CHAPTER 1

Introduction

What's the Problem?

A PERSONAL PROLOGUE

This book begins with me, even though starting this way makes me profoundly nervous. Over the years I've learned that just about all scholars have autobiographical connections to their research, although the connections don't always matter. I have an urge to come clean with mine, because I do have a personal stake in my arguments. Here at the outset I'm going to admit that I'm a foodie, and I'm going to have to convince you that I'm not a hypocrite. I'm going to admit that I'm not very thin, and I want to convince you that the current public conversation about obesity is wrongheaded. I'll even admit that I'm fairly privileged and still find much to fault in contemporary capitalism. In fact, the topics in this book come full circle for me. It all begins with my father.

My father was a "health food nut" long before natural foods were popularized. A sickly, bedridden child, in 1945 he moved to California as a young adult in search of the California dream and its promises of health. His first business was a health food store in Pasadena. Over the years, he followed and even befriended many of the health food gurus of the day, including Jack LaLanne, Paul Bragg, and John Robbins. He never met a dietary restriction he didn't like, constantly badgered his loved ones about weight and eating habits, and, while he valorized the "natural" above all, he too readily conflated the natural, the healthy, and the aesthetic. My father went from being a sickly, bedridden child to a singular specimen of physical health in adulthood, overcoming all odds of early death through his unflagging daily practices of rote exercise and orthorexic eating. (*Orthorexia* is a neologism that refers to self-imposed strictures concerning what foods one eats—a discipline now quite

fashionable.) At the age of eighty-five, he refused one bite of (as I recall, additive-free, organic) ice cream with his one beloved grandchild (my daughter) providing the temptation. He deemed this one bite poison and, as with many of his other refusals, took obvious pleasure in the denial. He died a year later in a bizarre accident, an apparent result of his Alzheimer's-diminished cognitive abilities and an ironic ending to a life defined by efforts to ensure longevity.

As for me, well, I drank raw milk as a kid, ate lots of meat (because at the time he thought it was healthy), and was allowed ice cream only once a year. If I wanted a treat, I had to eat carob-chip whole wheat cookies made with honey, which in the mid-1960s were truly awful, or our homemade peanut butter "candy" made of natural peanut butter, honey, and dried milk. When our family ate out, we never went to McDonald's or anything like it but ate at those late-1960s hippie restaurants that dotted Los Angeles, including the one where a famous scene in the movie *Annie Hall* was filmed. Early on I discovered how dietary strictures provoke desire, and I came to love Wonder Bread, found in the cupboards of my school-age friends' homes, and luncheon meat. By the time I went to college at UC Santa Cruz, I had come to love brown hippie food—but also Doritos and Budweiser.

As an adult living in Berkeley, California, I have long since dropped the Bud and Doritos and have developed a penchant for yuppie food. Like many others of my boomer generation, I first started drooling over restaurant menus in the 1980s and soon learned to love mesclun, or salad mix. In fact, my fascination with salad mix—then selling at fifteen dollars a pound—provoked the research that eventually became the subject of my first book, *Agrarian Dreams: The Paradox of Organic Farming in California. Agrarian Dreams*, which examines the production of organic food in California, shows how and why organic agriculture was unable to break away from the legacies of industrial farming in California. Much of it turned on California real estate, something I knew quite a lot about too, since many years ago my father shifted from health foods to the real estate business, another archetypal Southern California endeavor. Real estate figures in this book, too, because the kind of urban environments seen as *not* contributing to obesity tend to be extremely expensive places to live.

Today, as anyone who knows me will tell you, I'm one of those annoying San Francisco Bay Area foodies who shop at the farmers market once, twice, or sometimes thrice a week and get very excited about the deep yellow hues of egg yolks from pasture-raised hens, the sweetness of dry-farmed tomatoes, and the paradoxically relaxing work of shelling beans. I also read the food section

of the newspaper diligently, spend a good deal of my disposable income on food and wine, and, worst of all, can barely conceal my distaste for food that doesn't meet my particular standards of quality, which for me turns on how it was farmed and processed. Still, as I continue to fluctuate between both ends of the "overweight" category about which you will learn, one of my doctors has invoked the "obesity epidemic" to warn me to watch my weight. As my blood glucose level has crept just above the "normal" range, another one of my doctors has told me to cut down on sugar. For the record, I never drink sodas of any kind and I would wager that my diet is as close to what the food guru Michael Pollan recommends as his own. In researching this book, I now have reason to believe that my body mass and blood glucose levels, along with the hypothyroidism I have developed, may have something to do with environmental toxins. Or maybe just middle age. Of course, I will never really know.

To continue my story: After receiving my PhD in geography at UC Berkeley, I had the good fortune to join the Community Studies Department at the University of California at Santa Cruz (UCSC). Established in 1969 as a way to provide students an academically rigorous understanding of social change efforts, the community studies major has been an outstanding and unique laboratory for examining the shifts in social movement objectives, strategies, topics, and institutional forms over the past several decades. Tellingly, the past decade has seen unprecedented student interest in food and agriculture as both site and means of social transformation.

This interest owes its intensity, in no small part, to the pervasiveness of foodie culture on California's central coast and in the San Francisco Bay Area. As I discuss in *Agrarian Dreams*, UCSC and the county of Santa Cruz were ground zero for the US alternative food and agriculture movement. Today students at UCSC can be rapt in their devotion to various permutations of local, organic, vegan, and so forth. Witnessing this interest, my department created a position in local/global political economy of food, and I was hired in 2003 to accommodate the many students who wanted to work in this area. Student interest has grown even more since then, buoyed by the sheer number of people and organizations involved in alternative food. I use the term *alternative food* as shorthand to describe institutions and practices that bring small-scale farmers, artisan food producers, and restaurant chefs together with consumers for the market exchange of what is characterized as fresh, local, seasonal, organic, and craft-produced food. These have taken hold mainly in certain coastal regions and university enclaves, whose rarified

character can be measured by the degree to which my arguments will make more sense to those who live in or frequently visit those regions.

I tell you this because the insights my students bring from the community studies curriculum also figure in this book. To earn a community studies degree, a student is required to do field study with a social justice or social change organization full-time for six months. I have worked most closely with the students who work with organizations trying to transform food systems or otherwise address food- and environment-related inequities. How they first frame their social justice aspirations is telling. Many of my students want to enable people to make "healthy food choices" and even to "teach people how to eat." Typical statements to gain entry into the class include: "I would love to be a part of the food justice movement. . . . I would love to work with families that do not have the opportunity or proper education to live healthy and in harmony with the food they are living off of." Some have explicitly discussed obesity as evidence of the problem of inequity in the food system.

I refer to my students quite a bit in this book because I've come to see their comments as indicative of pervasive discourses in current food movements. My own research on food security and access to healthy food has shown me that my students' ideas are accurate reflections of how the alternative-food movement discusses social justice: namely, as a problem of lack of access to alternative food, with obesity as a consequence of this lack of access. In fact, what originally animated my interest in obesity as a research topic was that I observed activists invoking the obesity epidemic in support of programs to bring more fresh fruits and vegetables into the schools. I wondered how and why the alternative-food movement would latch on to this problem to which it could be a solution.

Meanwhile, I have watched my daughter make her way through the Berkeley public school system and, hence, exposed to the cooking and gardening curricula conceived by the chef-cum-activist Alice Waters. Although the goal of these programs is to connect children to nature and the taste of wholesome food, ideas about acceptable bodies have never been far off the agenda. In middle school, my daughter told me of how her cooking and gardening teachers discussed calorie counting. She also was asked to write a school essay on the value and ethics of student weigh-ins, and had been encouraged to watch cable television shows in which children policed their families' eating practices through various healthy eating initiatives. As a preteen she came to hear and know more about obesity, anorexia, and bulimia than I did at that age. As a

teenager she has clearly internalized norms of body and good food—both for better and for worse.

At one point I noticed that all of the food writers who are rightful critics of the modern food system, including Michael Pollan, Marion Nestle, Raj Patel, Eric Schlosser, and Jane Goodall, were taking up the cause of obesity in epidemic fashion. Following in the footsteps of several generations of writers and activists who have criticized industrial food for both the environmental effects of producing it and the probable health effects of eating it, Pollan stands apart in bringing these ideas to what is likely the broadest audience ever. If Amazon.com commentary and various blogs are at all reasonable indicators, his best-selling books have convinced many people of the ecological irrationality of the conventional food system and transformed many diets to include much more local, seasonal, and organic produce—and much less processed food and conventionally raised meat. His 2008 letter to the president-elect and "farmer in chief" and his vocal activism on the 2008 farm bill have brought long-absent public attention to food and farm policy by showing how it matters for more than just farmers (Pollan 2008a). And in foodie enclaves, especially in the San Francisco Bay Area, he has achieved a godlike status. I constantly hear him invoked in conversations at farmers markets, upscale restaurants, and food-related conferences, meetings, and fundraisers. It is precisely because he is having such a visible effect on the shape of food politics that I feel compelled to engage some of his claims in this book.

Having stated that, I want to make something very clear at the outset: although I take issue with alternative food, for reasons that will be elucidated in this book, *I am not an apologist for the conventional food system and this book should not be read as a defense of it*. I rarely disagree with Pollan or these other authors regarding their critiques of industrial food production and corporate influence on food policy. If anything, I find that Pollan's critiques, especially, do not go far enough since they don't effectively challenge inequality in the food system. Eating local, organic, seasonal food that you prepared yourself may be pleasurable but it is not universally so, nor is it tantamount to effecting social justice. Of course, Pollan is echoing what many in the alternative-food movement for years have asked us to do: buy sustainably produced food, so that the market will respond and the food system will eventually transform to provide food that is grown with attention to agroecological principles. Not only is that logic highly aspirational but also, as I will argue in this book, the alternative-food movement's embrace of, well, alternatives that are in seeming

opposition to what is bad in the food system works against broader transformation. This is because the creation of alternatives simultaneously produces places and people that for various reasons cannot be served by *an alternative* and therefore are put beyond consideration.

Obesity enters into this discussion because Pollan, more than any other food writer, has become carried away with linking growing girth to the US food system. In the *Omnivore's Dilemma*, for example, his primary narrative is that corn became the foundation of the national diet and made Americans fat. After *Zea mays* easily took hold in a variety of microclimatic conditions and outdid wheat in terms of its yield and easiness to grow, its strength turned into a weakness: corn was prone to systematic overproduction in US agriculture, so that even historically, surpluses ended up to no good, with corn liquor becoming the beverage of choice (and necessity) in pre-Prohibition drinking binges. Corn overproduction was later buttressed by a farm policy that subsidizes corn production to appease the farm lobby. Pollan then jumps to the omnipresence of corn in a fast-food meal: the high-fructose corn syrup that sweetens the soda, the feed of the steer that goes into the hamburger, often the oil that fries the potatoes, one of the many microingredients that stabilizes the bun. And he uses his own personal experiment to write about a broader "us" driving down the road and stuffing a McDonald's Happy Meal into our collective face, in a sort of daze of unnatural satiety. The narrative of corn is capped with what appears to be a simple fact. "When food is abundant and cheap, people will eat more of it and get fat" (p. 102).

One aim of this book is to make you question this claim—to show that it is not as simple as it appears. Why, for example, is food so cheap? Do people really eat it just because it is there? Do they eat more than they used to? Why isn't everyone fat? Simplified problems lead to simple solutions, and because local, organic, fresh, and seasonal food has been posed in opposition to all that is wrong with the food system, it is being posed as what is right for our bodies and health. So the solution has become education to encourage us to make a different set of choices. Never mind that the importance of organic, fresh, and local was constructed in advance of and independent of the obesity issue, so that this particular solution seems to have found a new problem. As a result of this articulation of problem and solution, we are being presented with a self-serving, self-congratulatory discourse that exalts certain ways of being and disparages others, and places blame in many of the wrong places. This is not only a superficial but also an unjust way to have this conversation. It may

be time to put other things on the table in addition to that healthy, organic, local food and pay closer attention to the problem. But what *is* the problem? I hope this book gives you an answer other than obesity.

AN INTERESTING PARALLEL

In April 2009, researchers at the London School of Hygiene and Tropical Medicine released a study that "showed" that obese people add more greenhouse gases to the atmosphere than thin people. Assuming that obese people eat and drive more than thin people, they deduced that the extra fuel devoted to feeding and transporting the obese was exacerbating global warming. As one of the principal investigators, Phil Edwards, put it, "The main message is staying thin. It's good for you, and it's good for the planet" (Landau 2009).

This was not the first time obesity was linked to global warming, or environmental degradation and resource depletion more broadly. In a 2006 article titled "Luxus Consumption: Wasting Food Resources through Overeating" (Blair and Sobal 2006), the authors described several calculations they had made to ascertain "the impact of eating on the ecosystem" based on current estimates of obesity rates in the United States. They stated that the 4.5 kg of extra fat each person, on average, is carrying (a total of 9.9 trillion kcals in the national population) would be released as CO_2 at that person's death (p. 65). They also argued that the 600 calories per day per capita increase made available between 1983 and 2000, of which they estimated 400 calories were eaten and 200 wasted, was using an additional 0.36 hectares of land per capita, for a total of one hundred million hectares going to produce this excess food (p. 67). They concluded by pointing to the utility of "luxus consumption" as a concept that has great potential to motivate and offer students, in particular, a link between overconsumption and environmental degradation (p. 71). Using similar logic, another set of authors argued that more "temperate behavior" would lead to better environmental protection (Cafaro, Primack, and Zimdahl 2006).

In certain respects, these studies appear to be opportunities to link and amplify crises (e.g., obesity *and* global warming) rather than explain them. Casting individual consumption practices as the source of public health and environmental problems, even those as complex as global warming, is a coarse analysis at best. That they are linked at all demonstrates the persistence of

Malthusian thinking. Thomas Malthus's argument, first published in 1798, is that unchecked population growth would outstrip food production. The claims in these articles from 2006 and 2009, though, are more of the *neo*-Malthusian sort. Rather than too much reproduction, the problem is too much consumption; rather than too little food production, it is broader environmental degradation and resource shortage. Who is to blame? For Malthus, the responsibility for population outstripping resources lay most squarely with poor people, who, he believed, could not curb their sexual appetites because of their ignorance or negligence. For the authors of the recent studies, the problem lies with those who appear to be uneducated about or negligent of the impact their eating has on both their bodies and their carbon footprints.

There's much to critique in this line of argument, not the least of which are the ideas that appetite is a driving force of how food is produced and distributed and that insufficient food production causes hunger. I hope that by the end of this book you will be skeptical of these claims and others embedded in that argument, especially the idea that body size affects planetary health. But I begin here for another reason: to draw parallels between representations of the obesity epidemic and of the global warming crisis. I emphatically do not deny that the earth's atmosphere has warmed or that people in the United States have gotten bigger over the past thirty years. Rather, I want to point out how ways of looking at these phenomena shape our understanding of what might be done about them. Much of our knowledge of global warming is an artifact of computational models of global climate change that include certain biophysical phenomenon and not others and use computer simulation in lieu of observational measurements. That doesn't make them wrong, but it does make them partial (Demeritt 2001). The causes of global warming are complex and interactive, a convergence of a variety of human-induced activity and secular patterns in earth-sun relations, and yet the current scientific consensus is that reducing CO_2 emissions is what must be done. This prescription leads to a disproportionate focus on individual consumption choices about which people should be educated rather than, say, a focus on enacting policies that would enforce corporate accountability, or on mitigating the consequences for those most harmed (Forsyth 2003).

Analogous points can be made about obesity: although people have certainly gotten bigger since 1980, the "obesity epidemic" is an artifact of particular measurements and norms for assessing pathology. The causes of

the rise in obesity are complex and interactive, and yet the current public health consensus is that reducing calorie intake, along with increasing calorie expenditure through exercise, is what must be done. Those who want to redress the problem put a great deal of effort into educating people to making better choices rather than into reforming the policies that allow bad food to be produced or mitigating the consequences for those most harmed. Yes, human bodies are different from the earth in the realm of the individually controllable, but perhaps not as much as you think.

Commonsense explanations of and solutions to both global warming and obesity are examples of what the environmental geographer Paul Robbins (2004) has called "apolitical ecologies," explanations of environmental degradation or resource depletion that do not account for social power in either *producing* environmental changes or *defining* them as problems. Instead, apolitical explanations posit that environmental degradation results from the aggregation of uninformed people making bad decisions, about which they should be educated. Political ecology, in contrast, subscribes to the idea that social, cultural, and political-economic relations profoundly affect both the materiality of the biophysical world and our understanding of it. So how might this apply to obesity?

TOWARD A POLITICAL ECOLOGY OF OBESITY

Obesity, I suggest, is an ecological condition that, like global warming, requires, if we are to understand it in a comprehensive way, that we pay attention to the broader political-economic and cultural context in which individual decisions affecting ecologies—even internal, bodily ecologies—are made (and human bodies do have ecologies). It also requires that we pay attention to the role of corporate behavior, state regulation, and the political economy more generally in producing or allowing pollution, degraded food, and problematic built environments, irrespective of the "choices" people make. At the same time, obesity being a condition that not all would agree is a problem, much less an illness, understanding it requires that we pay attention to how knowledge of obesity as a biological condition is constructed and interpreted. As it happens, the human-environment tradition in geography and cognate fields has much to offer on questions of health and illness, and many of the insights it has yielded in regard to the environment "out there" may be applicable to questions of bodily health "in here," and obesity in particular. In what follows, I draw on

key insights from political ecology and science studies to suggest some of the ways we might consider obesity through these lenses.

Producing Ecological Problems

As a scholarly field, political ecology "combines the concerns of ecology and a broadly defined political economy" (Blaikie and Brookfield 1987: 17). It first developed in academic geography, anthropology, and rural sociology in response to once-standard explanations of human-induced environmental changes in the developing world, many of which were decidedly Malthusian. These explanations tended to attribute land degradation to direct resource users' lack of education or will to use resources wisely. Early political ecologists strove to show how seemingly destructive environmental behaviors needed to be understood in the context of broader political-economic forces. For example, a seminal work on soil erosion in developing countries discussed that Nepalese peasants who farmed on steep Himalayan hillsides were skilled land managers who built and tended terraces to prevent erosion. The extent to which they neglected sound practices often reflected their need to work away from their farms or produce more because of poor prices or the "rent-seeking" practices of an extractive state (Blaikie 1985). Political ecologists urged that individual behavior be understood within a "chain of explanation," referring to the entirety of interlinking forces beyond the direct resource user (Blaikie and Brookfield 1987).

The idea that broader political-economic forces shape the conditions in which overexploitation, degradation, or pollution of natural resources occurs is one of political ecology's most important theses (Robbins 2004). Surely, this can be seen in the case of the CO_2 emissions responsible for global warming, which political ecologists would attribute to corporate malfeasance or the necessity of unfettered economic growth rather than individual consumers' decisions to use incandescent light bulbs. Apropos of contemporary US agriculture, a farmer's decision to use toxic pesticides is often a matter of economic survival to ensure against crop loss since prices offered by buyers are notoriously low, with low prices often a result of state efforts to enhance farmers' productivity (see chapter 6). Yet, as we shall see, those pesticides may contribute to obesity. Similarly, consumers' choices may be highly constrained by forces far removed from their everyday lives, from the agricultural policies that have encouraged the substitution of high-fructose corn syrup for cane sugar to the economic development policies that have created urban

environments that lack grocery stores with healthful food. To the extent that eating and exercise behaviors contribute to obesity, these behaviors don't happen in a vacuum of social possibility.

It is not only through individual decisions and behaviors that people may have become bigger, however. It appears that some of the growth in girth is environmentally caused in a more direct sense. This suggests a need to engage with environmental health and justice scholarship, which has considered the more immediate relationships between environment and health. This scholarship was begat by a social movement that arose in the US domestic context. The environmental health movement responded to mainstream environmentalism's long-standing dedication to wilderness preservation and relative neglect of urban, industrial environments' effects on health (Gottleib 1993). Both the movement and supporting scholarship have also emphasized health inequalities: that different environments can produce differential life chances since groups marginalized by their race, class, gender, or citizenship status tend to be disproportionately exposed to health-depriving conditions in their jobs, neighborhoods, and home environments or have less access to health-giving environmental amenities (e.g., open space) (Pulido 2000; Shrader-Frechette 2005; Sze 2007). Interestingly, the newly emerged food justice movement has borrowed heavily from these ideas to frame the lack of access to healthy food and the prevalence of obesity in certain neighborhoods as an environmental injustice (Alkon and Agyeman 2011). Though important, such accounts effectively emphasize constrained choice rather than the more direct ways that the environment can affect health.

The probable role of environmental toxins in obesity (see chapter 5) would seem to require a more traditional reading of environmental justice perspectives that focuses on the effects of industrial processes and pollutants on bodily health, irrespective of behavior. It also calls for more engagement with the ecology of disease, specifically how environmental conditions work materially with bodies to debilitate them (Mayer 1996). Newer work on the ecology of health points to exciting ways forward. As put by Nancy Langston in her book *Toxic Bodies* (2010: 147), a separation between the body and the environment is impossible to sustain, since "the body is enmeshed in a web of relationships, not isolated in a castle." In her book *Inescapable Ecologies*, Linda Nash (2007) recites the multiple ways that the putative boundary of the body is permeated, through, for example, inhalation, ingestion, epidermal absorption, insect bites, suckling of breast milk, and open wounds. The work of the ecologist Sandra

Steingraber (1997) has been particularly exemplary in articulating some of the biological pathways between the ecologies of agricultural landscapes and of humans. By drawing attention to the effects of toxic exposures, both she and Langston highlight the social causes of cancer and developmental disorders far beyond individual decision making, and often attributable to a failure of environmental regulation. Their emphasis on prenatal exposures to toxins is especially significant for obesity, in light of the emerging evidence I will discuss.

Discovery of the possibility that environmental toxins are contributing to obesity offers the hope that attention will shift away from individual lifestyles and the social scolding that accompanies that focus. As Phil Brown discusses in *Toxic Exposures* (2007), social movements have worked assiduously to reframe "contested illnesses" such as asthma, breast cancer, and Gulf War syndrome as caused by environmental exposures rather than lifestyle factors, precisely to draw more regulatory attention. Yet, it is equally important to consider why fat people (and others) might reject disease labels, even those that may be environmentally caused. Being pinned with a disease has consequences, which can include denial of health care or relegation to victim status (LeBesco 2004). In general, environmental health and justice approaches have been less concerned with the politics of disease knowledge and interpretation (Harper 2004: 298). It seems, though, that illnesses that are truly contested, such as obesity, beg for that sort of analysis.

Interpreting and Representing Ecological Problems

As it happens, political ecologists have been equally engaged in questions of knowledge production and interpretation of states of nature. This is because they were also responding to top-down evaluations of what constitutes "degradation." Many studies showed that ideas of degradation and overuse were inaccurate and infused with colonial or neocolonial ideas about land users' ignorance. For instance, in direct contradiction to narratives of deforestation promulgated by international development institutions, an investigation of forest cover in West Africa found that it was actually increasing, thanks to peasant practices (Fairhead and Leach 1995). Political ecologists also demonstrated that ideas of degradation were not only contested but also often used in the service of controlling and further marginalizing populations. For example, wildlife protection in Tanzania entailed the eviction and resettlement of native populations into increasingly smaller areas at the expense of traditional livelihood practices (Neumann 1998). These sorts of findings inspired broader

concern with the politics of knowledge and representation in political ecology: for example, questions such as how we assess a degraded landscape and what purposes are served by calling an environmental problem a crisis (Robbins 2004). Given the tendencies to assess obesity in terms of illness and to apply crisis narratives (e.g., the obesity *epidemic*), such approaches are surely relevant.

Interpreting health "in here" is no less fraught than interpreting nature "out there." Both rely on ecological and biological sciences to render them understandable. Despite facile claims to the contrary, how we know nature, even through science, is always through human eyes, experience, passions, desires, and often competing rationalities (Williams 1980). If anything, health is even more complex since our own feelings, sensations, and observations of bodily processes allow us to report on, but also affect, our health. Significant cultural variations in the experience of childbirth pain, for example, suggest that pain cannot be reduced to the firing of synapses. As so wonderfully depicted in the book *The Spirit Catches You* (Fadiman 1998), the story of a Hmong child afflicted with epilepsy living in California, disease more generally is subject to interpretation. In this girl's case, doctors were continually frustrated by her parents' refusal not only to give the child medicine as directed but also to interpret the disease as life-threatening in the way the doctors did.

Still, scientific interpretation is not simply an issue of cultural relativism. (Few adhere to the "hard constructivism" or "cultural relativism" that denies the existence or knowability of a reality outside of language; Demeritt 1998.) The more germane point is that scientific discovery and reporting take place in social contexts, so knowledge of health and environmental problems necessarily reflects the manifold social relations that affect science: from grantor funding priorities to peer review to personal friendships (Hess 1997). For these reasons, it is important to scrutinize the practice of science as much as what it describes, for example, by tracing "the ways in which social interests, values, history, actions, institutions, networks, and so on shape, influence, structure, cause, explain, inform, characterize, or constitute the content of science and technology" (Hess 1997: 82). Funding and peer review have demonstrably affected obesity science, for example; perhaps practitioners' displeasure with fatness has, too. This suggests the usefulness of what some call a science studies approach, which examines how and for whom scientific knowledge is produced as a way to promote reflexivity about the scientific process (Reardon 2005).

Such an approach is particularly useful for engaging politically with biophysical factors that exist independent of explicit political-economic

conflicts or outside of human experience, such as human physiological processes (Forsyth 2003: 7). What Forsyth calls a "critical political ecology" combines the insights of political ecology and science studies to allow for politicized explanation beyond the kind offered by political economy (p. 7). For him, the "aim is to highlight as far as possible the implicit social and political models built into statements of supposedly neutral explanation in order to increase both the social equity of science and its relevance to environmental problems experienced within diverse social settings" (p. 20). He suggests a number of tools toward this end, one of which is attention to metaphors and semiotics in representations of biophysical processes.

The use of metaphors to understand and explain bodily function is ubiquitous in matters of health. Yet medical experts often are not mindful of the metaphors they use to translate their findings to a broader public and, because those metaphors hold such cultural power, the public is usually not mindful of what messages they convey. Such mindfulness is important, though, since metaphors tell larger stories about what is ostensibly normal. Emily Martin's (1991) seminal work (pun intended) on the egg and the sperm tells of the inherent sexism of classic renditions of the active sperm penetrating the passive egg, even though some biologists have determined that the egg actively "selects" sperm. She also discusses how menstruation is often represented as waste from an unsuccessful fertilization rather than a regular cleansing of the uterus. Note that Martin uses metaphors, too; they are indeed unavoidable—and that is the point. How we know health depends on how we talk about it, and how we talk about it shapes how we think about it.

Scientific discussions of obesity employ all sorts of metaphors that paint the picture in generally unflattering ways. Fat cells are often portrayed in ways similar to fat people: they are described as yellow, bloated, greasy, flabby. This is despite research that shows that fat cells can play an important role in regulating appetite and metabolism. In that vein, the use of metaphors of pathology and adaptation bears scrutiny as well. Evolutionary biologists, for example, talk about the mismatch of our evolutionary heritage with our modern lifestyle and particularly the tendency to store fat, a tendency that was once adaptive and has become pathological (Power and Schulkin 2009). But what exactly makes it pathological—that it is debilitating or merely unsightly? More fundamentally, how do metaphors of adaptation and pathology more generally shape understandings of acceptable bodily change?

Forsyth (2003) also directs attention to the specific tools and techniques used to measure environmental—and thus health—problems. What others have called "artifactual constructivism" concerns the techniques, laboratory practices, conventions, observational methods, instrumentation, and measurements that produce scientific facts, an approach that, incidentally, has been applied to global climate change models (Demeritt 1998). Examining how tools and techniques shape scientific findings and thus knowledge is highly significant in medical science, which relies on hundreds, if not thousands, of such tools and techniques to experiment, measure, and diagnose. Imaging technology, biosampling, and patient questionnaires are just a few such techniques that are necessarily imperfect in what they can portray. As we shall see in chapter 2, tools developed from epidemiology to quantify the obesity epidemic favor the easily measurable or quantifiable, such as the body mass index, and draw inferences about pathology based on statistical conventions such as the bell curve.

Although much of the focus thus far has been on how the social shapes science, it is equally instructive to consider causality in the opposite direction: how new technologies and scientific findings shape and even create new social relationships (Hess 1997: 83). The notion of coproduction offers that reciprocity. Coproduction recognizes that the production of scientific knowledge is simultaneously the production of social order (Jasanoff 2004). Jenny Reardon's use of the term *coproduction* is particularly sensitive to the ways that scientific objects and phenomena are brought into being in the course of studying them. In her research on the Human Diversity Project, for example, Reardon (2005) found that efforts to study human origins independent of "race" tended to reinscribe racial categories because all attempts at defining populations to be sampled relied on various preconceived ideas about the category of race! Efforts to understand obesity as a scientific problem provide numerous examples of coproduction. As we shall see in chapter 4, studies that have attempted to show *that* (crucially, not *whether*) the built environment makes us fat are rife with already existing assumptions about the causes of obesity as mediated through the environment.

Perhaps the most important concept from science studies that applies to obesity is that of problem closure. Problem closure occurs when a specific definition of a problem is used to frame subsequent study of the problem's causes and consequences and thus precludes alternative conceptualizations of the problem (Hajer 1995: 22). Problem closure can entail defining the purpose