

ONE • FROM FOODS TO NUTRIENTS

If you spent any time at all in a supermarket in the 1980s, you might have noticed something peculiar going on. The food was gradually disappearing from the shelves. Not literally vanishing—I'm not talking about Soviet-style shortages. No, the shelves and refrigerated cases still groaned with packages and boxes and bags of various edibles, more of them landing every year in fact, but a great many of the traditional supermarket foods were steadily being replaced by “nutrients,” which are not the same thing. Where once the familiar names of recognizable comestibles—things like eggs or breakfast cereals or snack foods—claimed pride of place on the brightly colored packages crowding the aisles, now new, scientific-sounding terms like “cholesterol” and “fiber” and “saturated fat” began rising to large-type prominence. More important than mere foods, the presence or absence of these invisible substances was now generally believed to confer health benefits on their eaters. The implicit message was that foods, by comparison, were coarse, old-fashioned, and decidedly unscientific things—who

could say what was in them really? But nutrients—those chemical compounds and minerals in foods that scientists have identified as important to our health—gleamed with the promise of scientific certainty. Eat more of the right ones, fewer of the wrong, and you would live longer, avoid chronic diseases, and lose weight.

Nutrients themselves had been around as a concept and a set of words since early in the nineteenth century. That was when William Prout, an English doctor and chemist, identified the three principal constituents of food—protein, fat, and carbohydrates—that would come to be known as macronutrients. Building on Prout's discovery, Justus von Liebig, the great German scientist credited as one of the founders of organic chemistry, added a couple of minerals to the big three and declared that the mystery of animal nutrition—how food turns into flesh and energy—had been solved. This is the very same Liebig who identified the macronutrients in soil—nitrogen, phosphorus, and potassium (known to farmers and gardeners by their periodic table initials, N, P, and K). Liebig claimed that all that plants need to live and grow are these three chemicals, period. As with the plant, so with the person: In 1842, Liebig proposed a theory of metabolism that explained life strictly in terms of a small handful of chemical nutrients, without recourse to metaphysical forces such as “vitalism.”

Having cracked the mystery of human nutrition, Liebig went on to develop a meat extract—Liebig's *Extractum Carnis*—that has come down to us as bouillon and concocted the first baby formula, consisting of cow's milk, wheat flour, malted flour, and potassium bicarbonate.

Liebig, the father of modern nutritional science, had driven food into a corner and forced it to yield its chemical secrets. But the post-Liebig consensus that science now pretty much knew what was going on in food didn't last long. Doctors began to notice that many of the babies fed exclusively on Liebig's formula failed to thrive. (Not surprising, given that his preparation lacked any vitamins or several essential fats and amino acids.) That Liebig might have overlooked a few little things in food also began to occur to doctors who observed that sailors on long ocean voyages often got sick, even when they had adequate supplies of protein, carbohydrates, and fat. Clearly the chemists were missing something—some essential ingredients present in the fresh plant foods (like oranges and potatoes) that miraculously cured the sailors. This observation led to the discovery early in the twentieth century of the first set of micronutrients, which the Polish biochemist Casimir Funk, harkening back to older vitalist ideas of food, christened “vitamines” in 1912 (“vita-” for life and “-amines” for organic compounds organized around nitrogen).

Vitamins did a lot for the prestige of nutritional science. These special molecules, which at first were isolated from foods and then later synthesized in a laboratory, could cure people of nutritional deficiencies such as scurvy or beriberi almost overnight in a convincing demonstration of reductive chemistry's power. Beginning in the 1920s, vitamins enjoyed a vogue among the middle class, a group not notably afflicted by beriberi or scurvy. But the belief took hold that these magic molecules also promoted growth in children, long life in adults, and, in a phrase of the time, “positive health” in every-

one. (And what would “negative health” be exactly?) Vitamins had brought a kind of glamour to the science of nutrition, and though certain elite segments of the population now began to eat by its expert lights, it really wasn’t until late in the twentieth century that nutrients began to push food aside in the popular imagination of what it means to eat.

No single event marked the shift from eating food to eating nutrients, although in retrospect a little-noticed political dustup in Washington in 1977 seems to have helped propel American culture down this unfortunate and dimly lighted path. Responding to reports of an alarming increase in chronic diseases linked to diet—including heart disease, cancer, obesity, and diabetes—the Senate Select Committee on Nutrition and Human Needs chaired by South Dakota Senator George McGovern held hearings on the problem. The committee had been formed in 1968 with a mandate to eliminate malnutrition, and its work had led to the establishment of several important food-assistance programs. Endeavoring now to resolve the question of diet and chronic disease in the general population represented a certain amount of mission creep, but all in a good cause to which no one could possibly object.

After taking two days of testimony on diet and killer diseases, the committee’s staff—comprised not of scientists or doctors but of lawyers and (ahem) journalists—set to work preparing what it had every reason to assume would be an uncontroversial document called *Dietary Goals for the United States*. The committee learned that while rates of coronary heart disease had soared in America since World War II, certain other cultures that consumed traditional diets based mostly on plants

had strikingly low rates of chronic diseases. Epidemiologists had also observed that in America during the war years, when meat and dairy products were strictly rationed, the rate of heart disease had temporarily plummeted, only to leap upward once the war was over.

Beginning in the 1950s, a growing body of scientific opinion held that the consumption of fat and dietary cholesterol, much of which came from meat and dairy products, was responsible for rising rates of heart disease during the twentieth century. The “lipid hypothesis,” as it was called, had already been embraced by the American Heart Association, which in 1961 had begun recommending a “prudent diet” low in saturated fat and cholesterol from animal products. True, actual proof for the lipid hypothesis was remarkably thin in 1977—it was still very much a hypothesis, but one well on its way to general acceptance.

In January 1977, the committee issued a fairly straightforward set of dietary guidelines, calling on Americans to cut down on their consumption of red meat and dairy products. Within weeks a firestorm of criticism, emanating chiefly from the red meat and dairy industries, engulfed the committee, and Senator McGovern (who had a great many cattle ranchers among his South Dakota constituents) was forced to beat a retreat. The committee’s recommendations were hastily rewritten. Plain talk about actual foodstuffs—the committee had advised Americans to “reduce consumption of meat”—was replaced by artful compromise: “choose meats, poultry, and fish that will reduce saturated fat intake.”

Leave aside for now the virtues, if any, of a low-meat and/or

low-fat diet, questions to which I will return, and focus for a moment on language. For with these subtle changes in wording a whole way of thinking about food and health underwent a momentous shift. First, notice that the stark message to “eat less” of a particular food—in this case meat—had been deep-sixed; don’t look for it ever again in any official U.S. government dietary pronouncement. Say what you will about this or that food, you are not allowed officially to tell people to eat less of it or the industry in question will have you for lunch. But there is a path around this immovable obstacle, and it was McGovern’s staffers who blazed it: *Speak no more of foods, only nutrients*. Notice how in the revised guidelines, distinctions between entities as different as beef and chicken and fish have collapsed. These three venerable foods, each representing not just a different species but an entirely different taxonomic class, are now lumped together as mere delivery systems for a single nutrient. Notice too how the new language exonerates the foods themselves. Now the culprit is an obscure, invisible, tasteless—and politically unconnected—substance that may or may not lurk in them called saturated fat.

The linguistic capitulation did nothing to rescue McGovern from his blunder. In the very next election, in 1980, the beef lobby succeeded in rustivating the three-term senator, sending an unmistakable warning to anyone who would challenge the American diet, and in particular the big chunk of animal protein squatting in the middle of its plate. Henceforth, government dietary guidelines would shun plain talk about whole foods, each of which has its trade association on Capitol Hill, but would instead arrive dressed in scientific euphemism and

speaking of nutrients, entities that few Americans (including, as we would find out, American nutrition scientists) really understood but that, with the notable exception of sucrose, lack powerful lobbies in Washington.*

The lesson of the McGovern fiasco was quickly absorbed by all who would pronounce on the American diet. When a few years later the National Academy of Sciences looked into the question of diet and cancer, it was careful to frame its recommendations nutrient by nutrient rather than food by food, to avoid offending any powerful interests. We now know the academy's panel of thirteen scientists adopted this approach over the objections of at least two of its members who argued that most of the available science pointed toward conclusions about foods, not nutrients. According to T. Colin Campbell, a Cornell nutritional biochemist who served on the panel, all of the human population studies linking dietary fat to cancer actually showed that the groups with higher cancer rates consumed not just more fats, but also more animal foods and fewer plant foods as well. "This meant that these cancers could

*Sucrose is the exception that proves the rule. Only the power of the sugar lobby in Washington can explain the fact that the official U.S. recommendation for the maximum permissible level of free sugars in the diet is an eye-popping 25 percent of daily calories. To give you some idea just how permissive that is, the World Health Organization recommends that no more than 10 percent of daily calories come from added sugars, a benchmark that the U.S. sugar lobby has worked furiously to dismantle. In 2004 it enlisted the Bush State Department in a campaign to get the recommendation changed and has threatened to lobby Congress to cut WHO funding unless the organization recants. Perhaps we should be grateful that the saturated fat interests have as yet organized no such lobby.

just as easily be caused by animal protein, dietary cholesterol, something else exclusively found in animal-based foods, or a lack of plant-based foods,” Campbell wrote years later. The argument fell on deaf ears.

In the case of the “good foods” too, nutrients also carried the day: The language of the final report highlighted the benefits of the antioxidants in vegetables rather than the vegetables themselves. Joan Gussow, a Columbia University nutritionist who served on the panel, argued against the focus on nutrients rather than whole foods. “The really important message in the epidemiology, which is all we had to go on, was that some vegetables and citrus fruits seemed to be protective against cancer. But those sections of the report were written as though it was the vitamin C in the citrus or the beta-carotene in the vegetables that was responsible for the effect. I kept changing the language to talk about ‘foods that contain vitamin C’ and ‘foods that contain carotenes.’ Because how do you know it’s not one of the other things in the carrots or the broccoli? There are hundreds of carotenes. But the biochemists had their answer: ‘You can’t do a trial on broccoli.’ ”

So the nutrients won out over the foods. The panel’s resort to scientific reductionism had the considerable virtue of being both politically expedient (in the case of meat and dairy) and, to these scientific heirs of Justus von Liebig, intellectually sympathetic. With each of its chapters focused on a single nutrient, the final draft of the National Academy of Sciences report, *Diet, Nutrition and Cancer*, framed its recommendations in terms of saturated fats and antioxidants rather than beef and broccoli.

In doing so, the 1982 National Academy of Sciences report

helped codify the official new dietary language, the one we all still speak. Industry and media soon followed suit, and terms like polyunsaturated, cholesterol, monounsaturated, carbohydrate, fiber, polyphenols, amino acids, flavonols, carotenoids, antioxidants, probiotics, and phytochemicals soon colonized much of the cultural space previously occupied by the tangible material formerly known as food.

The Age of Nutritionism had arrived.

TWO • NUTRITIONISM DEFINED

The term isn't mine. It was coined by an Australian sociologist of science by the name of Gyorgy Scrinis, and as near as I can determine first appeared in a 2002 essay titled "Sorry Marge" published in an Australian quarterly called *Meanjin*. "Sorry Marge" looked at margarine as the ultimate nutritionist product, able to shift its identity (no cholesterol! one year, no trans fats! the next) depending on the prevailing winds of dietary opinion. But Scrinis had bigger game in his sights than spreadable vegetable oil. He suggested that we look past the various nutritional claims swirling around margarine and butter and consider the underlying message of the debate itself: "namely, that we should understand and engage with food and our bodies in terms of their nutritional and chemical constituents and requirements—the assumption being that this is all we need to

understand.” This reductionist way of thinking about food had been pointed out and criticized before (notably by the Canadian historian Harvey Levenstein, the British nutritionist Geoffrey Cannon, and the American nutritionists Joan Gussow and Marion Nestle), but it had never before been given a proper name: “nutritionism.” Proper names have a way of making visible things we don’t easily see or simply take for granted.

The first thing to understand about nutritionism is that it is not the same thing as nutrition. As the “-ism” suggests, it is not a scientific subject but an ideology. Ideologies are ways of organizing large swaths of life and experience under a set of shared but unexamined assumptions. This quality makes an ideology particularly hard to see, at least while it’s still exerting its hold on your culture. A reigning ideology is a little like the weather—all pervasive and so virtually impossible to escape. Still, we can try.

In the case of nutritionism, the widely shared but unexamined assumption is that the key to understanding food is indeed the nutrient. Put another way: Foods are essentially the sum of their nutrient parts. From this basic premise flow several others.

Since nutrients, as compared with foods, are invisible and therefore slightly mysterious, it falls to the scientists (and to the journalists through whom the scientists reach the public) to explain the hidden reality of foods to us. In form this is a quasireligious idea, suggesting the visible world is not the one that really matters, which implies the need for a priesthood. For to enter a world where your dietary salvation depends on unseen nutrients, you need plenty of expert help.

But expert help to do what exactly? This brings us to another unexamined assumption of nutritionism: that the whole point of eating is to maintain and promote bodily health. Hippocrates' famous injunction to "let food be thy medicine" is ritually invoked to support this notion. I'll leave the premise alone for now, except to point out that it is not shared by all cultures and, further, that the experience of these other cultures suggests that, paradoxically, regarding food as being about things other than bodily health—like pleasure, say, or sociality or identity—makes people no less healthy; indeed, there's some reason to believe it may make them more healthy. This is what we usually have in mind when we speak of the French paradox. So there is at least a question as to whether the ideology of nutritionism is actually any good for you.

It follows from the premise that food is foremost about promoting physical health that the nutrients in food should be divided into the healthy ones and the unhealthy ones—good nutrients and bad. This has been a hallmark of nutritionist thinking from the days of Liebig, for whom it wasn't enough to identify the nutrients; he also had to pick favorites, and nutritionists have been doing so ever since. Liebig claimed that protein was the "master nutrient" in animal nutrition, because he believed it drove growth. Indeed, he likened the role of protein in animals to that of nitrogen in plants: Protein (which contains nitrogen) comprised the essential human fertilizer. Liebig's elevation of protein dominated nutritionist thinking for decades as public health authorities worked to expand access to and production of the master nutrient (especially in the form of animal protein), with the goal of growing big-

ger, and therefore (it was assumed) healthier, people. (A high priority for Western governments fighting imperial wars.) To a considerable extent we still have a food system organized around the promotion of protein as the master nutrient. It has given us, among other things, vast amounts of cheap meat and milk, which have in turn given us much, *much* bigger people. Whether they are healthier too is another question.

It seems to be a rule of nutritionism that for every good nutrient, there must be a bad nutrient to serve as its foil, the latter a focus for our food fears and the former for our enthusiasms. A backlash against protein arose in America at the turn of the last century as diet gurus like John Harvey Kellogg and Horace Fletcher (about whom more later) railed against the deleterious effects of protein on digestion (it supposedly led to the proliferation of toxic bacteria in the gut) and promoted the cleaner, more wholesome carbohydrate in its place. The legacy of that revaluation is the breakfast cereal, the strategic objective of which was to dethrone animal protein at the morning meal.

Ever since, the history of modern nutritionism has been a history of macronutrients at war: protein against carbs; carbs against proteins, and then fats; fats against carbs. Beginning with Liebig, in each age nutritionism has organized most of its energies around an imperial nutrient: protein in the nineteenth century, fat in the twentieth, and, it stands to reason, carbohydrates will occupy our attention in the twenty-first. Meanwhile, in the shadow of these titanic struggles, smaller civil wars have raged within the sprawling empires of the big three: refined carbohydrates versus fiber; animal protein versus plant protein;

saturated fats versus polyunsaturated fats; and then, deep down within the province of the polyunsaturates, omega-3 fatty acids versus omega-6s. Like so many ideologies, nutritionism at bottom hinges on a form of dualism, so that at all times there must be an evil nutrient for adherents to excoriate and a savior nutrient for them to sanctify. At the moment, trans fats are performing admirably in the former role, omega-3 fatty acids in the latter. It goes without saying that such a Manichaeian view of nutrition is bound to promote food fads and phobias and large abrupt swings of the nutritional pendulum.

Another potentially serious weakness of nutritionist ideology is that, focused so relentlessly as it is on the nutrients it can measure, it has trouble discerning qualitative distinctions among foods. So fish, beef, and chicken through the nutritionist's lens become mere delivery systems for varying quantities of different fats and proteins and whatever other nutrients happen to be on their scope. Milk through this lens is reduced to a suspension of protein, lactose, fats, and calcium in water, when it is entirely possible that the benefits, or for that matter the hazards, of drinking milk owe to entirely other factors (growth hormones?) or relationships between factors (fat-soluble vitamins and saturated fat?) that have been overlooked. Milk remains a food of humbling complexity, to judge by the long, sorry saga of efforts to simulate it. The entire history of baby formula has been the history of one overlooked nutrient after another: Liebig missed the vitamins and amino acids, and his successors missed the omega-3s, and still to this day babies fed on the most "nutritionally complete" formula fail to do as well as babies fed human milk. Even more than margarine, infant

formula stands as the ultimate test product of nutritionism and a fair index of its hubris.

This brings us to one of the most troubling features of nutritionism, though it is a feature certainly not troubling to all. When the emphasis is on quantifying the nutrients contained in foods (or, to be precise, the *recognized* nutrients in foods), any qualitative distinction between whole foods and processed foods is apt to disappear. “[If] foods are understood only in terms of the various quantities of nutrients they contain,” Gyorgy Scrinis wrote, then “even processed foods may be considered to be ‘healthier’ for you than whole foods if they contain the appropriate quantities of some nutrients.”

How convenient.

THREE • NUTRITIONISM COMES TO MARKET

No idea could be more sympathetic to manufacturers of processed foods, which surely explains why they have been so happy to jump on the nutritionism bandwagon. Indeed, nutritionism supplies the ultimate justification for processing food by implying that with a judicious application of food science, fake foods can be made even more nutritious than the real thing. This of course is the story of margarine, the first important synthetic food to slip into our diet. Mar-

garine started out in the nineteenth century as a cheap and inferior substitute for butter, but with the emergence of the lipid hypothesis in the 1950s, manufacturers quickly figured out that their product, with some tinkering, could be marketed as better—smarter!—than butter: butter with the bad nutrients removed (cholesterol and saturated fats) and replaced with good nutrients (polyunsaturated fats and then vitamins). Every time margarine was found wanting, the wanted nutrient could simply be added (Vitamin D? Got it now. Vitamin A? Sure, no problem). But of course margarine, being the product not of nature but of human ingenuity, could never be any smarter than the nutritionists dictating its recipe, and the nutritionists turned out to be not nearly as smart as they thought. The food scientists' ingenious method for making healthy vegetable oil solid at room temperature—by blasting it with hydrogen—turned out to produce unhealthy trans fats, fats that we now know are more dangerous than the saturated fats they were designed to replace. Yet the beauty of a processed food like margarine is that it can be endlessly reengineered to overcome even the most embarrassing about-face in nutritional thinking—including the real wincer that its main ingredient might cause heart attacks and cancer. So now the trans fats are gone, and margarine marches on, unfazed and apparently unkillable. Too bad the same cannot be said of an unknown number of margarine eaters.

By now we have become so inured to fake foods that we forget what a difficult trail margarine had to blaze before it and other synthetic food products could win government and consumer acceptance. At least since the 1906 publication of

Upton Sinclair's *The Jungle*, the “adulteration” of common foods has been a serious concern of the eating public and the target of numerous federal laws and Food and Drug Administration regulations. Many consumers regarded “oleomargarine” as just such an adulteration, and in the late 1800s five states passed laws requiring that all butter imitations be dyed pink so no one would be fooled. The Supreme Court struck down the laws in 1898. In retrospect, had the practice survived, it might have saved some lives.

The 1938 Food, Drug and Cosmetic Act imposed strict rules requiring that the word “imitation” appear on any food product that was, well, an imitation. Read today, the official rationale behind the imitation rule seems at once commonsensical and quaint: “. . . there are certain traditional foods that everyone knows, such as bread, milk and cheese, and that when consumers buy these foods, they should get the foods they are expecting . . . [and] if a food resembles a standardized food but does not comply with the standard, that food must be labeled as an ‘imitation.’ ”

Hard to argue with that . . . but the food industry did, strenuously for decades, and in 1973 it finally succeeded in getting the imitation rule tossed out, a little-noticed but momentous step that helped speed America down the path to nutritionism.

Industry hated the imitation rule. There had been such a tawdry history of adulterated foods and related forms of snake oil in American commerce that slapping the word “imitation” on a food product was the kiss of death—an admission of adulteration and inferiority. By the 1960s and 1970s, the requirement that such a pejorative term appear on fake food packages

stood in the way of innovation, indeed of the wholesale reformulation of the American food supply—a project that, in the wake of rising concerns about dietary fat and cholesterol, was coming to be seen as a good thing. What had been regarded as hucksterism and fraud in 1906 had begun to look like sound public health policy by 1973. The American Heart Association, eager to get Americans off saturated fats and onto vegetable oils (including hydrogenated vegetable oils), was actively encouraging the food industry to “modify” various foods to get the saturated fats and cholesterol out of them, and in the early seventies the association urged that “any existing and regulatory barriers to the marketing of such foods be removed.”

And so they were when, in 1973, the FDA (not, note, the Congress that wrote the law) simply repealed the 1938 rule concerning imitation foods. It buried the change in a set of new, seemingly consumer-friendly rules about nutrient labeling so that news of the imitation rule’s repeal did not appear until the twenty-seventh paragraph of *The New York Times*’ account, published under the headline F.D.A. PROPOSES SWEEPING CHANGE IN FOOD LABELING: NEW RULES DESIGNED TO GIVE CONSUMERS A BETTER IDEA OF NUTRITIONAL VALUE. (The second deck of the headline gave away the game: PROCESSORS BACK MOVE.) The revised imitation rule held that as long as an imitation product was not “nutritionally inferior” to the natural food it sought to impersonate—as long as it had the same quantities of recognized nutrients—the imitation could be marketed without using the dreaded “i” word.

With that, the regulatory door was thrown open to all manner of faked low-fat products: Fats in things like sour cream and yogurt could now be replaced with hydrogenated oils or guar

gum or carrageenan, bacon bits could be replaced with soy protein, the cream in “whipped cream” and “coffee creamer” could be replaced with corn starch, and the yolks of liquefied eggs could be replaced with, well, whatever the food scientists could dream up, because the sky was now the limit. As long as the new fake foods were engineered to be nutritionally equivalent to the real article, they could no longer be considered fake. Of course the operative nutritionist assumption here is that we know enough to determine nutritional equivalence—something that the checkered history of baby formula suggests has never been the case.

Nutritionism had become the official ideology of the Food and Drug Administration; for all practical purposes the government had redefined foods as nothing more than the sum of their recognized nutrients. Adulteration had been repositioned as food science. All it would take now was a push from McGovern’s *Dietary Goals* for hundreds of “traditional foods that everyone knows” to begin their long retreat from the supermarket shelves and for our eating to become more “scientific.”

FOUR • FOOD SCIENCE’S GOLDEN AGE

In the years following the 1977 *Dietary Goals* and the 1982 National Academy of Sciences report on diet and cancer, the food industry, armed with its regulatory absolution, set

about reengineering thousands of popular food products to contain more of the nutrients that science and government had deemed the good ones and fewer of the bad. A golden age for food science dawned. Hyphens sprouted like dandelions in the supermarket aisles: *low-fat, no-cholesterol, high-fiber*. Ingredients labels on formerly two- or three-ingredient foods such as mayonnaise and bread and yogurt ballooned with lengthy lists of new additives—what in a more benighted age would have been called adulterants. The Year of Eating Oat Bran—also known as 1988—served as a kind of coming-out party for the food scientists, who succeeded in getting the material into nearly every processed food sold in America. Oat bran's moment on the dietary stage didn't last long, but the pattern now was set, and every few years since then, a new oat bran has taken its star turn under the marketing lights. (Here come omega-3s!)

You would not think that common food animals could themselves be rejiggered to fit nutritionist fashion, but in fact some of them could be, and were, in response to the 1977 and 1982 dietary guidelines as animal scientists figured out how to breed leaner pigs and select for leaner beef. With widespread lipophobia taking hold of the human population, countless cattle lost their marbling and lean pork was repositioned as “the new white meat”—tasteless and tough as running shoes, perhaps, but now even a pork chop could compete with chicken as a way for eaters to “reduce saturated fat intake.” In the years since then, egg producers figured out a clever way to redeem even the disreputable egg: By feeding flaxseed to hens, they could elevate levels of omega-3 fatty acids in the yolks.

Aiming to do the same thing for pork and beef fat, the animal scientists are now at work genetically engineering omega-3 fatty acids into pigs and persuading cattle to lunch on flaxseed in the hope of introducing the blessed fish fat where it had never gone before: into hot dogs and hamburgers.

But these whole foods are the exceptions. The typical whole food has much more trouble competing under the rules of nutritionism, if only because something like a banana or an avocado can't quite as readily change its nutritional stripes. (Though rest assured the genetic engineers are hard at work on the problem.) To date, at least, they can't put oat bran in a banana or omega-3s in a peach. So depending on the reigning nutritional orthodoxy, the avocado might either be a high-fat food to be assiduously avoided (Old Think) or a food high in monounsaturated fat to be embraced (New Think). The fate and supermarket sales of each whole food rises and falls with every change in the nutritional weather while the processed foods simply get reformulated and differently supplemented. That's why when the Atkins diet storm hit the food industry in 2003, bread and pasta got a quick redesign (dialing back the carbs; boosting the proteins) while poor unreconstructed potatoes and carrots were left out in the carbohydrate cold. (The low-carb indignities visited on bread and pasta, two formerly "traditional foods that everyone knows," would never have been possible had the imitation rule not been tossed out in 1973. Who would ever buy imitation spaghetti? But of course that is precisely what low-carb pasta is.)

A handful of lucky whole foods have recently gotten the

“good nutrient” marketing treatment: The antioxidants in the pomegranate (a fruit formerly more trouble to eat than it was worth) now protect against cancer and erectile dysfunction, apparently, and the omega-3 fatty acids in the (formerly just fattening) walnut ward off heart disease. A whole subcategory of nutritional science—funded by industry and, according to one recent analysis,* remarkably reliable in its ability to find a health benefit in whatever food it has been commissioned to study—has sprung up to give a nutritionist sheen—(and FDA-approved health claim) to all sorts of foods, including some not ordinarily thought of as healthy. The Mars Corporation recently endowed a chair in chocolate science at the University of California at Davis, where research on the antioxidant properties of cacao is making breakthroughs, so it shouldn’t be long before we see chocolate bars bearing FDA-approved health claims. (When we do, nutritionism will surely have entered its baroque phase.) Fortunately for everyone playing this game, scientists can find an antioxidant in just about any plant-based food they choose to study.

Yet as a general rule it’s a whole lot easier to slap a health claim on a box of sugary cereal than on a raw potato or a carrot, with the perverse result that the most healthful foods in the supermarket sit there quietly in the produce section, silent as stroke victims, while a few aisles over in Cereal the

*L. I. Lesser, C. B. Ebbeling, M. Goozner, D. Wypij, and D. S. Ludwig, “Relationship Between Funding Source and Conclusion Among Nutrition-Related Scientific Articles,” *PLoS Medicine*, Vol. 4, No. 1, e5 doi:10.1371/journal.pmed.0040005.

Cocoa Puffs and Lucky Charms are screaming their newfound “whole-grain goodness” to the rafters.

Watch out for those health claims.

FIVE • THE MELTING OF THE LIPID HYPOTHESIS

Nutritionism is good for the food business. But is it good for us? You might think that a national fixation on nutrients would lead to measurable improvements in public health. For that to happen, however, the underlying nutritional science and the policy recommendations (not to mention the journalism) based on that science would both have to be sound. This has seldom been the case.

The most important such nutrition campaign has been the thirty-year effort to reform the food supply and our eating habits in light of the lipid hypothesis—the idea that dietary fat is responsible for chronic disease. At the behest of government panels, nutrition scientists, and public health officials, we have dramatically changed the way we eat and the way we think about food, in what stands as the biggest experiment in applied nutritionism in history. Thirty years later, we have good reason to believe that putting the nutritionists in charge of the menu and the kitchen has not only ruined an untold number

of meals, but also has done little for our health, except very possibly to make it worse.

These are strong words, I know. Here are a couple more: What the Soviet Union was to the ideology of Marxism, the Low-Fat Campaign is to the ideology of nutritionism—its supreme test and, as now is coming clear, its most abject failure. You can argue, as some diehards will do, that the problem was one of faulty execution or you can accept that the underlying tenets of the ideology contained the seeds of the eventual disaster.

At this point you're probably saying to yourself, *Hold on just a minute. Are you really saying the whole low-fat deal was bogus? But my supermarket is still packed with low-fat this and no-cholesterol that! My doctor is still on me about my cholesterol and telling me to switch to low-fat everything. I was flabbergasted at the news too, because no one in charge—not in the government, not in the public health community—has dared to come out and announce: Um, you know everything we've been telling you for the last thirty years about the links between dietary fat and heart disease? And fat and cancer? And fat and fat? Well, this just in: It now appears that none of it was true. We sincerely regret the error.*

No, the admissions of error have been muffled, and the mea culpas impossible to find. But read around in the recent scientific literature and you will find a great many scientists beating a quiet retreat from the main tenets of the lipid hypothesis. Let me offer just one example, an article from a group of prominent nutrition scientists at the Harvard School of Public Health. In a recent review of the relevant research called "Types of Dietary Fat and Risk of Coronary Heart Disease: A

Critical Review,”* the authors proceed to calmly remove, one by one, just about every strut supporting the theory that dietary fat causes heart disease.

Hu and his colleagues begin with a brief, uninflected summary of the lipophobic era that is noteworthy mostly for casting the episode in the historical past:

During the past several decades, reduction in fat intake has been the main focus of national dietary recommendations. In the public’s mind, the words “dietary fat” have become synonymous with obesity and heart disease, whereas the words “low-fat” and “fat-free” have been synonymous with heart health.

We can only wonder how in the world such crazy ideas ever found their way into the “public’s mind.” Surely not from anyone associated with the Harvard School of Public Health, I would hope. Well, as it turns out, the selfsame group, formerly in thrall to the lipid hypothesis, was recommending until the early 1990s, when the evidence about the dangers of trans fats could no longer be ignored, that people reduce their saturated fat intake by switching from butter to margarine. (Though red flags about trans fats can be spotted as far back as 1956, when Ancel Keyes, the father of the lipid hypothesis, suggested that rising consumption of hydrogenated

*Frank B. Hu, et al., *Journal of the American College of Nutrition*, Vol. 20, 1, 5–19 (2001).

vegetable oils might be responsible for the twentieth-century rise in coronary heart disease.)

But back to the critical review, which in its second paragraph drops this bombshell:

It is now increasingly recognized that the low-fat campaign has been based on little scientific evidence and may have caused unintended health consequences.

Say what?

The article then goes on blandly to survey the crumbling foundations of the lipid hypothesis, circa 2001: Only two studies have ever found “a significant positive association between saturated fat intake and risk of CHD [coronary heart disease]”; many more have failed to find an association. Only one study has ever found “a significant inverse association between polyunsaturated fat intake and CHD.” Let me translate: The amount of saturated fat in the diet probably may have little if any bearing on the risk of heart disease, and evidence that increasing polyunsaturated fats in the diet will reduce risk is slim to nil. As for the dangers of dietary cholesterol, the review found “a weak and nonsignificant positive association between dietary cholesterol and risk of CHD.” (Someone should tell the food processors, who continue to treat dietary cholesterol as a matter of life and death.) “Surprisingly,” the authors wrote, “there is little direct evidence linking higher egg consumption and increased risk of CHD”—surprising, because eggs are particularly high in cholesterol.

By the end of the review, there is one strong association between a type of dietary fat and heart disease left standing, and it happens to be precisely the type of fat that the low-fat campaigners have spent most of the last thirty years encouraging us to consume more of: trans fats. It turns out that “a higher intake of trans fat can contribute to increased risk of CHD through multiple mechanisms”; to wit, it raises bad cholesterol and lowers good cholesterol (something not even the evil saturated fats can do); it increases triglycerides, a risk factor for CHD; it promotes inflammation and possibly thrombogenesis (clotting), and it may promote insulin resistance. Trans fat is really bad stuff, apparently, fully twice as bad as saturated fat in its impact on cholesterol ratios. If any of the authors of the critical review are conscious of the cosmic irony here—that the principal contribution of thirty years of official nutritional advice has been to replace a possibly mildly unhealthy fat in our diets with a demonstrably lethal one—they are not saying.

The paper is not quite prepared to throw out the entire lipid hypothesis, but by the end precious little of it is left standing. The authors conclude that while total levels of fat in the diet apparently have little bearing on the risk of heart disease (!), the ratio between types of fats does. Adding omega-3 fatty acids to the diet (that is, eating more of a certain kind of fat) “substantially reduces coronary and total mortality” in heart patients, and replacing saturated fats with polyunsaturated fats lowers blood cholesterol, which they deem an important risk factor for CHD. (Some researchers no longer do, pointing out that half the people who get heart attacks

don't have elevated cholesterol levels, and about half the people with elevated cholesterol do not suffer from CHD.) One other little grenade is dropped in the paper's conclusion: Although "a major purported benefit of a low-fat diet is weight loss," a review of the literature failed to turn up any convincing evidence of this proposition. To the contrary, it found "some evidence" that replacing fats in the diet with carbohydrates (as official dietary advice has urged us to do since the 1970s) will lead to weight gain.

I have dwelled on this paper because it fairly reflects the current thinking on the increasingly tenuous links between dietary fat and health. The lipid hypothesis is quietly melting away, but no one in the public health community, or the government, seems quite ready to publicly acknowledge it. For fear of what exactly? That we'll binge on bacon double cheeseburgers? More likely that we'll come to the unavoidable conclusion that the emperors of nutrition have no clothes and never listen to them again.

In fact, there have been dissenters to the lipid hypothesis all along, lipid biochemists like Mary Enig (who has been sounding the alarm on trans fats since the 1970s) and nutritionists like Fred Kummerow and John Yudkin (who have been sounding the alarm on refined carbohydrates, also since the 1970s), but these critics have always had trouble getting a hearing, especially after 1977, when the McGovern guidelines effectively closed off debate on the lipid hypothesis.

Scientific paradigms are never easy to challenge, even when they begin to crack under the weight of contradictory evidence.

Few scientists ever look back to see where they and their paradigms might have gone astray; rather, they're trained to keep moving forward, doing yet more science to add to the increments of our knowledge, patching up and preserving whatever of the current consensus can be preserved until the next big idea comes along. So don't count on a scientific Aleksandr Solzhenitsyn to show up and expose the whole fat paradigm as a historical disaster.

The closest thing to such a figure we have had is not a scientist but a science journalist named Gary Taubes, who for the last decade has been blowing the whistle on the science behind the low-fat campaign. In a devastating series of articles and an important new book called *Good Calories, Bad Calories*, Taubes has all but demolished the whole lipid hypothesis, demonstrating just how little scientific backing it had from the very beginning.

Indeed. Wind the tape back to 1976, and you find plenty of reasons to doubt the lipid hypothesis even then. Some of these reasons were circumstantial, but nevertheless compelling. For instance, during the decades of the twentieth century when rates of heart disease were rising in America, Americans were actually *reducing* their intake of animal fats (in the form of lard and tallow). In place of those fats, they consumed substantially more vegetable oils, especially in the form of margarine, sales of which outpaced butter for the first time in 1957. Between the end of World War II and 1976 (the year of McGovern's hearings), per capita consumption of animal fats from all sources dropped from eighty-four pounds to seventy-one, while fats from seed oils approximately doubled. Americans appeared to

be moving in the direction of a “prudent diet” and yet, paradoxically, having more heart attacks on it, not fewer.*

As for the precipitous decline in heart disease during the years of World War II, that could just as easily be attributed to factors other than the scarcity of meat, butter, and eggs. Not just animal protein, but sugar and gasoline were also strictly rationed during the war. Americans generally ate less of everything, including, notably, refined carbohydrates; they did, however, eat more fish. And got more exercise because they couldn’t drive as freely thanks to gas rationing.

But the lipid hypothesis would not be deterred. Researchers in the 1950s and 1960s had studied populations in other countries that had substantially lower rates of heart disease, which could be explained by their lower consumption of saturated fat. That it could just as easily be explained by other factors—fewer total calories? fewer refined carbohydrates? more exercise? more fruits and vegetables or fish?—did not disturb the gathering consensus that fat must be the key.

The consensus hinged on two suggestive links that were well established by the early sixties: a link between high rates of cholesterol in the blood and the likelihood of heart disease and a link between saturated fat in the diet and cholesterol levels in the blood. Both these links have held up, but it doesn’t necessarily follow from them that consumption of saturated

*In 1945, 217,000 deaths in the United States were attributed to heart attacks. By 1960 there were 500,000. By 2001 that number had fallen to 185,000. (It’s important to note that the diagnostic criteria for heart attack have changed over time, as has the size of the population.)

fat leads to heart disease, unless you can also demonstrate that serum cholesterol is a cause of heart disease and not, say, just a symptom of it. And though evidence for a link between cholesterol in the diet and cholesterol in the blood has always been tenuous, the belief that the former contributed to the latter has persisted, perhaps because it makes such intuitive sense—and perhaps because it has been so heavily promoted by the margarine makers.

Despite these gaps, it seemed a short easy step for McGovern's committee to link the links, as it were, and conclude that eating meat and dairy (as important sources of both saturated fat and cholesterol) contributed to heart disease. After all, the American Heart Association had already taken the same short link-linking step and had been advocating a prudent diet low in fat and cholesterol since 1961. Still, the committee was not unaware of the controversy surrounding the research on which it was basing its recommendations. It had received a strongly worded letter of dissent from the American Medical Association, arguing that "there is a potential for harmful effects for a radical long-term dietary change as would occur through adoption of the proposed national goal."

Still, the national goal was adopted. Never before had the government endeavored to change the diet of the whole population. In the past nutritional policies had targeted particular populations at risk for particular deficiencies. But as Taubes has documented, the attitude on the committee was that even if all the data weren't hard as rock quite yet, what would be the harm in getting Americans to cut down on dietary fats? At the press conference introducing the *Dietary Goals*, Mark Hegsted,

the Harvard School of Public Health nutritionist who helped to shape them, put it this way: “The question to be asked is not why we should change our diet, but why not?”

At least one good answer to that question was apparently overlooked. Perhaps because fat was in such bad repute in 1977, Dr. Hegsted and his colleagues must not have stopped to consider how a change in the levels or ratios of the various lipids, and the promotion of a biologically novel fat like trans fat, might affect human physiology. It bears remembering that the human brain is about 60 percent fat; every neuron is sheathed in a protective layer of the stuff. Fats make up the structure of our cell walls, the ratios between the various kinds influencing the permeability of the cells to everything from glucose and hormones to microbes and toxins. Without adequate amounts of fat in the diet, fat-soluble vitamins like A and E can’t pass through the intestinal walls. All this was known in 1977. But the Hippocratic oath—“First do no harm”—evidently does not apply to official dietary advice, which at least in 1977 followed a very different principle: “Why not?”

So potentially much was at stake for our health and well-being when the government threw its weight behind a wholesale change in the American diet. True, it was entirely possible that the nation would have chosen simply to ignore the Dietary Goals and go on eating as it had. But that’s not what happened. Instead, the goals were taken seriously, and one of the more ambitious nutritional experiments in our history got under way. Authority over the national menu, which in the past had rested largely with tradition and habit (and mom), shifted perceptibly in January 1977: Culture ceded a large measure of its

influence over how we ate and thought about eating to science. Or what passes for science in dietary matters; nutritionism would be a more accurate term. “Premature or not,” *The New York Times*’ Jane Brody wrote in 1981, “the Dietary Goals are beginning to reshape the nutritional philosophy, if not yet the eating habits, of most Americans.”

SIX • EAT RIGHT, GET FATTER

In fact, we did change our eating habits in the wake of the new guidelines, endeavoring to replace the evil fats at the top of the food pyramid with the good carbs spread out at the bottom. The whole of the industrial food supply was reformulated to reflect the new nutritional wisdom, giving us low-fat pork, low-fat Snackwell’s, and all the low-fat pasta and high-fructose (yet low-fat!) corn syrup we could consume. Which turned out to be quite a lot. Oddly, Americans got really fat on their new low-fat diet—indeed, many date the current epidemic of obesity and diabetes to the late 1970s, when Americans began bingeing on carbohydrates, ostensibly as a way to avoid the evils of fat.

But the story is slightly more complicated than that. For while it is true that Americans post-1977 did shift the balance in their diets from fats to carbs so that fat as a percentage of total calories in the diet declined (from 42 percent in 1977 to

34 percent in 1995), we never did in fact cut down on our total consumption of fat; we just ate more of other things. We did reduce our consumption of saturated fats, replacing them, as directed, with polyunsaturated fats and trans fats. Meat consumption actually held steady, though we did, again as instructed, shift from red meat to white to reduce our saturated fat intake. Basically what we did was heap a bunch more carbs onto our plate, obscuring but by no means replacing the expanding chunk of (now skinless white) animal protein still sitting there in the middle.

How did that happen? I would submit that the ideology of nutritionism deserves as much of the blame as the carbohydrates themselves do—that and human nature. By framing dietary advice in terms of good and bad nutrients, and by burying the recommendation that we should eat less of any particular actual food, it was easy for the take-home message of the 1977 and 1982 dietary guidelines to be simplified as follows: Eat more low-fat foods. And that is precisely what we did. We're always happy to receive a dispensation to eat more of something (with the possible exception of oat bran), and one of the things nutritionism reliably gives us is some such dispensation: low-fat cookies then, low-carb beer now. It's hard to imagine the low-fat/high-carb craze taking off as it did or our collective health deteriorating to the extent that it has if McGovern's original food-based recommendation had stood: *Eat less meat and fewer dairy products.* For how do you get from that stark counsel to the idea that another carton of Snackwell's is just what the doctor ordered?

You begin to see how attractive nutritionism is for all par-

ties concerned, consumers as well as producers, not to mention the nutrition scientists and journalists it renders indispensable. The ideology offers a respectable rationale for creating and marketing all manner of new processed foods and permission for people to eat them. Plus, every course correction in nutritionist advice gives reason to write new diet books and articles, manufacture a new line of products, and eat a whole bunch of even more healthy new food products. And if a product is healthy by design and official sanction, then eating lots of it must be healthy too—maybe even more so.

Nutritionism might be the best thing ever to happen to the food industry, which historically has labored under the limits to growth imposed by a population of eaters that isn't expanding nearly as fast as the food makers need it to if they are to satisfy the expectations of Wall Street. Nutritionism solves the problem of the fixed stomach, as it used to be called in the business: the fact that compared to other consumer products, demand for food has in the past been fairly inelastic. People could eat only so much, and because tradition and habit ruled their choices, they tended to eat the same old things. Not anymore! Not only does nutritionism favor ever more novel kinds of highly processed foods (which are by far the most profitable kind to make), it actually enlists the medical establishment and the government in the promotion of those products. Play your cards right and you can even get the American Heart Association to endorse your new breakfast cereal as "heart healthy." As I write, the FDA has just signed off on a new health claim for Frito-Lay chips on the grounds that eating chips fried in

polyunsaturated fats can help you reduce your consumption of saturated fats, thereby conferring blessings on your cardiovascular system. So can a notorious junk food pass through the needle eye of nutritionist logic and come out the other side looking like a health food.

SEVEN • BEYOND THE PLEASURE PRINCIPLE

We eaters, alas, don't reap nearly as much benefit from nutritionism as food producers. Beyond providing a license to eat more of the latest approved foodlike substance, which we surely do appreciate, nutritionism tends to foster a great deal of anxiety around the experience of shopping for food and eating it. To do it right, you've got to be up on the latest scientific research, study ever-longer and more confusing ingredients labels,* sift through increasingly dubious health claims, and then attempt to enjoy foods that have been engineered with many other objectives in view than simply tasting good. To think of some of the most delicious components of

*Geoffrey Cannon points out that nutrition labels, which have become the single most ubiquitous medium of chemical information in our lives, "are advertisements for the chemical principle of nutrition."

food as toxins, as nutritionism has taught us to do in the case of fat, does little for our happiness as eaters. Americans have embraced a “nutritional philosophy,” to borrow Jane Brody’s words, that, regardless of whether that philosophy does anything for our health, surely takes much of the pleasure out of eating.

But why do we even need a nutritional philosophy in the first place? Perhaps because we Americans have always had a problem taking pleasure in eating. We certainly have gone to unusual lengths to avoid it. Harvey Levenstein, who has written two illuminating histories of American food culture, suggests that the sheer abundance of food in America has bred “a vague indifference to food, manifested in a tendency to eat and run, rather than to dine and savor.” To savor food, to conceive of a meal as an aesthetic experience, has been regarded as evidence of effeteness, a form of foreign foppery. (Few things have been more likely to get an American political candidate in hot water than a taste for fine food, as Martin Van Buren discovered during his failed 1840 reelection campaign. Van Buren had brought a French chef to the White House, a blunder seized on by his opponent, William Henry Harrison, who made much of the fact that he subsisted on “raw beef and salt.” George H. W. Bush’s predilection for pork rinds and Bill Clinton’s for Big Macs were politically astute tastes to show off.)

It could well be that, as Levenstein contends, the sheer abundance of food in America has fostered a culture of careless, perfunctory eating. But our Puritan roots also impeded a sensual or aesthetic enjoyment of food. Like sex, the need to

eat links us to the animals, and historically a great deal of Protestant energy has gone into helping us keep all such animal appetites under strict control. To the Christian social reformers of the nineteenth century, “The naked act of eating was little more than unavoidable . . . and was not to be considered a pleasure except with great discretion.” I’m quoting from Laura Shapiro’s *Perfection Salad*, which recounts the campaign of these domestic reformers to convince Americans, in the words of one, “that eating is something more than animal indulgence, and that cooking has a nobler purpose than the gratification of appetite and the sense of taste.” And what might that nobler purpose be? Sound nutrition and good sanitation. By elevating those scientific principles and “disdaining the proof of the palate,” Shapiro writes, “they made it possible for American cooking to accept a flood of damaging innovations for years to come”—low-fat processed food products prominent among them.

So scientific eating is an old and venerable tradition in America. Here’s how Harvey Levenstein sums up the quasiscientific beliefs that have shaped American attitudes toward food for more than a century: “that taste is not a true guide to what should be eaten; that one should not simply eat what one enjoys; that the important components of foods cannot be seen or tasted, but are discernible only in scientific laboratories; and that experimental science has produced rules of nutrition which will prevent illness and encourage longevity.” Levenstein could be describing the main tenets of nutritionism.

Perhaps the most notorious flowering of pseudoscientific

eating (and protonutritionism) came in the early years of the twentieth century, when John Harvey Kellogg and Horace Fletcher persuaded thousands of Americans to trade all pleasure in eating for health-promoting dietary regimens of truly breathtaking rigor and perversity. The two diet gurus were united in their contempt for animal protein, the consumption of which Dr. Kellogg, a Seventh-Day Adventist who bore a striking resemblance to KFC's Colonel Sanders, firmly believed promoted both masturbation and the proliferation of toxic bacteria in the colon. During this, the first golden age of American food faddism, protein performed much the same role that fat would perform during the next. At Kellogg's Battle Creek sanitarium, patients (who included John D. Rockefeller and Theodore Roosevelt) paid a small fortune to be subjected to such "scientific" practices as hourly yogurt enemas (to undo the damage that protein supposedly wreaked on the colon); electrical stimulation and "massive vibration" of the abdomen; diets consisting of nothing but grapes (ten to fourteen pounds of them a day); and at every meal, "Fletcherizing," the practice of chewing each bite of food approximately one hundred times. (Often to the rousing accompaniment of special chewing songs.) The theory was that thorough mastication would reduce protein intake (this seems certain) and thereby improve "subjective and objective well-being." Horace Fletcher (aka "the great masticator") had no scientific credentials whatsoever, but the example of his own extraordinary fitness—at fifty he could bound up and down the Washington Monument's 898 steps without pausing to catch his breath—while existing on a daily regimen of only 45 well-chewed grams of protein

was all the proof his adherents needed.* The brothers Henry and William James both became enthusiastic “chewers.”†

Whatever their biological efficacy, all these dietary exertions had the effect of removing eating from social life and pleasure from eating; compulsive chewing (much less hourly enema breaks) is not exactly conducive to the pleasures of the table. Also, Fletcherizing would have forcibly drained food of the very last glimmer of flavor long before the hundredth contraction of the jaw had been counted. Kellogg himself was outspoken in his hostility to the pleasures of eating: “The decline of a nation commences when gourmandizing begins.”

If that is so, America had little reason to worry.

America’s early attraction to various forms of scientific eating may also have reflected discomfort about the way other people eat: the weird, messy, smelly, and mixed-up eating habits of immigrants.‡ How a people eats is one of the most powerful

*According to Levenstein, scientists seeking the secret of Fletcher’s exemplary health scrupulously monitored his ingestions and excretions, “noting with regard to the latter, as all observers did, the remarkable absence of odor” (Levenstein, *Revolution of the Table*, p. 89).

†William James wrote of Fletcher that “if his observations on diet, confirmed already on a limited scale, should prove true on a universal scale, it is impossible to overestimate their revolutionary import.” Fletcher returned the favor, assuring the philosopher that Fletcherism was “advancing the same cause as Pragmatism” (Levenstein, *Revolution of the Table*, p. 92).

‡Americans were particularly disturbed by the way many immigrant groups mixed their foods in stews and such, in contrast to the Anglo-American practice of keeping foods separate on the plate, the culinary format anthropologist Mary Douglas calls “1A plus 2B”—one chunk of animal protein plus two vegetables or starches. Perhaps the disdain for mixing foods reflected anxieties about other kinds of mixing.

ways they have to express, and preserve, their cultural identity, which is exactly what you don't want in a society dedicated to the ideal of "Americanization." To make food choices more scientific is to empty them of their ethnic content and history; in theory, at least, nutritionism proposes a neutral, modernist, forward-looking, and potentially unifying answer to the question of what it might mean to eat like an American. It is also a way to moralize about other people's choices without seeming to. In this, nutritionism is a little like the institution of the American front lawn, an unobjectionable, if bland, way to pave over our differences and Americanize the landscape. Of course in both cases unity comes at the price of aesthetic diversity and sensory pleasure. Which may be precisely the point.

EIGHT • THE PROOF IN THE LOW-FAT PUDDING

Whatever the sacrifice of pleasure, it would be made up for by better health—that, at least, has always been nutritionism's promise. But it's difficult to conclude that scientific eating has contributed to our health. As mentioned, the low-fat campaign coincided with a dramatic increase in the incidence of obesity and diabetes in America. You could blame this unfortunate fallout on us eaters for following the official advice to eat more low-fat food a little too avidly. This explana-

tion suggests that the problem with the low-fat campaign has been in its execution rather than in the theory behind it, and that a better, clearer public health message might have saved us from ourselves. But it is also possible that the advice itself, to replace fats in the diet with carbohydrates, was misguided. As the Hu paper suggests, there is a growing body of evidence that shifting from fats to carbohydrates may lead to weight gain (as well as a host of other problems). This is counterintuitive, because fats contain nearly twice as many calories as carbs (9 per gram for fats as compared to 5 for either carbohydrates or protein). The theory is that refined carbohydrates interfere with insulin metabolism in ways that increase hunger and promote overeating and fat storage in the body. (Call it the carbohydrate hypothesis; it's coming.)* If this is true, then there is no escaping the conclusion that the dietary advice enshrined not

*Gary Taubes describes the developing carbohydrate hypothesis at great length in *Good Calories, Bad Calories*. According to the hypothesis, most of the damage to our health that has been wrongly attributed to fats for the past half century—heart disease, obesity, cancer, diabetes, and so on—can rightly be blamed on refined carbohydrates. But the healthy skepticism Taubes brought to the lipid hypothesis is nowhere in evidence when he writes about the (also unproven) carbohydrate hypothesis. Even if refined carbohydrates do represent a more serious threat to health than dietary fat, to dwell on any one nutrient to the exclusion of all others is to commit the same reductionist error that the lipophobes did. Indeed, Taubes is so single-minded in his demonization of the carbohydrate that he overlooks several other possible explanations for the deleterious effects of the Western diet, including deficiencies of omega-3s and micronutrients from plants. He also downplays the risks (to health as well as eating pleasure) of the high-protein Atkins diet that the carbohydrate hypothesis implies is a sound way to eat. As its title suggests, *Good Calories, Bad Calories*, valuable as it is, does not escape the confines of nutritionism.

only in the McGovern “Goals” but also in the National Academy of Sciences report, the dietary guidelines of the American Heart Association and the American Cancer Society and the U.S. food pyramid bears direct responsibility for creating the public health crisis that now confronts us.

Even if we accept the epidemic of obesity and diabetes as the unintended consequence of the war against dietary fat—collateral damage, you might say—what about the intended consequence of that campaign: the reduction of heart disease? Here is where the low-fat campaigners have chosen to make their last stand, pointing proudly to the fact that after peaking in the late sixties, deaths from heart disease fell dramatically in America, a 50 percent decline since 1969. Cholesterol levels have also fallen. Epidemiologist Walter C. Willett of the Harvard School of Public Health (a coauthor of the Hu paper) cites the increase in consumption of polyunsaturated fats “as a major factor, if not the most important factor, in the decline in heart disease” observed in the seventies and eighties and calls the campaign to replace saturated fats in the diet one of the great public health success stories of our time. And so it would appear to be: We reduced our saturated fat intake, our cholesterol levels fell, and many fewer people dropped dead of heart attacks.

Whether the low-fat campaigners should take the credit for this achievement is doubtful, however. Reducing mortality from heart disease is not the same thing as reducing the incidence of heart disease, and there’s reason to question whether underlying rates of heart disease have greatly changed in the last thirty years, as they should have if changes in diet were so

important. A ten-year study of heart disease mortality published in the *New England Journal of Medicine* in 1998 strongly suggests that most of the decline in deaths from heart disease is due not to changes in lifestyle, such as diet, but to improvements in medical care. (Though cessation of smoking has been important.) For while during the period under analysis, heart attack deaths declined substantially, hospital admissions for heart attack did not. Modern medicine is clearly saving more people suffering from heart disease, but it appears that we haven't had nearly as much success eliminating the disease itself.

NINE • BAD SCIENCE

To understand how nutrition science could have been so spectacularly wrong about dietary fat and health, it's important to understand that doing nutrition science isn't easy. In fact, it's a lot harder than most of the scientists who do it for a living realize or at least are willing to admit. For one thing, the scientific tools at their disposal are in many ways ill suited to the task of understanding systems as complex as food and diet. The assumptions of nutritionism—such as the idea that a food is not a system but rather the sum of its nutrient parts—pose another set of problems. We like to think of scientists as being free from ideological taint, but of course they are as much the product of their ideological environment as the rest of us.

In the same way nutritionism can lead to a false consciousness in the mind of the eater, it can just as easily mislead the scientist.

The problem starts with the nutrient. Most nutritional science involves studying one nutrient at a time, a seemingly unavoidable approach that even nutritionists who do it will tell you is deeply flawed. “The problem with nutrient-by-nutrient nutrition science,” points out Marion Nestle, a New York University nutritionist, “is that it takes the nutrient out of the context of the food, the food out of the context of the diet, and the diet out of the context of the lifestyle.”

If nutrition scientists know this, why do they do it anyway? Because a nutrient bias is built into the way science is done. Scientists study variables they can isolate; if they can’t isolate a variable, they won’t be able to tell whether its presence or absence is meaningful. Yet even the simplest food is a hopelessly complicated thing to analyze, a virtual wilderness of chemical compounds, many of which exist in intricate and dynamic relation to one another, and all of which together are in the process of changing from one state to another. So if you’re a nutrition scientist you do the only thing you can do, given the tools at your disposal: Break the thing down into its component parts and study those one by one, even if that means ignoring subtle interactions and contexts and the fact that the whole may well be more than, or maybe just different from, the sum of its parts. This is what we mean by reductionist science.

Scientific reductionism is an undeniably powerful tool, but it can mislead us too, especially when applied to something as

complex, on the one side, as a food and on the other a human eater. It encourages us to take a simple mechanistic view of that transaction: Put in this nutrient, get out that physiological result. Yet people differ in important ways. We all know that lucky soul who can eat prodigious quantities of fattening food without ever gaining weight. Some populations can metabolize sugars better than others. Depending on your evolutionary heritage, you may or may not be able to digest the lactose in milk. Depending on your genetic makeup, reducing the saturated fat in your diet may or may not move your cholesterol numbers. The specific ecology of your intestines helps determine how efficiently you digest what you eat, so that the same 100 calories of food may yield more or less food energy depending on the proportion of Firmicutes and Bacteroides resident in your gut. In turn, that balance of bacterial species could owe to your genes or to something in your environment. So there is nothing very machinelike about the human eater, and to think of food as simply fuel is to completely misconstrue it. It's worth keeping in mind too that, curiously, the human digestive tract has roughly as many neurons as the spinal column. We don't yet know exactly what they're up to, but their existence suggests that much more is going on in digestion than simply the breakdown of foods into chemicals.

Also, people don't eat nutrients; they eat foods, and foods can behave very differently from the nutrients they contain. Based on epidemiological comparisons of different populations, researchers have long believed that a diet containing lots of fruits and vegetables confers some protection against cancer. So naturally they ask, What nutrient in those plant foods is

responsible for that effect? One hypothesis is that the antioxidants in fresh produce—compounds like beta-carotene, lycopene, vitamin E, and so on—are the X factor. It makes good theoretical sense: These molecules (which plants produce to protect themselves from the highly reactive forms of oxygen they produce during photosynthesis) soak up the free radicals in our bodies, which can damage DNA and initiate cancers. At least that's how it seems to work in a test tube. Yet as soon as you remove these crucial molecules from the context of the whole foods they're found in, as we've done in creating antioxidant supplements, they don't seem to work at all. Indeed, in the case of beta-carotene ingested as a supplement, one study has suggested that in some people it may actually *increase* the risk of certain cancers. Big oops.

What's going on here? We don't know. It could be the vagaries of human digestion. Maybe the fiber (or some other component) in a carrot protects the antioxidant molecule from destruction by stomach acids early in the digestive process. Or it could be we isolated the wrong antioxidant. Beta is just one of a whole slew of carotenes found in common vegetables; maybe we focused on the wrong one. Or maybe beta-carotene works as an antioxidant only in concert with some other plant chemical or process; under other circumstances it may behave as a pro-oxidant.

Indeed, to look at the chemical composition of any common food plant is to realize just how much complexity lurks within it. Here's a list of just the antioxidants that have been identified in a leaf of garden-variety thyme:

alanine, anethole essential oil, apigenin, ascorbic acid, beta-carotene, caffeic acid, camphene, carvacrol, chlorogenic acid, chrysoeriol, derulic acid, eriodictyol, eugenol, 4-terpinol, gallic acid, gamma-terpinene, isichlorogenic acid, isoeugenol, isothymonin, kaemferol, labiatic acid, lauric acid, linalyl acetate, luteolin, methionine, myrcene, myristic acid, naringenin, rosmarinic acid, selenium, tannin, thymol, tryptophan, ursolic acid, vanillic acid.

This is what you ingest when you eat food flavored with thyme. Some of these chemicals are broken down by your digestion, but others go on to do various as-yet-undetermined things to your body: turning some gene's expression on or off, perhaps, or intercepting a free radical before it disturbs a strand of DNA deep in some cell. It would be great to know how this all works, but in the meantime we can enjoy thyme in the knowledge that it probably doesn't do any harm (since people have been eating it forever) and that it might actually do some good (since people have been eating it forever), and even if it does nothing at all, we like the way it tastes.

It's important also to remind ourselves that what reductive science can manage to perceive well enough to isolate and study is subject to almost continual change, and that we have a tendency to assume that what we can see is the important thing to look at. The vast attention paid to cholesterol since the 1950s is largely the result of the fact that for a long time

cholesterol was the only factor linked to heart disease that we had the tools to measure. (This is sometimes called parking-lot science, after the legendary fellow who loses his keys in a parking lot and goes looking for them under the streetlight—not because that’s where he lost them but because that’s where it’s easiest to see.) When we learned how to measure different types of cholesterol, and then triglycerides and C-reactive protein, those became the important components to study. There will no doubt be other factors as yet unidentified. It’s an old story: When Prout and Liebig nailed down the macronutrients, scientists figured that they now understood the nature of food and what the body needed from it. Then when the vitamins were isolated a few decades later, scientists thought, okay, now we *really* understand food and what the body needs for its health; and today it’s the polyphenols and carotenoids that seem to have completed the picture. But who knows what else is going on deep in the soul of a carrot?

The good news is that, to the carrot eater, it doesn’t matter. That’s the great thing about eating foods as compared with nutrients: You don’t need to fathom a carrot’s complexity in order to reap its benefits.

The mystery of the antioxidants points up the danger in taking a nutrient out of the context of food; scientists make a second, related error when they attempt to study the food out of the context of the diet. We eat foods in combinations and in orders that can affect how they’re metabolized. The carbohydrates in a bagel will be absorbed more slowly if the bagel is spread with peanut butter; the fiber, fat, and protein in the peanut butter cushion the insulin response, thereby blunting

the impact of the carbohydrates. (This is why eating dessert at the end of the meal rather than the beginning is probably a good idea.) Drink coffee with your steak, and your body won't be able to fully absorb the iron in the meat. The olive oil with which I eat tomatoes makes the lycopene they contain more available to my body. Some of those compounds in the sprig of thyme may affect my digestion of the dish I add it to, helping to break down one compound or stimulate production of an enzyme needed to detoxify another. We have barely begun to understand the relationships among foods in a cuisine.

But we do understand some of the simplest relationships among foods, like the zero-sum relationship: If you eat a lot of one thing, you're probably not eating a lot of something else. This fact alone may have helped lead the diet-heart researchers astray. Like most of us, they assumed that a bad outcome like heart disease must have a bad cause, like saturated fat or cholesterol, so they focused their investigative energies on how these bad nutrients might cause disease rather than on how the absence of something else, like plant foods or fish, might figure in the etiology of the disease. Nutrition science has usually put more of its energies into the idea that the problems it studies are the result of too much of a bad thing instead of too little of a good thing. Is this good science or nutritionist prejudice? The epidemiologist John Powles has suggested this predilection is little more than a Puritan bias: *Bad things happen to people who eat bad things.*

But what people don't eat may matter as much as what they do. This fact could explain why populations that eat diets containing lots of animal food generally have higher rates of

coronary heart disease and cancer than those that don't. But nutritionism encouraged researchers to look beyond the possibly culpable food itself—meat—to the culpable nutrient in the meat, which scientists have long assumed to be the saturated fat. So they are baffled indeed when large dietary trials like the Women's Health Initiative and the Nurses' Health Study fail to find evidence that reducing fat intake significantly reduces the incidence of heart disease or cancer.

Of course thanks to the low-fat-diet fad (inspired by the same reductionist hypothesis about fat), it is entirely possible to slash your intake of saturated fat without greatly reducing your consumption of animal protein: Just drink the low-fat milk, buy the low-fat cheese, and order the chicken breast or the turkey bacon instead of the burger. So did the big dietary trials exonerate meat or just fat? Unfortunately, the focus on nutrients didn't tell us much about foods. Perhaps the culprit nutrient in meat and dairy is the animal protein itself, as some researchers hypothesize. (The Cornell nutritionist T. Colin Campbell argues as much in his recent book, *The China Study*.) Others think it could be the particular kind of iron in red meat (called heme iron) or the nitrosamines produced when meat is cooked. Perhaps it is the steroid growth hormones typically present in the milk and meat; these hormones (which occur naturally in meat and milk but are often augmented in industrial production) are known to promote certain kinds of cancer.

Or, as I mentioned, the problem with a meat-heavy diet might not even be the meat itself but the plants that all that meat has pushed off the plate. We just don't know. But eaters

worried about their health needn't wait for science to settle this question before deciding that it might be wise to eat more plants and less meat. This of course is precisely what the McGovern committee was trying to tell us.

The zero-sum fallacy of nutrition science poses another obstacle to nailing down the effect of a single nutrient. As Gary Taubes points out, it's difficult to design a dietary trial of something like saturated fat because as soon as you remove it from the trial diet, either you have dramatically reduced the calories in that diet or you have replaced the saturated fat with something else: other fats (but which ones?), or carbohydrates (but what kind?), or protein. Whatever you do, you've introduced a second variable into the experiment, so you will not be able to attribute any observed effect strictly to the absence of saturated fat. It could just as easily be due to the reduction in calories or the addition of carbohydrates or polyunsaturated fats. For every diet hypothesis you test, you can construct an alternative hypothesis based on the presence or absence of the substitute nutrient. It gets messy.

And then there is the placebo effect, which has always bedeviled nutrition research. About a third of Americans are what researchers call responders—people who will respond to a treatment or intervention regardless of whether they've actually received it. When testing a drug you can correct for this by using a placebo in your trial, but how do you correct for the placebo effect in the case of a dietary trial? You can't: Low-fat foods seldom taste like the real thing, and no person is ever going to confuse a meat entrée for a vegetarian substitute.

Marion Nestle also cautions against taking the diet out of

the context of the lifestyle, a particular hazard when comparing the diets of different populations. The Mediterranean diet is widely believed to be one of the most healthful traditional diets, yet much of what we know about it is based on studies of people living in the 1950s on the island of Crete—people who in many respects led lives very different from our own. Yes, they ate lots of olive oil and more fish than meat. But they also did more physical labor. As followers of the Greek Orthodox church, they fasted frequently. They ate lots of wild greens—weeds. And, perhaps most significant, they ate far fewer total calories than we do. Similarly, much of what we know about the health benefits of a vegetarian diet is based on studies of Seventh-Day Adventists, who muddy the nutritional picture by abstaining from alcohol and tobacco as well as meat. These extraneous but unavoidable factors are called, aptly, confounders.

One last example: People who take supplements are healthier than the population at large, yet their health probably has nothing whatsoever to do with the supplements they take—most of which recent studies have suggested are worthless. Supplement takers tend to be better educated, more affluent people who, almost by definition, take a greater than usual interest in personal health—confounders that probably account for their superior health.

But if confounding factors of lifestyle bedevil epidemiological comparisons of different populations, the supposedly more rigorous studies of large American populations suffer from their own arguably even more disabling flaws. In ascending order of supposed reliability, nutrition researchers have three main methods for studying the impact of diet on health:

the case-control study, the cohort study, and the intervention trial. All three are seriously flawed in different ways.

In the case-control study, researchers attempt to determine the diet of a subject who has been diagnosed with a chronic disease in order to uncover its cause. One problem is that when people get sick they may change the way they eat, so the diet they report may not be the diet responsible for their illness. Another problem is that these patients will typically report eating large amounts of whatever the evil nutrient of the moment is. These people read the newspaper too; it's only natural to search for the causes of one's misfortune and, perhaps, to link one's illness to one's behavior. One of the more pernicious aspects of nutritionism is that it encourages us to blame our health problems on lifestyle choices, implying that the individual bears ultimate responsibility for whatever illnesses befall him. It's worth keeping in mind that a far more powerful predictor of heart disease than either diet or exercise is social class.

Long-term observational studies of cohort groups such as the Nurses' Health Study represent a big step up in reliability from the case-control study. For one thing, the studies are prospective rather than retrospective: They begin tracking subjects before they become ill. The Nurses' Study, which has collected data on the eating habits and health outcomes of more than one hundred thousand women over several decades (at a cost of more than one hundred million dollars), is considered the best study of its kind, yet it too has limitations. One is its reliance on food-frequency questionnaires (about which more in a moment). Another is the population of nurses it has chosen to study. Critics (notably Colin Campbell) point out that the

sample is relatively uniform and is even more carnivorous than the U.S. population as a whole. Pretty much everyone in the group eats a Western diet. This means that when researchers divide the subject population into groups (typically fifths) to study the impact of, say, a low-fat diet, the quintile eating the lowest-fat diet is not all that low—or so dramatically different from the quintile consuming the highest-fat diet. “Virtually this entire cohort of nurses is consuming a high-risk diet,” according to Campbell. That might explain why the Nurses’ Study has failed to detect significant benefits for many of the dietary interventions it’s looked at. In a subject population that is eating a fairly standard Western diet, as this one is, you’re never going to capture the effects, good or bad, of more radically different ways of eating. (In his book, Campbell reports Walter Willett’s personal response to this criticism: “You may be right, Colin, but people don’t want to go there.”)

The so-called gold standard in nutrition research is the large-scale intervention study. In these studies, of which the Women’s Health Initiative is the biggest and best known, a large population is divided into two groups. The intervention group changes its diet in some prescribed way while the control group (one hopes) does not. The two groups are then tracked over many years to learn whether the intervention affects relative rates of chronic disease. In the case of the Women’s Health Initiative study of dietary fat, a \$415 million undertaking sponsored by the National Institutes of Health, the eating habits and health outcomes of nearly forty-nine thousand women (aged fifty to seventy-nine) were tracked for eight years to assess the impact of a low-fat diet on a woman’s risk

of breast and colorectal cancer and cardiovascular disease. Forty percent of the women were told to reduce their consumption of fat to 20 percent of total calories. When the results were announced in 2006, it made front-page news (*The New York Times* headline said LOW-FAT DIET DOES NOT CUT HEALTH RISKS, STUDY FINDS) and the cloud of nutritional confusion beneath which Americans endeavor to eat darkened further.

Even a cursory examination of the study's methods makes you wonder what, if anything, it proved, either about dietary fat or meat eating. You could argue that, like the Nurses' Healthy Study, all any such trials prove is that changing one component in the diet at a time, and not by much, does not confer a significant health benefit. But perhaps the strongest conclusion that can be drawn from an analysis of the Women's Health Initiative is about the inherent limitations of this kind of nutrient-by-nutrient nutrition research.

Even the beginning student of nutritionism will immediately spot several flaws: The focus was on dietary fat rather than on any particular food, such as meat or dairy. So women could reach their goal simply by switching to lower-fat animal products. Also, no distinctions were made between different types of fat: Women getting their allowable portion of fat from olive oil or fish were lumped together with women getting their fat from low-fat cheese or chicken breasts or margarine. Why? Because when the study was designed sixteen years ago, the whole notion of "good fats" was not yet on the mainstream scientific scope. Scientists study what scientists can see.

Another problem with the trial was that the low-fat group failed to hit the target of reducing their fat intake to 20 percent

of total calories. The best they could manage was 24 percent in the first year, but by the end of the study they'd drifted back to 29 percent, only a few percentage points lower than the control group's fat intake. Which was itself drifting downward as the women allowed to eat as much fat as they wanted presumably read the newspapers and the food product labels and absorbed the culture's enthusiasm for all things low fat. (This corruption of a control group by popular dietary advice is called the treatment effect.) So it's hardly surprising that the health outcomes of the two groups would not greatly differ—by the end, they might have been consuming pretty much the same diet.

I say “might have been” because we actually have little idea what these women were really eating. Like most people asked about their diet, they lied about it—which brings us to what is perhaps the single biggest problem in doing nutrition science. Even the scientists who conduct this sort of research conduct it in the knowledge that people underestimate (let's be generous) their food intake all the time. They have even developed scientific figures for the magnitude of the error. “Validation studies” of dietary trials like the Women's Health Initiative or the Nurses' Study, which rely on “food-frequency questionnaires” filled out by subjects several times a year, indicate that people on average eat between a fifth and a third more than they say they do on questionnaires.* How do the researchers

*In fact, the magnitude of the error could be much greater, judging by the huge disparity between the total number of food calories produced every day for each American (3,900) and the average number of those calories Americans own up to chomping each day: 2,000. Waste can account for some of this disparity, but not nearly all of it.

know that? By comparing what people report on their food-frequency questionnaires with interviews about their dietary intake over the previous twenty-four hours, thought to be somewhat more reliable. Somewhat. Because as you might expect, these “twenty-four-hour recall” data have their own accuracy problems: How typical of your overall diet is what you ate during any single twenty-four-hour period?

To try to fill out the food-frequency questionnaire used by the Women’s Health Initiative, as I recently did, is to realize just how shaky the data on which all such dietary studies rely really are. The survey, which takes about forty-five minutes to complete, starts off with some relatively easy questions. “Did you eat chicken or turkey during the last three months?” Having answered yes, I then was asked, “When you ate chicken or turkey, how often did you eat the skin?” And, “Did you usually choose light meat, dark meat, both?” But the survey soon became harder, as when it asked me to think back over the past three months to recall whether when I ate okra, squash, or yams were they fried, and if so, were they fried in stick margarine, tub margarine, butter, shortening (in which category they inexplicably lumped together hydrogenated vegetable oil and lard), olive or canola oil, or nonstick spray? I would hope they’d take my answers with a grain of salt because I honestly didn’t remember and in the case of any okra eaten in a restaurant, even a hypnotist or CIA interrogator could not extract from me what sort of fat it was fried in. Now that we spend half of our food dollars on meals prepared outside of the home, how can respondents possibly know what type of fats they’re consuming?

Matters got even sketchier in the second section of the sur-

vey, when I was asked to specify how many times in the last three months I'd eaten a half-cup serving of broccoli, among a dizzying array of other fruits and vegetables I was asked to tally for the dietary quarter. I'm not sure Marcel Proust himself could recall his dietary intake over the last ninety days with the sort of precision demanded by the FFQ.

When you get to the meat section, the portion sizes specified haven't been seen in America since the Hoover administration. If a four-ounce portion of steak is considered "medium," was I really going to admit that the steak I enjoyed on an unrecalable number of occasions during the past three months was probably the equivalent of two or three (or in the case of a steak house steak, no fewer than four) of these portions? I think not. In fact, most of the "medium serving sizes" to which I was asked to compare my own consumption made me feel like such a pig that I badly wanted to shave a few ounces here, a few there. (I mean, I wasn't under oath or anything.)

These are the sort of data on which the largest questions of diet and health are being decided today. "The most intellectually demanding challenge in the field of nutrition," as Marion Nestle writes in *Food Politics*, "is to determine dietary intake." The uncomfortable fact is that the entire field of nutritional science rests on a foundation of ignorance and lies about the most basic question of nutrition: What are people eating? Over lunch, I asked Nestle if I was perhaps being too harsh. She smiled.

"To really know what a person is eating you'd have to have a second invisible person following them around, taking photographs, looking at ingredients, and consulting accurate food composition tables, which we don't have." When you report

on an FFQ that you ate a carrot, the tabulator consults a U.S. Department of Agriculture database to determine exactly how much calcium or beta-carotene that carrot contained. But because all carrots are not created equal, their nutrient content varying with everything from the variety planted and type of soil it was planted in to the agriculture system used (organic? conventional?) and the carrot's freshness, these tables suffer from their own inaccuracies.

I was beginning to realize just how much suspension of disbelief it takes to be a nutrition scientist.

"It's impossible," Nestle continued. "Are people unconsciously underestimating consumption of things they think the researcher thinks are bad or overestimating consumption of things they think the researcher thinks are good? We don't know. Probably both. The issue of reporting is extraordinarily serious. We have to ask, How accurate are the data?"

It's not as though the epidemiologists who develop and deploy FFQs are unaware of their limitations. Some of them, like Walter Willett, strive heroically to repair the faulty data, developing "energy adjustment" factors to correct for the fact that the calories reported on surveys are invariably wrong and complicated "measurement error" algorithms to fix the errors in the twenty-four-hour recall surveys used to fix the errors in the FFQ.

I tracked down Gladys Block, the prominent epidemiologist who developed the FFQ on which the Women's Health Initiative based its own questionnaire. We met for coffee in Berkeley, where she is a professor in the School of Public Health. Nearing retirement, Block is unusually thoughtful about the limits of her field

and disarmingly candid. “It’s a mess,” she said, speaking not of the FFQ itself but of the various formulae and algorithms being used to correct errors in the data. “Because if the energy [i.e., the reported calorie consumption] is off, then the nutrients are off too. So if you’re going to correct for calories, do you then also correct for . . .” She paused and then sighed. “No, it’s a mess.”

Block thinks the problem with nutrition science, which she feels “has led us astray,” is not the FFQ itself but mis- and overinterpretation of the data derived from the FFQ, a tool for which she makes realistic but strikingly modest claims: “The real purpose of the FFQ is to rank people” on their relative consumption of, say, fruits and vegetables or total calories. “If someone reports consuming five hundred calories a day, that’s not true, obviously, but you can say they’re probably at the low end of the spectrum. People overworry about accuracy.”

This was not the sort of thing I expected to hear from an epidemiologist. But then neither was this: “I don’t believe anything I read in nutritional epidemiology anymore. I’m so skeptical at this point.”

TEN • NUTRITIONISM’S CHILDREN

So where does this leave us eaters? More confused about how to eat than any people in history, would be my strictly unscientific conclusion. Actually, there is some science, admit-

tedly a little soft, which has captured a bit of the confusion that the supposedly harder science of nutrition has sown in the American mind. Paul Rozin is a psychologist at the University of Pennsylvania who has dreamed up some of the more imaginative survey questions ever asked of American eaters; the answers he's collected offer a pretty good index to our current befuddlement and anxiety about eating. He has found, for example, that half of us believe high-calorie foods eaten in small amounts contain more calories than low-calorie foods eaten in much larger amounts. And that a third of us believe that a diet absolutely free of fat—a nutrient, lest you forget, essential to our survival—would be better for us than a diet containing even just “a pinch” of it. In one experiment, he showed the words “chocolate cake” to a group of Americans and recorded their word associations. “Guilt” was the top response. If that strikes you as unexceptional, consider the response of the French eaters to the same prompt: “celebration.” (Oh, yeah.) I think of Rozin as a kind of psychoanalyst of nutritionism.

A few years ago, Rozin presented a group of Americans with the following scenario: “Assume you are alone on a desert island for one year and you can have water and one other food. Pick the food that you think would be best for your health.”

The choices were corn, alfalfa sprouts, hot dogs, spinach, peaches, bananas, and milk chocolate. The most popular choice was bananas (42 percent), followed by spinach (27 percent), corn (12 percent), alfalfa sprouts (7 percent), peaches (5 percent), hot dogs (4 percent), and milk chocolate (3 percent). Only 7 percent of the participants chose one of the two foods

that would in fact best support survival: hot dogs and milk chocolate.

Evidently some of the wreckage of the lipid hypothesis has washed up on Rozin's desert island.

"Fat," he writes, "seems to have assumed, even at low levels, the role of a toxin" in our dietary imaginations. I wonder why. As Rozin points out, "Worrying so much about food can't be very good for your health." Indeed. Orthorexia nervosa is an eating disorder not yet recognized by the DSM-IV, but some psychologists have recently suggested that it's time it was. They're seeing more and more patients suffering from "an unhealthy obsession with healthy eating."

So this is what putting science, and scientism, in charge of the American diet has gotten us: anxiety and confusion about even the most basic questions of food and health, and a steadily diminishing ability to enjoy one of the great pleasures of life without guilt or neurosis.

But while nutritionism has its roots in a scientific approach to food, it's important to remember that it is not a science but an ideology, and that the food industry, journalism, and government bear just as much responsibility for its conquest of our minds and diets. All three helped to amplify the signal of nutritionism: journalism by uncritically reporting the latest dietary studies on its front pages; the food industry by marketing dubious foodlike products on the basis of tenuous health claims; and the government by taking it upon itself to issue official dietary advice based on sketchy science in the first place and corrupted by political pressure in the second. The novel food products the industry designed according to the

latest nutritionist specs certainly helped push real food off our plates. But the industry's influence would not be nearly so great had the ideology of nutritionism not already undermined the influence of tradition and habit and common sense—and the transmitter of all those values, mom—on our eating.

Now, all this might be tolerable if eating by the light of nutritionism made us, if not happier, then at least healthier. That it has failed to do. Thirty years of nutritional advice have left us fatter, sicker, and more poorly nourished. Which is why we find ourselves in the predicament we do: in need of a whole new way to think about eating.