at least to an extent, we can rewind the tape of the nutrition transition and undo some of its damage. The implications for our own health are potentially significant.*

The genius of Kerin O'Dea's experiment was its simplicity—and her refusal to let herself be drawn into the scientific labyrinth of nutritionism. She did not attempt to pick out from the complexity of the diet (either before or after the experiment) which one nutrient might explain the results—whether it was the low-fat diet, or the absence of refined carbohydrates, or the reduction in total calories that was responsible for the improvement in the group's health. Her focus instead was on larger dietary patterns, and while this approach has its limitations (we can't extract from such a study precisely which component of the Western diet we need to adjust in order to blunt its worst effects), it has the great virtue of escaping the welter of conflicting theories about specific nutrients and returning our attention to more fundamental questions about the links between diet and health.

Like this one: To what extent are we all Aborigines? When you consider that two thirds of Americans are overweight or obese, that fully a quarter of us have metabolic syndrome, that fifty-four million have prediabetes, and that the incidence of type 2 diabetes has risen 5 percent annually since 1990, going from 4 percent to 7.7 percent of the adult population (that's more than twenty million Americans), the question is not nearly as silly as it sounds.

*According to Walter C. Willett, only 3.1 percent of the Nurses' Health Study population could be described as following a "low risk" diet and lifestyle, which he defines as follows: nonsmoker, body-mass index (BMI) below 25 (the threshold for overweight), thirty minutes of exercise a day, and a diet characterized by low intake of trans fat; high ratio of polyunsaturated to saturated fats; high whole-grain intake; two servings of fish a week; recommended daily allowance of folic acid and at least five grams of alcohol a day. Based on fourteen years of follow-up, Willett and his colleagues calculated that, had the entire cohort adopted these behaviors, 80 percent of coronary heart disease; 90 percent of type 2 diabetes, and more than 70 percent of colon cancer cases could have been avoided. This analysis suggests that the worst effects of the Western diet can be avoided or reversed without leaving civilization. Or, as Willett writes, "the potential for disease prevention by modest dietary and lifestyle changes that are readily compatible with life in the 21st century is enormous." From Walter C. Willett, "The Pursuit of Optimal Diets: A Progress Report" in Jim Yacent, and Raymond L. Rodriguez, Nutritional Genomics: Discovering the Path to Personalized Nutrition (New York: John Wiley & Sons, 2006).
ican eaters do: trying to eat a little less of this nutrient, a little more of that one, depending on the latest thinking. But the overall dietary pattern is treated as a more or less unalterable given. Which is why it probably should not surprise us that the findings of such research should be so modest, equivocal, and confusing.

But what about the elephant in the room—this pattern of eating that we call the Western diet? In the midst of our deepening confusion about nutrition, it might be useful to step back and gaze upon it—review what we do know about the Western diet and its effects on our health. What we know is that people who eat the way we do in the West today suffer substantially higher rates of cancer, cardiovascular diseases, diabetes, and obesity than people eating any number of different traditional diets. We also know that when people come to the West and adopt our way of eating, these diseases soon follow, and often, as in the case of the Aborigines and other native populations, in a particularly virulent form.

The outlines of this story—the story of the so-called Western diseases and their link to the Western diet—we first learned in the early decades of the twentieth century. That was when a handful of dauntless European and American medical professionals working with a wide variety of native populations around the world began noticing the almost complete absence of the chronic diseases that had recently become commonplace in the West. Albert Schweitzer and Denis P. Burkitt in Africa, Robert McCarrison in India, Samuel Hutton among the Eskimos in Labrador, the anthropologist Aleš Hrdlička among Native Americans, and the dentist Weston A. Price among a dozen different groups all over the world (including Peruvian Indians, Australian Aborigines, and Swiss mountainers) sent back much the same news. They compiled lists, many of which appeared in medical journals, of the common diseases they'd been hard pressed to find in the native populations they had treated or studied: little to no heart disease, diabetes, cancer, obesity, hypertension, or stroke; no appendicitis, diverticulitis, malformed dental arches, or tooth decay; no varicose veins, ulcers, or hemorrhoids. These disorders suddenly appeared to these researchers under a striking new light, as suggested by the name given to them by the British doctor Denis Burkitt, who worked in Africa during World War II. He proposed that we call them Western diseases. The implication was that these very different sorts of diseases were somehow linked and might even have a common cause.

Several of these researchers were on hand to witness the arrival of the Western diseases in isolated populations, typically, as Albert Schweitzer wrote, among "natives living more and more after the manner of the whites." Some noted that the Western diseases followed closely on the heels of the arrival of Western foods, particularly refined flour and sugar and other kinds of "store food." They observed too that when one Western disease arrived on the scene, so did most of the others, and often in the same order: obesity followed by type 2 diabetes followed by hypertension and stroke followed by heart disease.

In the years before World War II the medical world entertained a lively conversation on the subject of the Western diseases and what their rise might say about our increasingly
industrialized way of life. The concept's pioneers believed there were novelties in the modern diet to which native populations were poorly adapted, though they did not necessarily agree on exactly which novelty might be the culprit. Burkitt, for example, believed it was the lack of fiber in the modern diet while McCarrison, a British army doctor, focused on refined carbohydrates while still others blamed meat eating and saturated fat or, in Price's case, the advent of processed food and industrially grown crops deficient in vitamins and minerals.

Not everyone, though, bought into the idea that chronic disease was a by-product of Western lifestyles and, in particular, that the industrialization of our food was taking a toll on our health. One objection to the theory was genetic: Different races were apt to be susceptible to different diseases went the argument; white people were disposed to heart attacks, brown people to things like leprosy. Yet as Burkitt and others pointed out, blacks living in America suffered from the same chronic diseases as whites living there. Simply by moving to places like America, immigrants from nations with low rates of chronic disease seemed to quickly acquire them.

The other objection to the concept of Western diseases, one you sometimes still hear, was demographic. The reason we see so much chronic disease in the West is because these are illnesses that appear relatively late in life, and with the conquest of infectious disease early in the twentieth century, we're simply living long enough to get them. In this view, chronic disease is the inevitable price of a long life. But while it is true that our life expectancy has improved dramatically since 1900 (rising in the United States from forty-nine to seventy-seven years), most of that gain is attributed to the fact that more of us are surviving infancy and childhood; the life expectancy of a sixty-five-year-old in 1900 was only about six years less than that of a sixty-five-year-old living today.* When you adjust for age, rates of chronic diseases like cancer and type 2 diabetes are considerably higher today than they were in 1900. That is, the chances that a sixty- or seventy-year-old suffers from cancer or type 2 diabetes are far greater today than they were a century ago. (The same may well be true of heart disease, but because heart disease statistics from 1900 are so sketchy, we can't say for sure.)

Cancer and heart disease and so many of the other Western diseases are by now such an accepted part of modern life that it's hard for us to believe this wasn't always or even necessarily the case. These days most of us think of chronic diseases as being a little like the weather—one of life's givens—and so count ourselves lucky that, compared to the weather, the diseases at least are more amenable to intervention by modern medicine. We think of them strictly in medical rather than historical, much less evolutionary, terms. But during the decades before World War II, when the industrialization of so many

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*It may be that the explosion of chronic diseases during the twentieth century is now taking a toll on American life expectancy. In 2007, the CIA World Factbook ranked the United States forty-fifth for life expectancy at birth, below countries like Israel, Jordan, Bosnia, and Bermuda. Future gains in life expectancy depend largely on how much we can extend life among the elderly—exceedingly difficult, when you consider that the incidence of diabetes in people over seventy-five is projected to increase 336 percent during the first half of this century.
aspect of our lives was still fairly fresh, the price of “progress,” especially to our health, seemed more obvious to many people and therefore more open to question.

One of the most intrepid questioners of the prewar period was Weston A. Price, a Canadian-born dentist, of all things, who became preoccupied with one of those glaring questions we can’t even see anymore. Much like heart disease, chronic problems of the teeth are by now part of the furniture of modern life. But if you stop to think about it, it is odd that everyone should need a dentist and that so many of us should need braces, root canals, extractions of wisdom teeth, and all the other routine procedures of modern mouth maintenance. Could the need for so much remedial work on a body part crucially involved in an activity as critical to our survival as eating reflect a design defect in the human body, some sort of oversight of natural selection? This seems unlikely. Weston Price, who was born in 1870 in a farming community south of Ottawa and built a dental practice in Cleveland, Ohio, had personally witnessed the rapid increase in dental problems beginning around the turn of the last century and was convinced that the cause could be found in the modern diet. (He wasn’t the only one: In the 1930s an argument raged in medical circles as to whether hygiene or nutrition was the key to understanding and treating tooth decay. A public debate on that very question in Manhattan in 1934 attracted an overflow audience of thousands. That hygiene ultimately won the day had as much to do with the needs of the dental profession as it did with good science; the problem of personal hygiene was easier, and far more profitable, to address than that of the diet and entire food system.)

In the 1930s, Price closed down his dental practice so he could devote all his energies to solving the mystery of the Western diet. He went looking for what he called control groups—isolated populations that had not yet been exposed to modern foods. He found them in the mountains of Switzerland and Peru, the lowlands of Africa, the bush of Australia, the outer islands of the Hebrides, the Everglades of Florida, the coast of Alaska, the islands of Melanesia and the Torres Strait, and the jungles of New Guinea and New Zealand, among other places. Price made some remarkable discoveries, which he wrote up in articles for medical journals (with titles like “New Light on Modern Physical Degeneration from Field Studies Among Primitive Races”) and ultimately summarized in his 510-page tome, Nutrition and Physical Degeneration, published in 1939.

Although his research was taken seriously during his lifetime, Weston Price has been all but written out of the history of twentieth-century science. The single best account I could find of his life and work is an unpublished master’s thesis by Martin Renner, a graduate student in history at UC Santa Cruz.* This neglect might owe to the fact that Price was a dentist, and more of an amateur scientist in the nineteenth-century mode than a professional medical researcher. It might also be because he could sometimes come across as a bit of a crackpot—one

of his articles was titled "Dentistry and Race Destiny." His discussions of "primitive races" are off-putting to say the least, though he ended up a harsh critic of "modern civilization," convinced his primitives had more to teach us than the other way around. He was also something of a monomaniac on the subject of diet, certain that poor nutrition could explain not just tooth decay and heart disease but just about everything else that bedeviled humankind, including juvenile delinquency, the collapse of civilizations, and war.

Still, the data he painstakingly gathered from his control groups, and the lines of connection he was able to trace, not only between diet and health but also between the way a people produces food and that food's nutritional quality, remain valuable today. Indeed, his research is even more valuable today than in 1939, because most of the groups he studied have long since vanished or adopted more Western ways of eating. If you want to study the Western diet today, control groups are few and far between. (You can of course create them, as Kerin O'Dea did in Australia.) Price's work also points the way toward a protoecological understanding of food that will be useful as we try to escape the traps of nutritionism.

So what did Price learn? First, that isolated populations eating a wide variety of traditional diets had no need of dentists whatsoever. (Well, almost no need of dentists: The "sturdy mountaineers" of Switzerland, who never met a toothbrush, had teeth covered in a greenish slime—but underneath that Price found perfectly formed teeth virtually free of decay.) Wherever he found an isolated primitive race that had not yet encountered the "displacing foods of modern commerce"—by which he meant refined flour, sugar, canned and chemically preserved foods, and vegetable oils—he found little or no evidence of "modern degeneration"—by which he meant chronic disease, tooth decay, and malformed dental arches. Either there was something present in the Western diet that led to these problems or there was something absent from it.

Wherever Price went he took pictures of teeth and collected samples of food, which he sent home to Cleveland to be analyzed for macronutrient and vitamin content. He found that his native populations were eating a diet substantially higher in vitamins A and D than that of modern Americans—on average ten times as much. This owed partly to the fact that, as was already understood by the 1930s, the processing of foods typically robs them of nutrients, vitamins especially. Store food is food designed to be stored and transported over long distances, and the surest way to make food more stable and less vulnerable to pests is to remove the nutrients from it. In general, calories are much easier to transport—in the form of refined grain or sugar—than nutrients, which are liable to deteriorate or attract the attention of bacteria, insects, and rodents, all keenly interested in nutrients. (More so, apparently, than we are.) Price concluded that modern civilization had sacrificed much of the quality of its food in the interests of quantity and shelf life.

Price identified no single ideal diet—he found populations that thrived on seafood diets, dairy diets, meat diets, and diets in which fruits, vegetables, and grain predominated. The Masai of Africa consumed virtually no plant foods at all, subsisting on meat, blood, and milk. Seafaring groups in the Hebrides consumed no dairy at all, subsisting on a diet consisting largely
of seafood and oats made into porridges and cakes. The Eskimos he interviewed lived on raw fish, game meat, fish roe, and blubber, seldom eating anything remotely green. Along the Nile near Ethiopia, Price encountered what he judged to be the healthiest populations of all: tribes that subsisted on milk, meat, and blood from pastured cattle as well as animal food from the Nile River. Price found groups that ate diets of wild animal flesh to be generally healthier than the agriculturists who relied on cereals and other plant foods; the agriculturists tended to have somewhat higher levels of tooth decay (though still low by our standards). Price noted that many of the peoples he visited particularly prized organ meats, in which he found high levels of fat-soluble vitamins, minerals, and "activator X," a term of his own invention that is probably vitamin K₃. Almost everywhere he went, he noted the high value people placed on seafood, which even mountain-dwelling groups would go to great lengths to procure, trading with coastal tribes for dried fish eggs and such. But the common denominator of good health, he concluded, was to eat a traditional diet consisting of fresh foods from animals and plants grown on soils that were themselves rich in nutrients.

Price paid special attention to the quality of animal-based foods and its link to what those animals ate. He compared the vitamin content of butter produced from cows grazing on spring grass to that of animals on winter forages; not only were levels of vitamins A and D much higher in the yellower butter of the pastured animals but the health of the people who subsisted on those animals was better too. Price believed the quality of the soil was a key to health, and in 1932, he published a paper titled "New Light on Some Relationships Between Soil Mineral Deficiencies, Low Vitamin Foods, and Some Degenerative Diseases."

In making such connections between the quality of soil and grass and the health of the human eaters at the top of the food chain, Price was advancing a critique of the industrialized agriculture just getting established in the thirties. In this he was not alone: Around the same time, the English agronomist Sir Albert Howard, the philosophical father of the organic farming movement, was also arguing that the industrialization of agriculture—in particular the introduction of synthetic nitrogen fertilizer, which simplified the chemistry of the soil—would eventually take its toll on our health. Howard urged that we regard "the whole problem of health in soil, plant, animal and man as one great subject." When Howard wrote these words, this was still little more than a working hypothesis; Weston Price had begun to put some empirical foundations beneath it.

Price was inching toward an ecological understanding of diet and health that was well ahead of his time. He understood that, ultimately, eating linked us to the earth and its elements as well as to the energy of the sun. "The dinner we have eaten tonight," he told his audience in a 1928 lecture, "was a part of the sun but a few months ago." Industrial food both obscured these links and attenuated them. In lengthening the food chain so that we could feed great cities from distant soils, we were breaking the "rules of nature" at least twice: by robbing nutrients from the soils the foods had been grown in and then squandering those nutrients by processing the foods. Compared to the native peoples Price studied, many of whom
took pains to return nutrients to the local soil on which they absolutely depended, "our modern civilization returns exceedingly little of what it borrows. Vast fleets are busy carrying the limited minerals of far-flung districts to distant markets." Renner documents how Price eventually came to see the problem of diet and health as a problem of ecological dysfunction. By breaking the links among local soils, local foods, and local peoples, the industrial food system disrupted the circular flow of nutrients through the food chain. Whatever the advantages of the new industrial system, it could no longer meet the biochemical requirements of the human body, which, not having had time to adapt, was failing in new ways.

Whether or not you're willing to travel quite that far with Dr. Price, he and all the other early twentieth-century explorers of the pre-Western diet returned to civilization with the same simple and devastating piece of news, one that seems hard to deny: The human animal is adapted to, and apparently can thrive on, an extraordinary range of different diets, but the Western diet, however you define it, does not seem to be one of them.

As it happened, the ecological critique of industrial civilization that Weston Price was advancing in the thirties would not survive World War II. The space for such writing—occupied also by Sir Howard and Lord Northbourne in England and the American agrarians—closed down very shortly after Price published Nutrition and Physical Degeneration in 1939. People would soon lose their patience for attacks on "industrial civilization," that being precisely what they were depending on to save them in wartime. By the time the war ended, that industrial civilization had consolidated its hold and in the process become much more sure of itself. In the years immediately after the war, industrial agriculture (which benefited from the peacetime conversion of munitions to chemical fertilizer and nerve gas research to pesticides) also consolidated its position; there would soon be no other kind. Weston Price and his fellow students of the Western diseases were largely forgotten. No one was much interested in looking back or celebrating the wisdom of primitive groups that were themselves quickly disappearing or being assimilated; even the Aborigines were moving to the city.

As for the Western diseases, they hadn't gone away—indeed, rates of heart disease exploded immediately after the war—but now they became the responsibility of modern medicine and reductionist science. Nutritionism became the accepted set of terms in which to conduct all conversations about diet and health. It wouldn't be until the late 1960s, with the rise of organic agriculture, that searching questions about the industrial food chain would be posed again.

I've dwelled on the all-but-forgotten ideas of people like Weston Price and Sir Albert Howard—ecological thinkers about the human food chain—because they point us down a