Despite living in a culture that prizes thinness above even wealth, we keep on eating. It's as though we've created a new "diet-resistant" form of obesity that, like some kind of cancer, perpetuates itself at the expense of our own vitality. Kindergarten children now struggle with their weight. Fully one-third of boys and girls from six to nineteen years of age are overweight or obese.

And obesity is just the most visible manifestation of a deeper malaise. Food has become a life-threatening indulgence. It seems to be disrupting the very way our bodies run—straining our organs, distressing our bowels, and crashing our mood. Adult-onset diabetes had to change its name to type 2 diabetes because so many children are now being diagnosed with what was formerly considered a metabolic disease of grown-ups. Once upon a time, we ate to sustain ourselves. Now food itself is toxic.

What happened?

SUGAR. That's the latest answer, anyway. As I write these words, sugar—or "white death," as some have

taken to calling it—is igniting flares of panic and condemnation. A year or two ago, a panic over high-fructose corn syrup came through like a flash flood and then died down to a trickle. Saturated fat, which used to be deadly, is enjoying a renaissance while polyunsaturated fat, which at one time was seen as the antidote to saturated fat, is now under attack. Before fat it was carbs and before carbs it was fat, and if you go back far enough sugar pops up again. For the better part of a century, millions of people, almost all of them with a rudimentary or nonexistent understanding of biochemistry, have been taking part in a richly technical conversation about such phenomena as glycemic load, protein ratios, and serum triglycerides.

Part of the problem is human nature. We are all natural reductionists. We always want to find the single cause of this or that problem, because then it's easy to come up with a silver-bullet solution. That sort of thinking works very well when it comes to car trouble—your alternator is fried, your air filter is clogged, your timing belt is worn out. (If it's all three, it's time for the scrap heap.) But it doesn't work very well with nutrition, which is about a lot of things. The list of essential vitamins, fats, and amino acids includes twenty-four different substances. And that doesn't include minerals, trace minerals, fiber, choline, or the very fuel of life: energy. But even when you add those to the list, along with starch in all its amazing forms and the micro-universe of fats, you still haven't come anywhere close to describing the radiant complexity of the plant and animal matter that goes into our mouths, our stomachs and intestines, and eventually becomes part of our bodies.

That's the other problem. Food is complicated. And when a species that delights in one-word answers faces a problem as complex but crucial as food, the result is not surprising: a decades-long kangaroo court in which we keep putting the latest evil nutrient on trial. The truth is, it would all be so much simpler if it really were just sugar's fault.

But clearly, something—or things—did change.

Here's one thing that definitely did not change: our genes. This is not evolution. There was no cataclysmic event—no meteor, no supervirus that wafted out of some secret government lab—that conferred a reproductive advantage to those inclined to obesity. Similarly, there has been no demographic influx of genetically obese immigrants who fundamentally changed the population. Most likely, no mistake, there are genetic aspects that determine each individual's propensity to obesity—I might be more susceptible to putting on weight than you because of traits I inherited from my parents. But as a group, we all have pretty much the same genes as we had in the 1960s. And that can mean only one thing: Something in the world around us has changed.

When you stop to think about it, the human body faces the same doozy of a problem as the nutritionists. It has complex needs. And it fulfills those needs with a very complex substance: food. How does it do that? How does a body know what it wants?

That, it turns out, is the part we've been messing with—the *want* part. Sugar has something to do with want, and so do high-fructose corn syrup, fat, carbs, and all those other nutrients we've been obsessing over. But the cause of the food problem will not be found in individual nutrients. We keep mistaking the mechanism of obesity for the cause. If we regarded smoking the same flawed way we understand food, we would say cigarettes are deadly because they cause cancer. Cancer is the *how* of tobacco-related mortality. The reason people smoke in the first place—the *why*—is that tobacco is addictive. People smoke because they experience a powerful *desire* to smoke. Jean Nidetch's problem, similarly, was behavioral. It wasn't that her body turned all the food she ate into fat, or that perhaps she was exquisitely efficient in turning refined carbs into fat. That's what bodies do. Her problem was that she ate too much food. She wanted to eat. She could not resist the desire. And when it comes to wanting, food speaks its own special language: flavor.

Flavor, as we will see, is the aspect of the human environment that has changed. The food we eat today still seems like food, but it tastes very different than it used to. For the better part of a century, two complimentary trends have conspired to transform the flavor of what we eat. These two trends were already ascendant when Jean Nidetch was mistaken for pregnant in that Long Island supermarket. And within a year, they would unite in a Dallas suburb with the momentous utterance of a single word: “taco.”

This is where our story begins.

IN THE SUMMER of 1962, the vice president of marketing at Frito-Lay took his wife and three kids on a trip to Southern California. It was, on the surface, a family vacation. The five of them piled into Dad's gold Lincoln Continental for the long trip from Dallas to Orange County, stopping along the way at Carlsbad Caverns and the rim of the Grand Canyon.

From the very beginning, however, the trip portended big things about flavor. Before getting hired by Frito-Lay, Arch West had been a Madison Avenue ad man, where he'd headed up the Kraft account and worked on Jell-O puddings. In Corona del Mar, the West family stayed at a house belonging to Lawrence Frank, the inventor of Lawry's seasoned salt. And one afternoon, after the family had just dined at a restaurant called the Five Crowns—West liked the prime rib and fancy creamed spinach—a stranger walked up and complimented his daughter's golden blond hair. The man asked the Wests if they'd ever eaten at his restaurant, but they'd never heard of it, even though in just two years the 500th location would open in Toledo, Ohio. The man was Ray Kroc and his restaurant was McDonald's.

The most important meal of that trip, however, didn't take place at the Five Crowns, or at the restaurant that would go on to become the world's largest chain of hamburger fast-food restaurants. It was served at a little Mexican “shack” West spotted by the side of the highway somewhere between L.A. and San Diego, where he pulled over and ordered a small container of tortilla chips.

It was likely the crunch that got him. Besides shape, crunch is the only aspect in which tortilla chips are meaningfully different from a snack West was already in charge of marketing, Fritos. Both are fried pieces of cornmeal. Tortilla chips, however, are baked first, which makes them crunchier. Arch West was struck by an idea: Tortilla chips just might be Frito-Lay's next big thing.

Back at company headquarters in Dallas, West presented his great new idea to his fellow executives. The response was something like the sound a vacuum cleaner makes when it's unplugged. Why would Americans want Mexican “tortilla” chips, his colleagues wondered, when they already had perfectly good corn chips? They weren't even interested in trying one. Their instructions were clear: Do not pursue tortilla chips.

West knew better. He was so confident about the future of tortilla chips that he secretly funneled discretionary funds to an off-site facility to develop the tortilla chip concept. He pitched his idea again. This time, though, he handed out samples. He had a plan: They weren't tortilla chips anymore. Now they had their very own Mexican name, one that meant little pieces of gold: “Doritos.” West got the green light.

The rest, however, is not history. The Doritos people all over the world know and love, and gobble up four at a time, almost never happened. The Doritos Arch West used to seduce his fellow executives, and that would hit store shelves in 1964, were exactly like the ones West tasted back in California, just salted tortilla chips—“toasted corn taste” is how they were billed on the packaging. They sold decently in the Southwest, where people knew that the pointy tip was well suited to scooping up globs of dip. (The early packaging even featured an illustration of a hand dipping a Dorito in dip.) But the rest of the country

didn't know what to make of them. Doritos sounded Mexican, but they didn't taste Mexican. This was a problem.

Archibald C. West once again found himself facing his fellow executives over his catchy new snack—snack he wasn't even supposed to develop—that wasn't catching on. West didn't give up. Instead, he uttered the word that changed everything. Make Doritos, he said, taste like a “taco.”

The Frito-Lay executives sneered. As his son Jack West recounts, they chided the fancy New York pitchman for “not knowing the difference between a ‘thing’ and a ‘flavor.’” But West was one step ahead of them. Perhaps because of his friendship with the Lawry's seasoning mogul, West already knew that the line between things and flavors could be blurred, that technology existed that could impose the flavor of a taco on a fried triangle of corn. “Of course, you and I know that,” he fired back, “but the rest of the country north of here sure doesn't. And that's our market.”

And what a market. The Northeast, the Northwest, the South, the Southwest—everyone loved taco-flavored Doritos. They loved them so much that four years later, Frito-Lay blurred the line between thing and flavor once again, this time with Doritos that tasted like nacho cheese. In 1986, Cool Ranch—a tortilla chip flavored like salad dressing—was born. By 2010, the chip beloved by everyone from toddlers and teenagers to stoners and the infirm was earning Frito-Lay \$5 billion a year. There are, at present, fourteen flavors of Doritos in the United States, including Salsa Verde and Spicy Sweet Chili. Every day around the world, fingers numbering in the tens of millions become coated in sticky orange seasoning. Every second, untold trillions of neurons are fired by that irresistible combination of salt, fat, and flavor while the people attached to those fingers experience the irresistible desire to put their hands back in the bag for more. “One good crunch,” as the 1968 package copy trumpeted, “leads to another . . . and another.”

“Taco.”

A THING, of course, is different from a flavor. Different things have their own different flavors. Oranges taste like oranges. Bananas taste like bananas. Tacos taste like tacos, and corn chips taste like corn chips. That, at least, is how the world worked back when there were still families who'd never heard of McDonald's.

Years before West arrived at Frito-Lay, the company launched “barbecue”-flavored potato chips, a breakthrough that made it possible to give fried slices of potato some of the same smoky, sweet notes of meat cooked slowly over hardwood. People who ate barbecue chips liked washing them down with soft drinks that tasted like oranges, grapes, or lemons, even though these foods contained none of the “things.” By the early 1960s, however, flavor technology had taken a great leap forward. The science was now so good it was possible not just to blur these lines but to utterly distort them. And that's what West did. He gave a simple fried piece of corn the tang and savory depth of a Mexican meal.

“Things,” meanwhile, were also changing. Fruits, grains, meat, and vegetables were themselves losing flavor. The corn Frito-Lay used to make Fritos in the 1960s looked just like the corn Elmer Doolin used when he founded the Frito Company back in 1932. But it didn't taste the same, because by 1967 an American corn farm was growing nearly three times as much corn as it had thirty years earlier. There was more corn, but it tasted weaker, like a lesser version of itself. Corn was getting bland. So were potatoes. The same year Elmer Doolin started making Fritos, Herman W. Lay got into the potato chip business. Back then, a typical American potato farmer produced about sixty-three sacks of potatoes from every acre. By the mid-1960s, it was up to two hundred sacks. And just like corn, the potatoes in those sacks didn't taste as “potatoey.”

That problem could be solved. The gathering void of blandness was filled by industry. Using the most sophisticated analytical technology of the era, scientists isolated the mysterious chemicals that humans experience as flavor, and the companies they worked for began manufacturing them and selling them to food companies, which added them to their products. You can see those chemicals right there on a 1960s package of taco Doritos represented by a single, exceptionally vague word: "Flavorings."

West's genius was one of vision. He stood firmly astride two waves—food getting blander and flavoring getting better—and married them. He showed how extraordinarily potent flavor technology had become. Taco Doritos tasted better than salted Doritos. And, unlike actual tacos, they didn't spoil; they were never overdone, they always tasted the same, they didn't need to be cooked, and they were cheap. A 1³/₄-ounce bag of original Taco Doritos sold for 15¢.

The Dorito didn't just predict the future of tortilla chips. It didn't just predict the future of snack food, either. It predicted the future of all food. Nothing tastes like what it is anymore. Everything tastes like what we want it to taste like. As food gets blander, we crank out zestiness by the hundreds of tons to make up for it. Most people recognize this as junk food. But it's happening to food served at restaurants and the food people buy at the supermarket and cook, from scratch, at home. It's happening to blueberries, chicken breast, broccoli, and lettuce, even fennel. Everything is getting blander and simultaneously more seasoned. Everything is becoming like a Dorito.

The birth of Doritos was a watershed moment. Flavor wasn't up to Mother Nature anymore. Now it was in the hands of the folks in marketing.

FOR ALL its technicality, the food conversation has been strangely silent on the topic of flavor. Back in Arch West's day, no one thought ingredients like torula yeast, flavorings, or MSG were particularly dangerous, and that thinking hasn't changed much today. They're noncaloric, for one thing. You could never get fat on a diet of these chemicals. They don't cause cancer or debilitating brain disease, either. (Not directly, at least.) Is there even any point in scrutinizing pleasure? Hedonism, as any puritan can tell you, never leads to virtue. If we could all set pleasure aside and eat what's good for us, our problems would all go away. (Good luck with that.)

Let's not be too quick to lay all the blame on a 1960s snack food executive. The man who invented Doritos was a World War II veteran and churchgoing family man who was raised in a Masonic home and once got injured while volunteering for disaster relief when his car was hit by a tanker truck. Arch West, furthermore, understood something the field of nutrition and the \$60 billion weight-loss industry have only recently showed the faintest glimmer of grasping: Flavor matters. Eating isn't a rational act of nutrient acquisition. Eating has as much to do with nutrients as sex does with procreation—we do it because it feels good to do it. We might pretend we're interested in vitamins, fish oil, and ketosis, but it's the flavor we're after. We think in flavor, we dream about flavor, and we get up out of our chair when the bases are loaded in the bottom of the ninth to get it. We eat for one reason: because we love the way food tastes. Flavor is the original craving.

This is not because we are lazy or weak. It's by design. If you think of the human genome as an instruction manual with each bodily system having its own chapter, you will discover something quite unexpected. The thickest chapter is the one on flavor. Our ability to sense and enjoy food is no accident. Not only are we expert flavor sensors, but the flavors we sense have a firm grip on our minds. They drive our behaviors and control our moods. If music is emotion expressed in the medium of sound, flavor is emotion expressed in the medium of food.

We are, if you like, playing with our own minds. And our game has gotten a lot better since Arch

West's taco moment. Taco Doritos listed eleven ingredients. The much more recent Jacked Ranch Dipped Hot Wings Doritos—a tortilla chip that tastes like chicken wings dipped in hot sauce and the dipped in salad dressing—lists thirty-four.

So imagine for a moment an alternate world in which everyone is wearing flavor goggles. When they bite into foods that taste like tacos, cherries, grapes, or oranges, their brains think they are actually eating tacos, cherries, grapes, or oranges. But what they are actually tasting are flavor chemicals.

That's the world you live in. You may not think so. You may believe you possess the kind of sophisticated palate that can easily spot the difference between a real taco and a taco-flavored tortilla chip, or between a real grape and a grape-flavored beverage. Your flavor-sensing system, however, is being fooled. And the proof is in the fact that you—we, all of us—*like* these flavors. We like taco-flavored Doritos more than plain ones, even though we know they're not really tacos. We like Coke 7Up, and ginger ale more than plain old sugar water. And we like the flavor chemicals we didn't even know are being added to apparently wholesome foods, like raw beef, butter, soy milk, yogurt, and tea. The deception is so elegant as to be invisible. We are all wearing flavor goggles.

There are consequences. Bland, synthetically flavored food is not the same as naturally flavorful food. On the most basic level, when real foods like tomatoes, strawberries, and chicken taste bland, we make them palatable the only way we know how, by pouring ranch dressing over watery tomatoes, ladling dollops of whipped cream over strawberries, and blitzing chicken in flavoring and then dunking it in the deep fryer. We do what Arch West did to plain old tortilla chips to get people to eat more of them.

It gets worse. Nature endowed us with our most sophisticated bodily system because it performed the body's most essential task: getting important nutrients. By manipulating our richest and most direct source of pleasure, we have warped our relationship with the fuel our bodies require, food. Evolution may have given us an amazingly complex flavor-sensing apparatus, but it wasn't made for a world of cheap calories and egregious flavor lies. We have taken a system designed to bring our bodies to a state of nutritional completion and turned it against us.

The Dorito Effect, very simply, is what happens when food gets blander and flavor technology gets better. This book is about how and why that took place. It's also about the consequences, which include obesity and metabolic disturbance along with a cultural love-hate obsession with food. This book argues that we need to begin understanding food through the same lens by which it is experienced: how it tastes. The food crisis we're spending so much time and money on might be better thought of as a large-scale flavor disorder. Our problem isn't calories and what our bodies do with them. Our problem is that we want to eat the wrong food. The longer we ignore flavor, the longer we are bound to be victims of it.

This book is also about the solution. The Dorito Effect can be reversed. That's already happening on small farms and in pioneering science labs. Not only can we imagine a world where the food tastes better and people eat less of it—we can also visit it. I have visited it, and the food, as you will see, is superb. One day, we may look back on this obesity epidemic as a curious aberration in history when advances in analytic and synthetic chemistry outpaced our knowledge of psychology and nutrition.

If you like the food in the world you're in just fine the way it is—the way it tastes, the way it makes you feel, and the effect it has on your body—this book isn't for you. Get your money back before the spine creases and spend it on bland, synthetically flavored food. I'm confident you'll enjoy eating it; I'm less confident you'll enjoy the consequences. If you want to discover the true nature of our relationship with food and how we've manipulated the ornate chemical system that sparks cravings and touches every cell of our bodies, turn the page.

Big Bland

TO THOSE who doubt the blandness of modern chicken, consider the following story:

In the town of McPherson, Kansas, there is a butcher shop called Krehbiels Meats, where, not long ago, an elderly woman bought a chicken that moved her to tears. She spotted it in one of the display cases, a brand she hadn't seen before called Good Shepherd Poultry Ranch. The chicken beneath the shrink-wrap packaging had longer legs, a smaller breast, and yellower skin than regular chickens, and on the back appeared two words the woman, who was in her seventies, would not have seen in a very long time: "barred rock." This chicken was a throwback, a variety nearly vanished since the 1950s and still raised the old-fashioned way, outdoors, where it ate blades of grass, leaves, seeds, bugs, and whatever else it could put its beak on. The woman purchased one and took it back home, an hour south of Wichita.

She had every reason not to be excited. During the course of her forty-eight years of marriage, chicken had only ever brought disappointment. The problem was chicken and dumplings. It was one of her husband's favorite dishes, but every time she made it his verdict was always the same: "Not as good as my mother's." She tried different recipes. She tried different ingredients. But as the years turned into decades, his judgment never wavered. After close to a half century of marriage, she was married to a man who still missed his mother's chicken. And that, it seemed, is how it was fated to be.

For whatever reason, the woman decided to give chicken and dumplings one more try with the barred rock chicken from Krehbiels. This time, her husband was astounded. This time, he swallowed his dumplings and delivered the news she'd been waiting almost fifty years to hear: "This is my mother's chicken and dumplings."

It was at this point in the story that the woman began weeping. She was on the phone with the farmer who raised the chicken, an heirloom poultry buff named Frank Reese, whom she'd never met or spoken to before. As the tears flowed, she said, "I just wanted to call and thank you so much," and she shared memories of eating chicken on a farm as a little girl. When they hung up, Reese went back outside to the thing he loves most of all: looking after his barred rock chickens.

The woman's mistake, it turned out, had nothing to do with the recipes she'd been using. It had nothing to do with her cookware, her oven, the thickness of her dumplings, her gravy, the amount of salt and spices she used, the hardness of her tap water, or any of the usual variables a home cook might place under the beam of doubt. All that time, the problem was the flavor of the chicken itself.

It's a complaint we hear often from the blue-hair set. Nothing tastes the way it used to. We tend to dismiss it as the rose-tinted memory of times past or the result of failing taste buds. But the blue-hair set is on to something. Food has changed. The change has been documented scientifically. And it is a story best told by chicken, which has become not only our number one source of animal protein but also simultaneously the blandest and most flavored—the most Dorito-like—meat.

CHICKEN'S DESCENT into blandness began precisely sixty-one years earlier, in March 1948, when fine world-changing chicks pecked out of their shells at a hatchery in Easton, Maryland. The eggs had come all the way from Marysville, California, where a month earlier, at an outfit called Vantress Hatchery, a fine plump California Cornish rooster mounted some fine plump red New Hampshire hens. They arrived in Easton along with 31,630 eggs from 25 different states and were there as part of a grand event that would determine the way soups, broths, and braises of chicken would taste for decades to come.

The Chicken of Tomorrow contest was conceived by Howard "Doc" Pierce, who was national poultry research director with A&P Food Stores, one of the largest grocery chains of the time. For anyone in the chicken business, the late 1940s was the best of times, but also the worst of times. World War II, which had just ended, had been good to chicken farmers. As red meat was rationed, Americans almost doubled the amount of chicken they ate. But with the war over, Pierce worried that the spike in chicken consumption would come to a crashing end as Americans returned to their red-meat-loving ways. Pierce wanted to stop that from happening.

Chicken of the 1940s was nothing like it is today. It was expensive by modern standards, and since chickens were often the by-product of the egg industry, they came in a range of sizes. There were broiler chickens, which were young and tiny—some weighed in at just a pound and a half—and so tender you could cook them under a scorching-hot broiler. Next came fryers, which were a bit bigger and less tender, but still small. After fryers came roasters, and last came "fowl"—old hens that were so tough they could be used only in soups and stews. If a quick and easy Tuesday night dinner was what you had in mind, you needed a broiler or a fryer. You might even need two. And it was going to cost you.

What this country really needs, Pierce thought, is a steady supply of tender, large-breasted chickens. So A&P put up \$10,000 in prize money and sent wax models of perfect-looking chickens around the country. Whoever could raise the flock of chickens that grew the fastest and looked most like the wax model stood to make quite a bit of money.

In 1946 and 1947, regional Chicken of Tomorrow contests were held. The cream of that group was invited to compete in the national event in 1948, which is how 31,680 eggs from 25 different states found their way to a hatchery in Maryland. Once hatched, the chicks were raised in identical pens and fed a secret diet that contained a minimum of 20 percent protein, 3.5 percent fat, and 7 percent fiber. After twelve weeks and two days, the chickens crossed the metaphorical finish line—they were slaughtered. Then came judgment. Under bright and unflattering light, their plucked bodies were scored for things like uniformity of size; quality of skin; the length, depth, and width of the breast; along with performance traits such as hatchability, feed efficiency, and average weight. Those Vantress chickens were big, averaging 3.75 pounds, and scored 3.17 for feed efficiency, which means it took just over three pounds of feed for every pound of chicken.

This is what agricultural types call "improvement." And it had been going on at a slowish pace for a couple of decades already. Back in 1923, it took sixteen weeks to get a chicken to a relatively puny live "broiler" weight of 2.2 pounds, with a feed efficiency of 4.7. By 1933, that same broiler had gained half a pound, and took two fewer weeks to do so. By 1943, broilers were averaging 3 pounds at twelve weeks. These Vantress chickens, however, were something to behold. Not only were they roughly a full pound heavier than their peers, they somehow managed to get that big on less food. These were miracle chickens.

How did these miracle chickens taste? No one knows. The judges didn't measure flavor. The point of the contest, after all, was to create a chicken that looked like a wax model.

THERE WAS a second great legacy of the Chicken of Tomorrow contest. Like the Vantress Hatcher chickens, it was a precocious, high-performing biped that would go on to change the world. This one, however, didn't have feathers.

Paul Siegel, who would grow up to become one of the most important and prolific researchers in the history of poultry science, was fifteen years old in 1948. He lived on a thirty-two-acre farm near Vernon, Connecticut, where, from an early age, he displayed the unmistakable signs of poultry genius. When Siegel won Connecticut Poultry Boy of the Year, he got caught playing hooky. His school, phoning to share the good news, thought Siegel was home sick only to discover he was out cleaning the chicken house. The day Siegel learned there was a youth division of the Chicken of Tomorrow contest, he went out to his tiny broiler house and put some New Hampshire roosters with some White Plymouth Rock hens. When the chicks hatched, he kept the feed trough full and made sure not to let them go outside because any forays they took outdoors were a waste of valuable energy they could be putting into growth. After twelve weeks of fervent poultry husbandry, the county agent pulled up to the family farm to assess the young man's chickens—Siegel can still remember him marking their weights on a score sheet he hung on the back of a wooden door. Some time later, he received the good news. Siegel took the prize for the junior Chicken of Tomorrow contest for the state of Connecticut. Nearly seventy years later, the plaque still hangs in his den. But Siegel wasn't surprised. Being a star poultry boy is like being a star athlete. "I knew I was pretty good," he says.

Siegel's singular talent was exploiting the very principle that had been demonstrated at the Chicken of Tomorrow contest, and that would go on to doom the flavor of chicken and dumplings for decades to come: Chickens can be changed through breeding. Growth rate and plumpness weren't fixed physical laws, like the speed of light or the electrical charge of a proton. By choosing which rooster got to mate with which hens, you could change chickens' genes. You could make chicks that were different—much different—from their parents.

Those genes kept changing. By 1951, the Chicken of Tomorrow winners got fat two weeks earlier than they did in 1948, and by 1955 the winning chickens of 1951 were just average. By 1973, it was down to eight and a half weeks.

Everything, in other words, went according to plan. As World War II concluded, chicken consumption did indeed decline, just as Doc Pierce had feared. But then chickens got cheaper and plumper, and the eating of said chicken rebounded, rising back up to wartime levels in the early '50s and then exceeding them by the middle of that decade. By 1967, Americans were eating twice as much chicken as they had in 1948, and by 2006, chicken had become so cheap and so abundant that Americans were eating nearly five times as much as they had in 1948.

The former Connecticut Poultry Boy of the Year is partly to thank. Six years after winning Connecticut's junior prize, Siegel received a master's degree in poultry genetics. After he got his PhD, he joined the faculty at Virginia Tech, where, after more than fifty years, he's still at it. Over his incredible career, he has personally incubated and hatched around 200,000 baby chicks and published more than 500 scientific papers (a chick-to-publication ratio of 400:1). He is an inductee of not only the American Poultry Industry Hall of Fame but the International Poultry Hall of Fame as well. Pretty good for a guy who played hooky.

The Chicken of Tomorrow contest never really ended. Siegel dedicated his academic career to exploring how chickens could be changed and improved through breeding. He found that there was always a tradeoff. For example, there is a genetic tradeoff between body weight and egg laying. That's why the chicken industry is now split into two distinct halves, meat chickens and egg chickens. Today's meat chickens are pathetic layers compared to today's egg chickens, and the reason is that they put a

their energy into creating flesh. Today's egg chickens, by comparison, are so scrawny that no one bothers raising the males into fryers. Instead, as soon as they can be "sexed," the boys are separated from the girls and exterminated—their necks are snapped, or they're gassed, or fed, live, into a high-speed meat grinder.

But Siegel's biggest influence on America, not to mention the rest of the planet, was his students, the small army of poultry geneticists—professional chicken breeders, basically—who went out into the world with a single goal: to improve chickens, to make them ever plumper, younger, more efficient, and faster. In the early years, Siegel's students were hired by the quaint little hatcheries that still dotted the countryside. As chicken consumption spiked and the chicken business became serious business, his graduates joined huge multinational companies whose specialty is poultry genetics. Today there are three global giants: Hubbard, Cobb, and Aviagen. Almost no one has heard of these companies. But everyone has eaten their chicken.

The result has been formerly unimaginable "improvement." The broiler of today looks plumper. The broiler of today grows in less than half the time, about thirty-five days, as the world's fastest chickens did in 1948. Somehow, the broiler of today manages to weigh a pound and a half more and, even more incredibly, gets to that weight on a third less feed. Its legs are so short and plump that chickens, which were once agile goose-steppers, now waddle, and its breasts are so broad and thick that modern chickens don't quite stand up straight. Today's raw chicken is the porn star of the meat world: sensationally curved and expertly denuded. When Siegel thinks back to those perfect wax chickens in 1948, he laughs. "They could never dream what the broiler of today would look like," he says.

The dream of Doc Pierce, in other words, has been gloriously realized. Chicken is number one. The country that formerly preferred beef now eats 26 billion pounds of chicken every year. Chicken is cheap. The bird that was selling for 60¢ a pound in 1948 was down to 39¢ in 1968. In 1948, a five-pound chicken cost \$3—which might sound cheap, but in 2014 dollars it works out to \$30 for a single bird. In 2014, a supermarket chicken will run you \$7. Chicken today costs less than a quarter of what it did during the Chicken of Tomorrow contest.

They are all broilers now. Words like "fryer" and "roaster" still appear in cookbooks, but they don't exist anymore. We eat gigantic babies. As a paper in the journal *Poultry Science* puts it, if humans grew as fast as broilers, "a 3 kg (6.6 lb) newborn baby would weigh 300 kg (660 lb) after 2 months."

Paul Siegel likes eating chickens as much as he likes studying them. But he will admit that for all the improvement, they might not taste the same as they used to. The best chicken he's ever eaten wasn't the chicken of tomorrow. It was a chicken of yesterday: his mother's chicken fricassée, which he misses in much the same way the husband in Wichita missed his mother's chicken and dumplings. The tastiest chicken he's eaten since wasn't a commercial broiler. It wasn't even American. It was an eighty-four-day-old slowpoke sold under the brand Label Rouge. And as its exotic name suggests, Siegel ate it in France.

ONE OF the first signs there was a flavor problem with chicken appeared in a cookbook published thirteen years after the Chicken of Tomorrow contest. "Modern poultry raising," it stated, "has done wonders in making it possible to grow a fine-looking chicken in record time and to sell it at a most reasonable price, but rarely does anyone in the country discuss flavor. If you are interested in price alone," it continued, "you will often end up with something that tastes like the stuffing inside a teddy bear and needs strong seasonings of herbs, wines, and spices to make it at all palatable." It's pretty clear what was happening. Chicken was getting blander. It needed flavoring. Chicken was turning into something that didn't even exist yet: a Dorito.

The book was *Mastering the Art of French Cooking*, which would go on to become one of the landmark cookbooks of the last century, and one of whose authors was the soon-to-be-famous Julia Child. No one, however, seems to have taken the book's chicken warning to heart. By 1997, the chicken situation had gotten worse. "With the emergence of the modern poultry farm after World War II," an updated *Joy of Cooking* stated, "both the quality and safety of our poultry were compromised. Chicken has suffered the most." A year later, in *How to Cook Everything*, *New York Times* columnist Marth Stewart Bittman all but wrote the epitaph for chicken flavor. Chicken "leaves you in the same position you're in when you're cooking pasta: You must add flavor."

In 1961, Julia Child and her coauthors stated that chicken "should be so good in itself that it is an absolute delight to eat as a perfectly plain, buttery roast, sauté or grill." Thirty-seven years later it was "downright bland" and "essentially a blank slate." It wasn't just the occasional disappointing chicken that tasted like the stuffing inside a teddy bear. Now all chicken tasted that way.

To understand exactly what happened to chicken, it helps to acquaint oneself with a dispute that raged several years ago in *Organic Gardening* magazine, which, on the surface, had nothing to do with chicken flavor. In the December 1999 issue, senior editor Cheryl Long wrote an open letter of the charged and inflammatory variety to the secretary of agriculture. Food, she claimed, seemed to be getting less healthy. Long backed up her claim with a recent study published in the *British Food Journal* that compared fruits and vegetables grown in the 1930s and the 1980s. Wholesome things like rhubarb, bananas, and parsnips, the study found, contained fewer of the essential micronutrients necessary to human life than they used to. Calcium, Long pointed out, was down by 19 percent, iron down by 22 percent, and potassium by 14 percent. "Mr. Secretary," Long wrote, "what's going on here?"

In a letter back to Long, the director of the department's Research Service admitted that, yes, it did look like the nutritional content of fruits and vegetables was going down, but not to worry because there could be all sorts of reasons, including imprecise measurements back in the 1930s, and that it might not matter anyway. *Organic Gardening* returned fire with an editorial titled "As Food Quality Drops, the USDA Just Shrugs." At which point, the USDA shrugged and the world returned to its nutrient-depleted vegetables and teddy-bear-stuffing chicken.

Everyone, that is, except a biochemist by the name of Donald Davis who worked at the Biochemistry Institute, the University of Texas lab with the distinction of having discovered more vitamins than any other lab in the world. Davis read the British study and was duly alarmed, but he noticed a problem: it didn't account for moisture. Some modern fruits and vegetables, he noted, contained more water than the old ones. The problem might be nothing more than the fact that modern produce was plumper and juicier than heirloom produce. So Davis and two colleagues set out to compare the nutritional properties of thirty-nine vegetables, three melons, and strawberries from 1950 with the very same readings performed in 1999, only this time, they adjusted the results to reflect differences in moisture. They also used a more sophisticated statistical methodology (medians instead of geometric means, but never mind) and generally bent over backward and sideways to make sure there wasn't the slightest hint of bias against the modern produce.

Once again, there were differences. Startling ones: 1950s kale had twice as much riboflavin as modern kale, 1950s cauliflower had twice as much thiamin, and 1950s asparagus had almost three times as much ascorbic acid (vitamin C). The trend wasn't universal—1999 green onions, for example, had more riboflavin than 1950s green onions (but way less calcium), to cite one among a few counterexamples. But the overall trend was pretty clear: ascorbic acid down by 15 percent; vitamin A down by nearly 20 percent. On it went. It was as though modern produce had been nutritionally dumbed down.

Davis and his colleagues put these findings in a paper, which they submitted to the well-respected

Journal of the American College of Nutrition. As is always the case, the paper was sent to esteemed anonymous scientists around the country for independent review. The initial feedback was good, but one reviewer made a comment that caught Davis's attention. He mentioned something called the "dilution effect." In all his years of nutritional research, Davis had never come across this intriguing term. He began researching it, and what he discovered was indeed intriguing. Scientists had been aware of it since as far back as the 1940s.

What they had noticed more than half a century earlier is that when crops are fertilized and irrigated they contain lower concentrations of major minerals and trace minerals. But intensive farming wasn't the whole story. Davis also found evidence that there was genetic dilution taking place. Part of the reason things like broccoli, wheat, and corn were losing nutrients was that broccoli, wheat, and corn had changed due to careful breeding. Just like chickens, they'd been selected to grow faster and bigger, and that was diluting the nutrients. It was as though everything farmers had been doing for the last fifty years—breeding, fertilizing, spraying—was ganging up on nutrition.

This is alarming. For one thing, the story of the last fifty to one hundred years of agriculture is the story of massive, world-changing leaps in yield. The explosion in productivity has been so miraculous there's even a term for it: the green revolution. It is thought to have saved more than a billion people from starving to death. But Donald Davis noticed a dark side to the revolution that no one talks about. Although the gains in quantity have been huge, there has been a corresponding loss in quality.

What, you might wonder, are plants replacing all those nutrients with? If we're harvesting millions of pounds of broccoli and that broccoli has less calcium and magnesium in it, what's taking their place? Each plant tells its own story, Davis says, but generally speaking we're getting the following: more water and more carbohydrates.

NONE OF the tiny nutrients Donald Davis tested for will help you throw a better dinner party. Riboflavin may play a crucial role in the decarboxylation of pyruvate (don't ask), but it's flavorless. So are thiamin and niacin. In fact, of all the nutrients Davis studied, the only one that tastes of anything is ascorbic acid, which tastes sour.

This is one of the main reasons that for so long no one has seen much of a connection between flavor and nutrition—essential, life-sustaining nutrients like vitamins don't taste like anything. But the nutritional dilution Donald Davis measured is nonetheless proof of flavor dilution. It is the key to understanding not only how fruits and vegetables got bland but also why Julia Child came to compare modern chickens with teddy-bear stuffing. There is one obvious point of connection: moisture, the variable Davis worked so hard to correct for. If modern peppers, cabbage, and strawberries contain more water, then they're going to taste watery.

Flavor dilution, however, goes much deeper than water, and we know this because in 1989, a molecular biologist working at Monsanto named Harry Klee set out to make a plant that had suffered particularly badly at the hands of flavor dilution—the tomato—taste better. He failed. But failure brought Klee face-to-face with a problem plaguing all of modern agriculture, one that looked very much like the one Donald Davis found. Water was part of that problem, but not all of it.

When Klee set out to fix bland tomatoes, he and most other tomato scientists thought they knew what the issue was: Tomatoes had no flavor because they were picked green. Since tomatoes have to make such a long journey from fields in Florida, California, and Mexico to supermarket shelves as far away as Michigan, Alaska, and Maine, farmers picked them when they were still green as a precaution. Sometimes they ripened on the truck, and very often they were stored in warehouses and later fogged

with ethylene gas, which advances the ripening process. Hence, the problem. Because a tomato that ripens in a truck or a warehouse, as every grandmother can tell you, just isn't the same as a tomato that ripens on the vine. As soon as it has been severed from its metabolic energy source—leaves—it loses most of the capacity to turn itself into something delicious.

Klee had an idea. Why not create a tomato that ripened more slowly? That way, it could cling to its life-giving vine long enough to become almost ripe by the time it was picked, and hit full ripeness on the truck. It might not be quite as tasty as a vine-ripened tomato, but it was sure to be much better than a tomato that was picked green.

This was not a new idea. For years, scientists had thought that slower ripening could fix the tomato. What was new, however, was the technology that could make it happen: genetic engineering. In 1987, Klee and his team inserted a gene from a bacterium found in soil into the genome of an ordinary plum tomato, and it did exactly what they'd hoped it would do. Ripening began taking place slow motion. Instead of taking one week, it took three weeks.

And so, on a sunny morning in June 1990, Harry Klee walked out into a Monsanto test plot in Bonita Springs, Florida, where, three months earlier, rows of tomato seedlings genetically engineered to ripen slowly had been tucked into the dark earth. The plants were now three feet tall, each branch heavy with pink orbs like some kind of subtropical Christmas tree. The fruit had just started ripening. Klee needed to see the tomatoes inside a climate-controlled storage facility where they were stored on shelves of cardboard boxes. The effects of that soil bacterium's gene on shelf life were "spectacular"—far better than Klee had dreamed possible. These transgenic tomatoes stayed plump and red for months. Klee reached into a box, pulled out a perfect specimen and, using the long blade of his Swiss Army knife, sliced off a disk and popped it in. His mouth was bathed in sugars and acids and pinged by flavor compounds.

But not enough sugars, acids, and flavor compounds. That genetically engineered, slow-ripening tomato—a tomato that, Klee estimates, cost Monsanto around \$10 million to develop—was better than a standard supermarket tomato, which Klee considers "tasteless." It was not, however, the kind of tomato that made him pause, midchew, to reflect on the positive and uplifting event taking place in his mouth. After all that effort, it was just somewhat better than a bad tomato. Progress? Perhaps. But even with \$10 million of help, the tomato was, as Klee puts it, "nowhere close to where we wanted to be."

Whatever was wrong with tomatoes, Klee realized, it went way beyond picking them green. So in 1995, Klee left Monsanto and joined the Horticultural Sciences Department at the University of Florida in Gainesville to immerse himself in tomato flavor the way Paul Siegel had done with chicken breeding. After nearly twenty years and three million tomatoes' worth of flavor research, Klee has scaled back his original certainties. Now the one thing he's certain of is this: Modern tomatoes are very, very bland.

Picking them green is one among numerous insults. And you can't fix it by slowing ripening because when the genes that regulate ripening are turned down, Klee learned, ripening never fully takes place. Delayed ripening is just another way of saying impaired ripening.

Color is another problem. In the early part of the last century, tomato growers seized upon a mutation that made tomatoes uniformly red, which makes them appear luscious and all the more ready to eat. Before this, tomatoes bore patches and stripes of green. They tasted all the better for it, because those stretches of chlorophyll produced energy that powered the flavor-making process. But as with the world model chickens, the focus was on how they looked, and by the 1950s tomatoes were a factory-finish red.

And then, of course, there is yield. A hundred years ago, a typical tomato plant was twelve feet tall and carried four or five ripe tomatoes at any one time, with a few green babies still weeks away. Around the time of the Chicken of Tomorrow contest, tomato breeders set about cranking up tomato output. A tomato plant now tops out at six feet and carries as many as ten ripe tomatoes at once. That's too many.

According to Klee, the plant is “source limited.” It doesn’t have enough leaves to power all that fruit, so it undergoes the plant equivalent of a brownout. Like a frantic parent, the plant fills its fruit with the one thing it can: water. And the tomatoes taste like what they’re filled with.

But even if you fixed the color situation, balanced the leaves-to-fruit ratio, and got rid of all the water, you still wouldn’t fix the modern tomato’s flavor problem. And the reason is that tomatoes, on a genetic level, have forgotten how to taste good. As breeders selected moneymaking traits like yield, disease resistance, and a thick skin for easier transportation, they ignored the genes that determine good flavor. There are a lot of those genes, and with each generation, some aspect of flavor can be lost. Over uncountable generations, the loss is substantial. And when the flavor genes are gone, there’s only one thing that can make a tomato taste good: a bottle of ranch dressing.

CHICKENS, of course, are not tomatoes. They have feathers, not leaves, and broilers are anything but “source limited.” They get to stand there at the feeder and gorge. And boy, do they ever gorge. Modern broilers have been intentionally bred to be voracious. These birds don’t even want to go outside to eat grass and bugs, because the genetic tradeoff for fast growth—genetics, remember, is all about tradeoffs—is laziness. But there is still a dilution problem. And, just as with bland tomatoes, a chicken’s blandness is intimately related to nutrition.

For the first 99.9925 percent of their domesticated careers, chickens ate all sorts of stuff: blades of grass, leaves, seeds, bugs, mice, frogs, meat scraps, dead rabbits, even snakes. Their human keepers carried the barest understanding of a chicken’s dietary needs. The Romans thought visiting a dung heap was the thing to do. (Not ridiculous at all: There are a lot of bugs in dung heaps.) By the turn of the last century, the picture wasn’t a whole lot clearer. Poultrymen and poultrywomen knew you could fatten chickens by feeding them things like ground-up corn. But they also knew that if all you gave chickens was corn, they’d get sick. So they sent chickens out to forage, and their beaks would find the foodstuffs that kept them healthy. In the winter, chickens would get milk, cabbage, green onions, bran, and table scraps. Without green treats and outdoor foraging, chickens got sick and died. No one knew why.

Around the turn of the last century, a Dutch physician named Christiaan Eijkman observed that when his chickens were fed white rice and only white rice, they became afflicted with beriberi—they had difficulty walking, they would vomit, and eventually they became paralyzed and died. If the sick chickens were fed brown rice, however, they recovered. Eijkman postulated that there must be something about brown rice, some hidden essence crucial to maintaining health, that was not to be found in white rice. A few years later, a Polish biochemist by the superb name of Casimir Funk took the stuff that makes brown rice brown—rice bran—and treated it with alcohol and phosphotungstic acid and was left with a tiny amount of an almost magical substance that could cure a pigeon just hours away from death of beriberi. Funk called this revolutionary substance a “vitamine.” (It was, in fact, vitamin B₁, properly known today as thiamin, and which is down by half in cauliflower and collards.)

The study of nutrition would never be the same. Thanks to vitamins, deadly diseases like rickets, scurvy, beriberi, and pellagra would become not only treatable but preventable. Eijkman was awarded the Nobel Prize. (Funk got bupkis.) But what Christiaan Eijkman almost surely did not realize is that thanks to him, the birds he was studying would, before the century was over, taste like teddy-bear stuffing.

As poultry scientists ticked off the list of vitamins, minerals, amino acids, and the other microscopic substances essential to chicken life, feed makers began adding them to chicken feed. Chickens didn’t need to go outside anymore. They didn’t need to eat cabbage and table scraps or a dead toad to get a “complete” diet. And with those pesky essential nutrients out of the way, it was at last possible to

concentrate on the stuff that really made chickens get big fast: carbs. In the late 1940s, a new and important feed was unleashed upon poultrydom: the “high-energy diet.” For chickens to grow twice as fast as their recent ancestors, they needed to mainline carbs.

There was, however, a tradeoff that no one thought much about in the 1940s, or today. What the high-energy diet gains in calories, it loses in flavor. The feed is typically a blend of seeds—corn, wheat, millet, soybeans, etc.—and while some seeds (nutmeg, for example) are flavorful, the seeds we feed chickens are not. And unlike tomatoes, a chicken doesn’t make its own flavor. The taste of animal flesh is strongly influenced by what an animal eats. Flavor compounds in the food birds eat find their way into bird tissue. Scientists refer to this as biodistribution—it’s the same reason a dairy cow that eats onion grass produces milk that tastes like onions.

Flavor-wise, chicken started moving in the wrong direction when the high-energy diet appeared, much so that Julia Child sounded the alarm in 1961. It’s only gotten worse. Never mind that chickens don’t eat grass, herbs, or bugs anymore, all the seeds that go into modern broiler feed come from varieties of grain that themselves have been “improved” the same way tomatoes have been “improved.” They have experienced massive leaps in yield and corresponding diminishments in flavor. It’s hard to imagine a blander diet. Broilers may not be source limited when it comes to nutrients, but they are source limited when it comes to flavor. Like modern tomatoes, modern chickens suffer from a flavor brownout. But unlike tomatoes, it’s not because of a lack of nutrition—it’s because of an overload of nutrition.

There is a second part to this problem: youth. The high-energy diet, with its dusting of essential vitamins and minerals, enabled the production of giant babies. And meat from babies is bland. Veal is blander than beef. Lamb is blander than mutton. Suckling pig is blander than mature pork (which most people today have never tasted). Part of that is due to water—the younger the muscle, the more moisture it contains. But it is also due to aspects of animal biology that scientists still don’t understand, in large part because very few of them are looking.

A COOK named Jeanette Young Norton, who knew not a thing about biodistribution, genetic tradeoffs, and source limitation, nevertheless learned this lesson as early as 1917. That’s the year the now totally forgotten *Mrs. Norton’s Cook-Book* was published, in whose pages Norton preempted *Mastering the Art of French Cooking* by more than four decades when she thundered, “Of course the birds that are unnaturally mothered, fed, and fattened may make a fine appearance, but the flavor is not up to the real thing.” The more ancient *Good Cooking*, first published in 1896, had this to say about how chicken taste: “Full-grown poultry have the best flavor.” For fried chicken—which, you will recall, requires a younger, more tender and, therefore, less flavorful chicken—*Good Cooking* suggests a four- or five-month-old bird (quadruple the age of today’s broiler). And though this bird was mild by antiquarian standards, it couldn’t have been that mild since the recipe suggests seasoning the chicken with salt and pepper and nothing else. No poultry spice, no garlic, no Chicken Tikka Flavour Explosion, no paprika. Just salt and pepper. Same thing for the pan gravy—no sage leaves, no cognac, no bouillon cubes, no instant gravy mix. Just milk, flour, and salt and pepper.

Now consider the fried chicken recipe in a 1902 masterpiece called *The Ideal Cook Book*. It’s the same recipe. Salt and pepper. So is the recipe in 1896’s *Boston Cooking-School Cook Book*, the *Joy of Cooking* of its day. Nearly every recipe from what we might as well start calling the salt-and-pepper era said that fried chicken needed only two things: salt and pepper.

This was not due to failed herb crops, a trade embargo on spices, or a puritanical preference for plain.

- [Sauces, Salsas, and Chutneys pdf, azw \(kindle\), epub](#)
- [Redemption Protocol \(Contact, Book 1\) pdf, azw \(kindle\), epub](#)
- [read online Be a People Person: Effective Leadership Through Effective Relationships pdf, azw \(kindle\), epub, doc, mobi](#)
- [read Under the Volcano for free](#)

- <http://aneventshop.com/ebooks/Sauces--Salsas--and-Chutneys.pdf>
- <http://www.mmastyles.com/books/A-Journey-in-Islamic-Thought--The-Life-of-Fathi-Osman.pdf>
- <http://omarnajmi.com/library/Be-a-People-Person--Effective-Leadership-Through-Effective-Relationships.pdf>
- <http://deltaphenomics.nl/?library/At-the-Dark-End-of-the-Street--Black-Women--Rape--and-Resistance--A-New-History-of-the-Civil-Rights-Movement-f>