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The Pima Paradox

*Can we learn how to lose weight from one of
the most obese people in the world?*

by Malcolm Gladwell

1.

Sacaton lies in the center of Arizona, just off interstate 10, on the Gila River reservation of the Pima Indian tribe. It is a small town, dusty and unremarkable, which looks as if it had been blown there by a gust of desert wind. Shacks and plywood bungalows are scattered along a dirt-and-asphalt grid. Dogs crisscross the streets. Back yards are filled with rusted trucks and junk. The desert in these parts is scruffy and barren, drained of water by the rapid growth of Phoenix, just half an hour's drive to the north. The nearby Gila River is dry, and the fields of wheat and cushaw squash and tepary beans which the Pima used to cultivate are long gone. The only prepossessing building in Sacaton is a gleaming low-slung modern structure on the outskirts of town--the Hu Hu Kam Memorial Hospital. There is

nothing bigger or more impressive for miles, and that is appropriate, since medicine is what has brought Sacaton any wisp of renown it has.

Thirty-five years ago, a team of National Institutes of Health researchers arrived in Sacaton to study rheumatoid arthritis. They wanted to see whether the Pima had higher or lower rates of the disease than the Blackfoot of Montana. A third of the way through their survey, however, they realized that they had stumbled on something altogether strange--a population in the grip of a plague. Two years later, the N.I.H. returned to the Gila River Indian Reservation in force. An exhaustive epidemiological expedition was launched, in which thousands of Pima were examined every two years by government scientists, their weight and height and blood pressure checked, their blood sugar monitored, and their eyes and kidneys scrutinized.

In Phoenix, a modern medical center devoted to Native Americans was built; on its top floor, the N.I.H. installed a state-of-the-art research lab, including the first metabolic chamber in North America--a sealed room in which to measure the precise energy intake and expenditure of Pima research subjects. Genetic samples were taken; family histories were mapped; patterns of illness and death were traced from relative to relative and generation to generation. Today, the original study group has grown from four thousand people to seven thousand five hundred, and so many new studies have been added to the old that the total number of research papers arising from the Gila River reservation takes up almost forty feet of shelf space in the N.I.H. library in Phoenix.

The Pima are famous now--famous for being fatter than

any other group in the world, with the exception only of the Nauru islanders of the West Pacific. Among those over thirty-five on the reservation, the rate of diabetes, the disease most closely associated with obesity, is fifty per cent, eight times the national average and a figure unmatched in medical history. It is not unheard of in Sacaton for adults to weigh five hundred pounds, for teen-agers to be suffering from diabetes, or for relatively young men and women to be already disabled by the disease--to be blind, to have lost a limb, to be confined to a wheelchair, or to be dependent on kidney dialysis.

When I visited the town, on a monotonously bright desert day not long ago, I watched a group of children on a playing field behind the middle school moving at what seemed to be half speed, their generous shirts and baggy jeans barely concealing their bulk. At the hospital, one of the tribe's public-health workers told me that when she began an education program on nutrition several years ago she wanted to start with second graders, to catch the children before it was too late. "We were under the delusion that kids didn't gain weight until the second

grade," she said, shaking her head. "But then we realized we'd have to go younger. Those kids couldn't run around the block."

From the beginning, the N.I.H. researchers have hoped that if they can understand why the Pima are so obese they can better understand obesity in the rest of us; the assumption is that obesity in the Pima is different only in degree, not in kind. One hypothesis for the Pima's plight, favored by Eric Ravussin, of the N.I.H.'s Phoenix team, is that after generations of living in the desert the only Pima who survived famine and drought were those highly adept at storing fat in times of plenty. Under normal circumstances, this disposition was kept in check by the Pima's traditional diet: cholla-cactus buds, honey mesquite, povertyweed, and prickly pears from the desert floor; mule deer, white-winged dove, and black-tailed jackrabbit; squawfish from the Gila River; and wheat, squash, and beans grown in irrigated desert fields. By the end of the Second World War, however, the Pima had almost entirely left the land, and they began to eat like other Americans. Their traditional diet had been fifteen to twenty per cent fat. Their new diet was closer to forty per cent fat. Famine, which had long been a recurrent condition, gave way

to permanent plenty, and so the Pima's "thrifty" genes, once an advantage, were now a liability. N.I.H. researchers are trying to find these genes, on the theory that they may be the same genes that contribute to obesity in the rest of us. Their studies at Sacaton have also uncovered valuable clues to how diabetes works, how obesity in pregnant women affects their children, and how human metabolism is altered by weight gain. All told, the collaboration between the N.I.H. and the Pima is one of the most fruitful relationships in modern medical science--with one fateful exception. After thirty-five years, no one has had any success helping the Pima lose weight. For all the prodding and poking, the hundreds of research papers describing their bodily processes, and the determined efforts of health workers, year after year the tribe grows fatter.

"I used to be a nurse, I used to work in the clinic, I used to be all gung ho about going out and teaching people about diabetics and obesity," Teresa Wall, who heads the tribe's public-health department, told me. "I thought that was all people needed--information. But they weren't interested. They had other issues." Wall is a Pima, short and stocky,

who has long, straight black hair, worn halfway down her back. She spoke softly. "There's something missing. It's one thing to say to people, 'This is what you should do.' It's another to actually get them to take it in."

The Pima have built a new wellness center in downtown Sacaton, with a weight room and a gymnasium. They now have an education program on nutrition aimed at preschoolers and first graders, and at all tribal functions signs identify healthful food choices--a tray of vegetables or of fruit, say. They are doing, in other words, what public-health professionals are supposed to be doing. But results are hard to see.

"We've had kids who were diabetic, whose mothers had diabetes and were on dialysis and had died of kidney failure," one of the tribe's nutritionists told me. "You'd think that that would make a difference--that it would motivate them to keep their diet under control. It doesn't." She got up from her desk, walked to a bookshelf, and pulled out two bottles of Coca-Cola. One was an old glass bottle. The other was a modern plastic bottle, which towered over it. "The original Coke bottle, in the nineteen-

thirties, was six and a half ounces." She held up the plastic bottle. "Now they are marketing one litre as a single serving. That's five times the original serving size. The McDonald's regular hamburger is two hundred and sixty calories, but now you've got the double cheeseburger, which is four hundred and forty-five calories. Portion sizes are getting way out of whack. Eating is not about hunger anymore. The fact that people are hungry is way down on the list of why they eat." I told her that I had come to Sacaton, the front lines of the weight battle, in order to find out what really works in fighting obesity. She looked at me and shrugged. "We're the last people who could tell you that," she said.

In the early nineteen-sixties, at about the time the N.I.H. team stumbled on the Pima, seventeen per cent of middle-aged Americans met the clinical definition of obesity. Today, that figure is 32.3 per cent. Between the early nineteen-seventies and the early nineteen-nineties, the percentage of preschool girls who were overweight went from 5.8 per cent to ten per cent. The number of Americans who fall into what epidemiologists call Class Three Obesity--that is, people too grossly overweight, say, to fit into an airline seat--has risen three hundred and fifty

per cent in the past thirty years. "We've looked at trends by educational level, race, and ethnic group, we've compared smokers and non-smokers, and it's very hard to say that there is any group that is not experiencing this kind of weight gain," Katherine Flegal, a senior research epidemiologist at the National Center for Health Statistics, says. "It's all over the world. In China, the prevalence of obesity is vanishingly low, yet they are showing an increase. In Western Samoa, it is very high, and they are showing an increase." In the same period, science has unlocked many of obesity's secrets, the American public has been given a thorough education in the principles of good nutrition, health clubs have sprung up from one end of the country to another, dieting has become a religion, and health food a marketing phenomenon. None of it has mattered. It is the Pima paradox: in the fight against obesity all the things that worked in curbing behaviors like drunk driving and smoking and in encouraging things like safe sex and the use of seat belts--education, awareness, motivation--don't seem to work. For one reason or another, we cannot stop eating. "Since many people cannot lose much weight no matter how hard they try,

and promptly regain whatever they do lose," the editors of The New England Journal of Medicine wearily concluded last month, "the vast amount of money spent on diet clubs, special foods and over-the-counter remedies, estimated to be on the order of \$30 billion to \$50 billion yearly, is wasted." Who could argue? If the Pima--who are surrounded by the immediate and tangible consequences of obesity, who have every conceivable motivation--can't stop themselves from eating their way to illness, what hope is there for the rest of us?

In the scientific literature, there is something called Gourmand Syndrome--a neurological condition caused by anterior brain lesions and characterized by an unusual passion for eating. The syndrome was described in a recent issue of the journal *Neurology*, and the irrational, seemingly uncontrollable obsession with food evinced by its victims seems a perfect metaphor for the irrational, apparently uncontrollable obsession with food which seems to have overtaken American society as a whole. Here is a diary entry from a Gourmand Syndrome patient, a fifty-five-year-old stroke victim who had previously displayed no

more than a perfunctory interest in food.

After I could stand on my feet again, I dreamt to go downtown and sit down in this well-known restaurant. There I would get a beer, sausage, and potatoes. Slowly my diet improved again and thus did quality of life. The day after discharge, my first trip brought me to this restaurant, and here I order potato salad, sausage, and a beer. I feel wonderful. My spouse anxiously registers everything I eat and nibble. It irritates me. A few steps down the street, we enter a coffee-house. My hand is reaching for a pastry, my wife's hand reaches between. Through the window I see my bank. If I choose, I could buy all the pastry I wanted, including the whole store. The creamy pastry slips from the foil like a mermaid. I take a bite.

2.

Is there an easy way out of this problem? Every year, millions of Americans buy books outlining new approaches to nutrition and diet, nearly all of which are based on the idea that overcoming our obsession with food is really just a matter of technique: that the right foods eaten in the right combination can succeed where more traditional approaches to nutrition have failed. A cynic would say, of

course, that the seemingly endless supply of these books proves their lack of efficacy, since if one of these diets actually worked there would be no need for another. But that's not quite fair. After all, the medical establishment, too, has been giving Americans nutritional advice without visible effect. We have been told that we must not take in more calories than we burn, that we cannot lose weight if we don't exercise consistently, that an excess of eggs, red meat, cheese, and fried food clogs arteries, that fresh vegetables and fruits help to ward off cancer, that fibre is good and sugar is bad and whole-wheat bread is better than white bread. That few of us are able to actually follow this advice is either our fault or the fault of the advice. Medical orthodoxy, naturally, tends toward the former position. Diet books tend toward the latter. Given how often the medical orthodoxy has been wrong in the past, that position is not, on its face, irrational. It's worth finding out whether it is true.

Arguably the most popular diet of the moment, for example, is one invented by the biotechnology entrepreneur Barry Sears. Sears's first book, "The Zone," written with Bill Lawren, sold a million and a half copies and has been

translated into fourteen languages. His second book, "Mastering the Zone," was on the best-seller lists for eleven weeks. Madonna is rumored to be on the Zone diet, and so are Howard Stern and President Clinton, and if you walk into almost any major bookstore in the country right now Sears's two best-sellers--plus a new book, "Zone Perfect Meals in Minutes"--will quite likely be featured on a display table near the front. They are ambitious books, filled with technical discussions of food chemistry, metabolism, evolutionary theory, and obscure scientific studies, all apparently serving as proof of the idea that through careful management of "the most powerful and ubiquitous drug we have: food" we can enter a kind of high-efficiency, optimal metabolic state--the Zone.

The key to entering the Zone, according to Sears, is limiting your carbohydrates. When you eat carbohydrates, he writes, you stimulate the production of insulin, and insulin is a hormone that evolved to put aside excess carbohydrate calories in the form of fat in case of future famine. So the insulin that's stimulated by excess carbohydrates aggressively promotes the accumulation of body fat. In other words, when we eat too much

carbohydrate, we're essentially sending a hormonal message, via insulin, to the body (actually to the adipose cells). The message: "Store fat."

His solution is a diet in which carbohydrates make up no more than forty per cent of all calories consumed (as opposed to the fifty per cent or more consumed by most Americans), with fat and protein coming to thirty per cent each. Maintaining that precise four-to-three ratio between carbohydrates and protein is, in Sears's opinion, critical for keeping insulin in check. "The Zone" includes all kinds of complicated instructions to help readers figure out how to do things like calculate their precise protein requirements in restaurants. ("Start with the protein, using the palm of your hand as a guide. The amount of protein that can fit into your palm is usually four protein blocks. That's about one chicken breast or 4 ounces sliced turkey.")

It should be said that the kind of diet Sears suggests is perfectly nutritious. Following the Zone diet, you'll eat lots of fibre, fresh fruit, fresh vegetables, and fish, and very little red meat. Good nutrition, though, isn't really the point. Sears's argument is that being in the Zone can induce permanent weight loss--that by controlling

carbohydrates and the production of insulin you can break your obsession with food and fundamentally alter the way your body works. "Weight loss . . . can be an ongoing and usually frustrating struggle for most people," he writes. "In the Zone it is painless, almost automatic."

Does the Zone exist? Yes and no. Certainly, if people start eating a more healthful diet they'll feel better about themselves. But the idea that there is something magical about keeping insulin within a specific range is a little strange. Insulin is simply a hormone that regulates the storage of energy. Precisely how much insulin you need to store carbohydrates is dependent on all kinds of things, including how fit you are and whether, like many diabetics, you have a genetic predisposition toward insulin resistance. Generally speaking, the heavier and more out of shape you are, the more insulin your body needs to do its job. The Pima have a problem with obesity and that makes their problem with diabetes worse--not the other way around. High levels of insulin are the result of obesity. They aren't the cause of obesity. When I read the insulin section of "The Zone" to Gerald Reaven, an emeritus

professor of medicine at Stanford University, who is acknowledged to be the country's leading insulin expert, I could hear him grinding his teeth. "I had the experience of being on a panel discussion with Sears, and I couldn't believe the stuff that comes out of this guy's mouth," he said. "I think he's full of it."

What Sears would have us believe is that when it comes to weight loss your body treats some kinds of calories differently from others--that the combination of the food we eat is more critical than the amount. To this end, he cites what he calls an "amazing" and "landmark" study published in 1956 in the British medical journal *Lancet*. (It should be a tipoff that the best corroborating research he can come up with here is more than forty years old.) In the study, a couple of researchers compared the effects of two different thousand-calorie diets--the first high in fat and protein and low in carbohydrates, and the second low in fat and protein and high in carbohydrates--on two groups of obese men. After eight to ten days, the men on the low-carbohydrate diet had lost more weight than the men on the high-carbohydrate diet. Sears concludes from the study that if you want to lose

weight you should eat protein and shun carbohydrates. Actually, it shows nothing of the sort. Carbohydrates promote water retention; protein acts like a diuretic. Over a week or so, someone on a high-protein diet will always look better than someone on a high-carbohydrate diet, simply because of dehydration. When a similar study was conducted several years later, researchers found that after about three weeks--when the effects of dehydration had evened out--the weight loss on the two diets was virtually identical. The key isn't how you eat, in other words; it's how much you eat. Calories, not carbohydrates, are still what matters. The dirty little secret of the Zone system is that, despite Sears's expostulations about insulin, all he has done is come up with another low-calorie diet. He doesn't do the math for his readers, but some nutritionists have calculated that if you follow Sears's prescriptions religiously you'll take in at most seventeen hundred calories a day, and at seventeen hundred calories a day virtually anyone can lose weight. The problem with low-calorie diets, of course, is that no one can stay on them for very long. Just ask Sears. "Diets based on choice restriction and calorie limits usually fail," he writes in the second chapter of "The Zone," just as he is about to present

his own choice-restricted and calorie-limited diet. "People on restrictive diets get tired of feeling hungry and deprived. They go off their diets, put the weight back on (primarily, as increased body fat) and then feel bad about themselves for not having enough will power, discipline, or motivation."

These are not, however, the kinds of contradiction that seem to bother Sears. His first book's dust jacket claims that in the Zone you can "reset your genetic code" and "burn more fat watching TV than by exercising." By the time he's finished, Sears has held up his diet as the answer to virtually every medical ill facing Western society, from heart disease to cancer and on to alcoholism and PMS. He writes, "Dr. Paul Kahl, the same physician with whom I did the aids pilot study"--yes, Sears's diet is just the thing for aids, too--"told me the story of one of his patients, a fifty-year-old woman with MS."

Paul put her on a Zone-favorable diet, and after a few months on the program she came in for a checkup. Paul asked the basic question: "How are you feeling?" Her answer was "Great!" Noticing that she was still using a cane for stability, Paul asked her, "If

you're feeling so great, why are you still using the cane?" Her only response was that since developing MS she always had. Paul took the cane away and told her to walk to the end of the hallway and back. After a few tentative steps, she made the round trip quickly. When Paul asked her if she wanted her cane back, she just smiled and told him to keep it for someone who really needed it.

Put down your carbohydrates and walk!

It is hard, while reading this kind of thing, to escape the conclusion that what is said in a diet book somehow matters less than how it's said. Sears, after all, isn't the only diet specialist who seems to be making things up. They all seem to be making things up. But if you read a large number of popular diet books in succession, what is striking is that they all seem to be making things up in precisely the same way. It is as if the diet-book genre had an unspoken set of narrative rules and conventions, and all that matters is how skillfully those rules and conventions are adhered to. Sears, for example, begins fearful and despondent, his father dead of a heart attack at fifty-three, a "sword of Damocles" over his head. Judy Moscovitz, author of

"The Rice Diet Report" (three months on the Times best-seller list), tells us, "I was always the fattest kid in the class, and I knew all the pain that only a fat kid can know.... I was always the last one reluctantly chosen for the teams." Martin Katahn, in his best-seller "The Rotation Diet," writes, "I was one of those fat kids who had no memory of ever being thin. Instead, I have memories such as not being able to run fast enough to keep up with my playmates, being chosen last for all games that required physical movement."

Out of that darkness comes light: the Eureka Moment, when the author explains how he stumbled on the radical truth that inspired his diet. Sears found himself in the library of the Boston University School of Medicine, reading everything he could on the subject: "I had no preconceptions, no base of knowledge to work from, so I read everything. I eventually came across an obscure report..." Rachael Heller, who was a co-author of the best-selling "The Carbohydrate Addict's Diet" (and, incidentally, so fat growing up that she was "always the last one picked for the team"), was at home in bed when her doctor called, postponing her appointment and thereby setting in motion an extraordinary chain of events that involved veal parmigiana,

a Greek salad, and two French crullers: "I will always be grateful for that particular arrangement of circumstances.... Sometimes we are fortunate enough to recognize and take advantage of them, sometimes not. This time I did. I believe it saved my life." Harvey Diamond, the co-author of the three-million-copy-selling "Fit for Life," was at a music festival two thousand miles from home, when he happened to overhear two people in front of him discussing the theories of a friend in Santa Barbara: "'Excuse me,' I interrupted, 'who is this fellow you are discussing?'" In less than twenty-four hours I was on my way to Santa Barbara. Little did I know that I was on the brink of one of the most remarkable discoveries of my life."

The Eureka Moment is followed, typically within a few pages, by the Patent Claim--the point at which the author shows why his Eureka Moment, which explains how weight can be lost without sacrifice, is different from the Eureka Moment of all those other diet books explaining how weight can be lost without sacrifice. This is harder than it appears. Dieters are actually attracted to the idea of discipline, because they attribute their condition to a

failure of discipline. It's just that they know themselves well enough to realize that if a diet requires discipline they won't be able to follow it. At the same time, of course, even as the dieter realizes that what he is looking for--discipline without the discipline--has never been possible, he still clings to the hope that someday it might be. The Patent Claim must negotiate both paradoxes. Here is Sears, in his deft six-paragraph Patent Claim: "These are not unique claims. The proponents of every new diet that comes along say essentially the same thing. But if you're reading this book, you probably know that these diets don't really work." Why don't they work? Because they "violate the basic biochemical laws required to enter the Zone." Other diets don't have discipline. The Zone does. Yet, he adds, "The beauty of the dietary system presented in this book is that . . . it doesn't call for a great deal of the kind of unrealistic self-sacrifice that causes many people to fall off the diet wagon. . . . In fact, I can even show you how to stay within these dietary guidelines while eating at fast-food restaurants." It is the very discipline of the Zone system that allows its adherent to lose weight without discipline.

Or consider this from Adele Puhn's recent runaway best-seller, "The 5-Day Miracle Diet." America's No. 1 diet myth, she writes, is that "you have to deprive yourself to lose weight":

Even though countless diet programs have said you can have your cake and eat it, too, in your heart of hearts, you have that "nibbling" doubt: For a diet to really work, you have to sacrifice. I know. I bought into this myth for a long time myself. And the fact is that on every other diet, deprivation is involved. Motivation can only take you so far. Eventually you're going to grab for that extra piece of cake, that box of cookies, that cheeseburger and fries. But not the 5-Day Miracle Diet.

Let us pause and savor the five-hundred-and-forty-degree rhetorical triple gainer taken in those few sentences:

- (1) the idea that diet involves sacrifice is a myth;
- (2) all diets, to be sure, say that on their diets dieting without sacrifice is not a myth;
- (3) but you believe that dieting without sacrifice is a myth;
- (4) and I, too, believed that dieting without sacrifice is a myth;

- (5) because in fact on all diets dieting without sacrifice is a myth;
- (6) except on my diet, where dieting without sacrifice is not a myth.

The expository sequence that these books follow--last one picked, moment of enlightenment, assertion of the one true way--finally amounts to nothing less than a conversion narrative. In conception and execution, diet books are self-consciously theological. (Whom did Harvey Diamond meet after his impulsive, desperate mission to Santa Barbara? A man he will only identify, pseudonymously and mysteriously, as Mr. Jensen, an ethereal figure with "clear eyes, radiant skin, serene demeanor and well-proportioned body.") It is the appropriation of this religious narrative that permits the suspension of disbelief.

There is a more general explanation for all this in the psychological literature--a phenomenon that might be called the Photocopier Effect, after the experiments of the Harvard social scientist Ellen Langer. Langer examined the apparently common-sense idea that if you are trying to persuade someone to do something for you, you are always better off if you

provide a reason. She went up to a group of people waiting in line to use a library copying machine and said, "Excuse me, I have five pages. May I use the Xerox machine?" Sixty per cent said yes. Then she repeated the experiment on another group, except that she changed her request to "Excuse me, I have five pages. May I use the Xerox machine, because I'm in a rush?" Ninety-four per cent said yes. This much sounds like common sense: if you say, "because I'm in a rush"--if you explain your need--people are willing to step aside. But here's where the study gets interesting. Langer then did the experiment a third time, in this case replacing the specific reason with a statement of the obvious: "Excuse me, I have five pages. May I use the Xerox machine, because I have to make some copies?" The percentage who let her do so this time was almost exactly the same as the one in the previous round--ninety-three per cent. The key to getting people to say yes, in other words, wasn't the explanation "because I'm in a rush" but merely the use of the word "because." What mattered wasn't the substance of the explanation but merely the rhetorical form--the conjunctive footprint--of an explanation.

Isn't this how diet books work? Consider the following paragraph, taken at random from "The Zone":

In paracrine hormonal responses, the hormone travels only a very short distance from a secreting cell to a target cell. Because of the short distance between the secreting cell and the target cell, paracrine responses don't need the long-distance capabilities of the bloodstream. Instead, they use the body's version of a regional system: the paracrine system. Finally, there are the autocrine hormone systems, analogous to the cord that links the handset of the phone to the phone itself. Here the secreting cells release a hormone that comes immediately back to affect the secreting cell itself.

Don't worry if you can't follow what Sears is talking about here--following isn't really the point. It is enough that he is using the word "because."

3.

If there is any book that defines the diet genre, however, it is "Dr. Atkins' New Diet Revolution." Here is the conversion narrative at its finest. Dr. Atkins, a humble

corporate physician, is fat. ("I had three chins.") He begins searching for answers. ("One evening I read about the work that Dr. Garfield Duncan had done in nutrition at the University of Pennsylvania. Fasting patients, he reported, lose all sense of hunger after forty-eight hours without food. That stunned me. . . . That defied logic.") He tests his unorthodox views on himself. As if by magic, he loses weight. He tests his unorthodox views on a group of executives at A.T. & T. As if by magic, they lose weight. Incredibly, he has come up with a diet that "produces steady weight loss" while setting "no limit on the amount of food you can eat." In 1972, inspired by his vision, he puts pen to paper. The result is "Dr. Atkins' Diet Revolution," one of the fifty best-selling books of all time. In the early nineties, he publishes "Dr. Atkins' New Diet Revolution," which sells more than three million copies and is on the Times best-seller list for almost all of 1997. More than two decades of scientific research into health and nutrition have elapsed in the interim, but Atkins' message has remained the same. Carbohydrates are bad. Everything else is good. Eat the hamburger, hold the bun. Eat the steak, hold the French fries. Here is the list

of ingredients for one of his breakfast "weight loss" recommendations: scrambled eggs for six. Keep in mind that Atkins is probably the most influential diet doctor in the world.

12 link sausages (be sure they contain no sugar)
1 3-ounce package cream cheese
1 tablespoon butter
3/4 cup cream
1/4 cup water
1 teaspoon seasoned salt
2 teaspoons parsley
8 eggs, beaten

Atkins' Patent Claim centers on the magical weight-loss properties of something called "ketosis." When you eat carbohydrates, your body converts them into glycogen and stores them for ready use. If you are deprived of carbohydrates, however, your body has to turn to its own stores of fat and muscle for energy. Among the intermediate metabolic products of this fat breakdown are ketones, and when you produce lots of ketones, you're in ketosis. Since an accumulation of these chemicals swiftly becomes toxic, your body works very hard to get rid of them, either through the kidneys, as urine, or through the lungs, by exhaling, so people in ketosis commonly spend a lot of time in the bathroom and have breath

that smells like rotten apples. Ketosis can also raise the risk of bone fracture and cardiac arrhythmia and can result in light-headedness, nausea, and the loss of nutrients like potassium and sodium. There is no doubt that you can lose weight while you're in ketosis. Between all that protein and those trips to the bathroom, you'll quickly become dehydrated and drop several pounds just through water loss. The nausea will probably curb your appetite. And if you do what Atkins says, and suddenly cut out virtually all carbohydrates, it will take a little while for your body to compensate for all those lost calories by demanding extra protein and fat. The weight loss isn't permanent, though. After a few weeks your body adjusts, and the weight--and your appetite--comes back.

For Atkins, however, ketosis is as "delightful as sex and sunshine," which is why he wants dieters to cut out carbohydrates almost entirely. (To avoid bad breath he recommends carrying chlorophyll tablets and purse-size aerosol breath fresheners at all times; to avoid other complications, he recommends regular blood tests.) Somehow, he has convinced himself that his kind of ketosis is different from the bad kind of ketosis, and that his ketosis can actually lead to permanent weight loss. Why he thinks

this, however, is a little unclear. In "Dr. Atkins' Diet Revolution" he thought that the key was in the many trips to the bathroom: "Hundreds of calories are sneaked out of your body every day in the form of ketones and a host of other incompletely broken down molecules of fat. You are disposing of these calories not by work or violent exercise--but just by breathing and allowing your kidneys to function. All this is achieved merely by cutting out your carbohydrates." Unfortunately, the year after that original edition of Atkins' book came out, the American Medical Association published a devastating critique of this theory, pointing out, among other things, that ketone losses in the urine and the breath rarely exceed a hundred calories a day--a quantity, the A.M.A. pointed out, "that could not possibly account for the dramatic results claimed for such diets." In "Dr. Atkins' New Diet Revolution," not surprisingly, he's become rather vague on the subject, mysteriously invoking something he calls Fat Mobilizing Substance. Last year, when I interviewed him, he offered a new hypothesis: that ketosis takes more energy than conventional food metabolism does, and that it

is "a much less efficient pathway to burn up your calories via stored fat than it is via glucose." But he didn't want to be pinned down. "Nobody has really been able to work out that mechanism as well as I would have liked," he conceded.

Atkins is a big, white-haired man in his late sixties, well over six feet, with a barrel chest and a gruff, hard-edged voice. On the day we met, he was wearing a high-lapelled, four-button black suit. Given a holster and a six-shooter, he could have passed for the sheriff in a spaghetti western. He is an intimidating figure, his manner brusque and impatient. He gives the impression that he doesn't like having to explain his theories, that he finds the details tedious and unnecessary. Given the Photocopier Effect, of course, he is quite right. The appearance of an explanation is more important than the explanation itself. But Atkins seems to take this principle farther than anyone else.

For example, in an attempt to convince his readers that eating pork chops, steaks, duck, and rack of lamb in abundance is good for them, Atkins points out that primitive Eskimo cultures

had virtually no heart disease, despite a high-fat diet of fish and seal meat. But one obvious explanation for the Eskimo paradox is that cold-water fish and seal meat are rich in n-3 fatty acids--the "good" kind of fat. Red meat, on the other hand, is rich in saturated fat--the "bad" kind of fat. That dietary fats come in different forms, some of which are particularly bad for you and some of which are not, is the kind of basic fact that seventh graders are taught in Introduction to Nutrition. Atkins has a whole chapter on dietary fat in "New Diet Revolution" and doesn't make the distinction once. All diet-book authors profit from the Photocopier Effect. Atkins lives it.

I watched Atkins recently as he conducted his daily one-hour radio show on New York's WEVD. We were in a Manhattan town house in the East Fifties, where he has his headquarters, in a sleek, modernist office filled with leather furniture and soapstone sculpture. He sat behind his desk--John Wayne in headphones--as his producer perched in front of him. It was a bravura performance. He spoke quickly and easily, glancing at his notes only briefly, and then deftly gave counsel to listeners around the region.

The first call came from George, on his car phone.

George told Atkins his ratio of triglycerides to cholesterol. It wasn't good. George was a very unhealthy man. "You're in big trouble," Atkins said. "You have to change your diet. What do you generally eat? What's your breakfast?"

"I've stopped taking junk foods," George says. "I don't eat eggs. I don't eat bacon."

"Then that's-- See there." Atkins' voice rose in exasperation. "What do you have for breakfast?"

"I have skim milk, cereal, with banana."

"That's three carbs!" Atkins couldn't believe that in this day and age people were still consuming fruit and skim milk. "That's how you are getting into trouble!... What you need to do, George, seriously, is get ahold of 'New Diet Revolution' and just read what it says."

Atkins took another call. This time, it was from Robert, forty-one years old, three hundred pounds, and possessed of a formidable Brooklyn accent. He was desperate to lose weight--up on a ledge and wanting Atkins to talk him down. "I really don't know anything about dieting," he said. "I'm getting a little discouraged."

"It's really very easy," Atkins told him, switching artfully to the Socratic method. "Do you like meat?"

"Yes."

"Could you eat a steak?"

"Yes."

"All by itself, without any French fries?"

"Yes."

"And let's say we threw in a salad, but you couldn't have any bread or anything else."

"Yeah, I could do that."

"Well, if you could go through life like that... Do you like eggs in the morning? Or a cheese omelette?"

"Yes," Robert said, his voice almost giddy with relief. He called expecting a life sentence of rice cakes. Now he was being sent forth to eat cheeseburgers. "Yes, I do!"

"If you just eat that way," Atkins told him, "you'll have eighty pounds off in six months."

When I first arrived at Atkins' headquarters, two members of his staff took me on a quick tour of the facility, a vast medical center, where Atkins

administers concoctions of his own creation to people suffering from a variety of disorders. Starting from the fifth floor, we went down to the third, and then from the third to the second, taking the elevator each time. It's a small point, but it did strike me as odd that I should be in the headquarters of the world's most popular weight-loss expert and be taking the elevator one floor at a time. After watching Atkins' show, I was escorted out by his public-relations assistant. We were on the second floor. He pressed the elevator button, down. "Why don't we take the stairs?" I asked. It was just a suggestion. He looked at me and then at the series of closed doors along the corridor. Tentatively, he opened the second. "I think this is it," he said, and we headed down, first one flight and then another. At the base of the steps was a door. The P.R. man, a slender fellow in a beautiful Italian suit, peered through it: for the moment, he was utterly lost. We were in the basement. It seemed as if nobody had gone down those stairs in a long time.

4.

Why are the Pima so fat? The answer that diet books would give is that the Pima don't eat as well as they used to. But that's what is ultimately wrong with diet books. They talk as if food were the only

cause of obesity and its only solution, and we know, from just looking at the Pima, that things are not that simple. The diet of the Pima is bad, but no worse than anyone else's diet.

Exercise is also clearly part of the explanation for why obesity has become epidemic in recent years. Half as many Americans walk to work today as did twenty years ago. Over the same period, the number of calories burned by the average American every day has dropped by about two hundred and fifty. But this doesn't explain why obesity has hit the Pima so hard, either, since they don't seem to be any less active than the rest of us.

The answer, of course, is that there is something beyond diet and exercise that influences obesity--that can make the consequences of a bad diet or of a lack of exercise much worse than they otherwise would be--and this is genetic inheritance. Claude Bouchard, a professor of social and preventive medicine at Laval University, in Quebec City, and one of the world's leading obesity specialists, estimates that we human beings probably carry several dozen genes that are directly related to our weight. "Some affect

appetite, some affect satiety. Some affect metabolic rate, some affect the partitioning of excess energy in fat or lean tissue," he told me. "There are also reasons to believe that there are genes affecting physical-activity level." Bouchard did a study not long ago in which he took a group of men of similar height, weight, and life style and overfed them by a thousand calories a day, six days a week, for a hundred days. The average weight gain in the group was eighteen pounds. But the range was from nine to twenty-six pounds. Clearly, the men who gained just nine pounds were the ones whose genes had given them the fastest possible metabolism--the ones who burn the most calories in daily living and are the least efficient at storing fat. These are people who have the easiest time staying thin. The men at the other end of the scale are closer to the Pima in physiology. Their obesity genes thriftilly stored away as much of the thousand extra calories a day as possible.

One of the key roles for genes appears to be in determining what obesity researchers refer to as setpoints. In the classic experiment in the field, researchers took a group of rats and made a series of lesions in the base of each

rat's brain. As a result, the rats began overeating and ended up much more obese than normal rats. The first conclusion is plain: there is a kind of thermostat in the brain that governs appetite and weight, and if you change the setting on that thermostat appetite and weight will change accordingly. With that finding in mind, the researchers took a second step. They took those same brain-damaged rats and put them on a diet, severely limiting the amount of food they could eat. What happened? The rats didn't lose weight. In fact, after some initial fluctuations, they ended up at exactly the same weight as before. Only, this time, being unable to attain their new thermostat setting by eating, they reached it by becoming less active--by burning less energy.

Two years ago, a group at Rockefeller University in New York published a landmark study essentially duplicating in human beings what had been done years ago in rats. They found that if you lose weight your body responds by starting to conserve energy: your metabolism slows down; your muscles seem to work more efficiently, burning fewer calories to do the same work. "Let's say you have two people, side by side, and these people have exactly the same body composition," Jules Hirsch, a member of the

Rockefeller team, says. "They both weigh a hundred and thirty pounds. But there is one difference--the first person maintains his weight effortlessly, while the second person, who used to weigh two hundred pounds, is trying to maintain a lower weight. The second will need fifteen per cent fewer calories per day to do his work. He needs less oxygen and will burn less energy." The body of the second person is backpedalling furiously in response to all that lost weight. It is doing everything it can to gain it back. In response to weight gain, by contrast, the Rockefeller team found that the body speeds up metabolism and burns more calories during exercise. It tries to lose that extra weight. Human beings, like rats, seem to have a predetermined setpoint, a weight that their body will go to great lengths to maintain.

One key player in this regulatory system may be a chemical called leptin--or, as it is sometimes known, Ob protein--whose discovery four years ago, by Jeff Friedman, of the Howard Hughes Medical Institute at Rockefeller University, prompted a flurry of headlines. In lab animals, leptin tells the brain to cut back on appetite, to speed up metabolism, and to burn

stored fat. The theory is that the same mechanism may work in human beings. If you start to overeat, your fat cells will produce more leptin, so your body will do everything it can to get back to the setpoint. That's why after gaining a few pounds over the holiday season most of us soon return to our normal weight. But if you eat too little or exercise too much, the theory goes, the opposite happens: leptin levels fall. "This is probably the reason that virtually every weight-loss program known to man fails," José F. Caro, vice-president of endocrine research and clinical investigation at Eli Lilly & Company, told me. "You go to Weight Watchers. You start losing weight. You feel good. But then your fat cells stop producing leptin. Remember, leptin is the hormone that decreases appetite and increases energy expenditure, so just as you are trying to lose weight you lose the hormone that helps you lose weight."

Obviously, our body's fat thermostat doesn't keep us at one weight all our adult lives. "There isn't a single setpoint for a human being or an animal," Thomas Wadden, the director of the Weight and Eating Disorders Clinic at the University of Pennsylvania, told me. "The body will regulate a stable weight but

at very different levels, depending on food intake--quality of the diet, high fat versus low fat, high sweet versus low sweet--and depending on the amount of physical activity." It also seems to be a great deal easier to move the setpoint up than to move it down--which, if you think about the Pima, makes perfect sense. In their long history in the desert, those Pima who survived were the ones who were very good at gaining weight during times of plenty--very good, in other words, at overriding the leptin system at the high end. But there would have been no advantage for the ones who were good at losing weight in hard times. The same is probably true for the rest of us, albeit in a less dramatic form. In our evolutionary history, there was advantage in being able to store away whatever calorific windfalls came our way. To understand this interplay between genes and environment, imagine two women, both five feet five. The first might have a setpoint range of a hundred and ten to a hundred and fifty pounds; the second a range of a hundred and twenty-five to a hundred and eighty. The difference in the ranges of the two women is determined by their genes. Where they are in that range is determined by their life styles.

Not long after leptin was discovered, researchers began

testing obese people for the hormone, to see whether a fat person was fat because his body didn't produce enough leptin. They found the opposite: fat people had lots of leptin. Some of the researchers thought this meant that the leptin theory was wrong--that leptin didn't do what it was supposed to do. But some other scientists now think that as people get fatter and fatter, their bodies simply get less and less sensitive to leptin. The body still pumps out messages to the brain calling for the metabolism to speed up and the appetite to shrink, but the brain just doesn't respond to those messages with as much sensitivity as it did. This is probably why it is so much easier to gain weight than it is to lose it. The fatter you get, the less effective your own natural weight-control system becomes.

This doesn't mean that diets can't work. In those instances in which dieters have the discipline and the will power to restrict their calories permanently, to get regular and vigorous exercise, and to fight the attempt by their own bodies to maintain their current weight, pounds can be lost. (There is also some evidence that if you can keep weight off for an extensive period--three years, say--a lower setpoint can be established.)

Most people, though, don't have that kind of discipline, and even if they do have it the amount of weight that most dieters can expect to lose on a permanent basis may be limited by their setpoint range. The N.I.H. has a national six-year diabetes-prevention study going on right now, in which it is using a program of intensive, one-on-one counselling, dietary modification, and two and a half hours of exercise weekly to see if it can get overweight volunteers to lose seven per cent of their body weight. If that sounds like a modest goal, it should. "A lot of studies look at ten-per-cent weight loss," said Mary Hoskin, who is coördinating the section of the N.I.H. study involving the Pima. "But if you look at long-term weight loss nobody can maintain ten per cent. That's why we did seven."

On the other hand, now that we're coming to understand the biology of weight gain, it is possible to conceive of diet drugs that would actually work. If your body sabotages your diet by lowering leptin levels as you lose weight, why not give extra leptin to people on diets? That's what a number of drug companies, including Amgen and Eli Lilly, are working on now. They are trying to develop a

leptin or leptin-analogue pill that dieters could take to fool their bodies into thinking they're getting fatter when they're actually getting thinner. "It is very easy to lose weight," José Caro told me. "The difficult thing is to maintain your weight loss. The thinking is that people fail because their leptin goes down. Here is where replacement therapy with leptin or an Ob-protein analogue might prevent the relapse. It is a subtle and important concept. What it tells you is that leptin is not going to be a magic bullet that allows you to eat whatever you want. You have to initiate the weight loss. Then leptin comes in."

Another idea, which the Hoffmann-La Roche company is exploring, is to focus on the problems obese people have with leptin. Just as Type II diabetics can become resistant to insulin, many overweight people may become resistant to leptin. So why not try to resensitize them? The idea is to find the leptin receptor in the brain and tinker with it to make it work as well in a fat person as it does in a thin person. (Drug companies have actually been pursuing the same strategy with the insulin receptors of diabetics.) Arthur Campfield, who heads the leptin project for Roche, likens the process by which leptin passes the signal about fat to the brain to a firemen's

bucket brigade, where water is passed from hand to hand. "If you have all tall people, you can pass the bucket and it's very efficient," he said. "But if two of the people in the chain are small children, then you're going to spill a lot of water and slow everything down. We want to take a tablet or a capsule that goes into your brain and puts a muscular person in the chain and overcomes that weakness. The elegant solution is to find the place in the chain where we are losing water."

The steps that take place in the brain when it receives the leptin message are known as the Ob pathway, and any number of these steps may lend themselves to pharmaceutical intervention. Using the Ob pathway to fight obesity represents a quantum leap beyond the kinds of diet drugs that have been available so far. Fen-phen, the popular medication removed from the market last year because of serious side effects, was, by comparison, a relatively crude product, which worked indirectly to suppress appetite. Hoffmann-La Roche is working now on a drug called Xenical, a compound that blocks the absorption of dietary fat by the intestine. You can eat fat; you just don't keep as much of it in

your system. The drug is safe and has shown real, if modest, success in helping chronically obese patients lose weight. It will probably be the next big diet drug. But no one is pretending that it has anywhere near the potential of, say, a drug that would resensitize your leptin receptors.

Campfield talks about the next wave of drug therapy as the third leg of a three-legged stool--as the additional element that could finally make diet and exercise an easy and reliable way to lose weight. Wadden speaks of the new drugs as restoring sanity: "What I think will happen is that people on these medications will report that they are less responsive to their environment. They'll say that they are not as turned on by Wendy's or McDonald's. Food in America has become a recreational activity. It is divorced from nutritional need and hunger. We eat to kill time, to stimulate ourselves, to alter our mood. What these drugs may mean is that we're going to become less susceptible to these messages." In the past thirty years, the natural relationship between our bodies and our environment--a relation that was developed over thousands of years--has fallen out of balance. For

people who cannot restore that natural balance themselves--who lack the discipline, the wherewithal, or, like the Pima, the genes--drugs could be a way of restoring it for them.

5.

Seven years ago, Peter Bennett, the epidemiologist who first stumbled on the Gila River Pima twenty-eight years earlier, led an N.I.H. expedition to Mexico's Sierra Madre Mountains. Their destination was a tiny Indian community on the border of Sonora and Chihuahua, seven thousand feet above the desert. "I had known about their existence for at least fifteen years before that," Bennett says. "The problem was that I could never find anyone who knew much about them. In 1991, it just happened that we linked up with an investigator down in Mexico." The journey was a difficult one, but the Mexican government had just built a road linking Sonora and Chihuahua, so the team didn't have to make the final fifty- or sixty-mile trek on horseback. "They were clearly a group who have got along together for a very long time," Bennett recalls. "My reaction as a stranger going in was: Gee, I think these people are really very friendly, very cooperative. They seem to be interested in what we want to do, and they are willing to

stick their arms out and let us take blood samples." He laughed. "Which is always a good sign."

The little town in the Sierra Madre is home to the Mexican Pima, the southern remnants of a tribe that once stretched from present-day Arizona down to central Mexico. Like the Pima of the Gila River reservation, they are farmers, living in small clusters of wood-and-adobe rancherías among the pine trees, cultivating beans, corn, and potatoes in the valleys. On that first trip, the N.I.H. team examined no more than a few dozen Pima. Since then, the team has been back five or six times, staying for as many as ten days at a time. Two hundred and fifty of the mountain Pima have now been studied. They have been measured and weighed, their blood sugar has been checked, and their kidneys and eyes have been examined for signs of damage. Genetic samples have been taken and their metabolism has been monitored. The Mexican Pima, it turns out, eat a diet consisting almost entirely of beans, potatoes, and corn tortillas, with chicken perhaps once a month. They take in twenty-two hundred calories a day, which is slightly more than the Pima of Arizona do. But on the average each of them puts in

twenty-three hours a week of moderate to hard physical labor, whereas the average Arizona Pima puts in two hours. The Mexican Pima's rates of diabetes are normal. They are slightly shorter than their American counterparts. In weight, there is no comparison: "I would say they are thin," Bennett says. "Thin. Certainly by American standards."

There are, of course, a hundred reasons not to draw any great lessons from this. Subsistence farming is no way to make a living in America today, nor are twenty-three hours of hard physical labor feasible in a society where most people sit at a desk from nine to five. And even if the Arizona Pima wanted to return to the land, they couldn't. It has been more than a hundred years since the Gila River, which used to provide the tribe with fresh fish and with water for growing beans and squash, was diverted upstream for commercial farming. Yet there is value in the example of the Mexican Pima. People who work with the Pima of Arizona say that the biggest problem they have in trying to fight diabetes and obesity is fatalism--a sense among the tribe that nothing can be done, that the way things are is the way things have to be. It is possible to see in the

attitudes of Americans toward weight loss the same creeping resignation. As the world grows fatter, and as one best-selling diet scheme after another inevitably fails, the idea that being slender is an attainable--or even an advisable--condition is slowly receding. Last month, when *The New England Journal of Medicine* published a study suggesting that the mortality costs of obesity had been overstated, the news was greeted with resounding relief, as if we were all somehow off the hook, as if the issue with obesity were only mortality and not the thousand ways in which being fat undermines our quality of life: the heightened risk of heart disease, hypertension, diabetes, cancer, arthritis, gallbladder disease, trauma, gout, blindness, birth defects, and other aches, pains, and physical indignities too numerous to mention. What we are in danger of losing in the epidemic of obesity is not merely our health but our memory of health. Those Indian towns high in the Sierra Madre should remind the people of Sacaton--and all the rest of us as well--that it is still possible, even for a Pima, to be fit.

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