12. Editors’ note: Another of these experiments has been the rise of microfinance, of which the most famous example is probably the Grameen Bank. For more on the Grameen Bank and its founder Muhammad Yunus, see Muhammad Yunus (with Alan Jolis), Banker to the Poor (Karachi and New York: Oxford University Press, 2001).


15. The World Factbook of the U.S. Central Intelligence Agency gives an estimate of U.S. life expectancy at birth in 2010 as 78.11 years, placing it forty-ninth on its list; this chart is available online at https://www.cia.gov/library/publications/the-world-factbook/rankorder/2102rank.html.


17. From The World Factbook chart previously cited, life expectancy at birth for the European Union is estimated at 78.82 years for 2010, giving it a ranking of forty-first (with several European countries ranked higher than that, including France, Sweden, Switzerland, Italy, Monaco, Liechtenstein, Spain, Norway, the Netherlands, and Germany). For energy use, see the U.S. Energy Information Administration’s website (previously cited), Independent Statistics and Analysis, International Energy Statistics, and search by total primary energy consumption per capita. The site gives the U.S. per capita energy consumption for 2008 as 327 million BTU and Europe’s as 143 million BTU.


to distract attention from the overall problem of climate change and the specific problem of the melting of glaciers.

All over the world, the melting of glaciers threatens agriculture. For example, agriculture in California depends on rivers fed by snow melt from the mountains of the Sierra Nevada. Snow falls in the winter and melts throughout the summer and is a source of water for farming. By the end of the century, maybe sooner, those rivers will run dry during the summer, the peak of the growing season. There is not enough space to build reservoirs to make up for the natural capacity of the mountains. This is true throughout the western United States. The concern in the Himalayas and in the Tibetan plateau is similar; the rivers there sustain agriculture for three billion people.

Bill McKibben gives us hope by reminding us of the involvement of people around the world and the example of the ability to motivate them. He also appeals to human values, values we share. That appeal touches me powerfully, particularly because climate scientists are uncomfortable talking about values. We like to talk about observations. In thinking about values and the value of human flourishing, of simplicity, I am enticed by McKibben’s question: could we do less, could we actually live better with less? Part of me aspires to that. Yet, when I think about the world energy systems to which we have become accustomed and which have greatly improved the quality of our life in many ways, part of me worries that less is not enough.

Let me explain what I mean. Many of us, especially those interested in the environment, have a romantic attraction to simplicity, to a life lived simply and in harmony with nature. I suspect we share an uncomfortable intuition that many of the world’s problems, including climate change, come from modern technology and the overconsumption of natural resources. If only we could convince everyone to live simpler lives and consume less, perhaps our relationship with nature would move back into balance. At the same time, we should not be naïve about how much we depend on technology. I do not mean only our computers and smart phones, although I am as addicted to those gadgets as anyone. I am thinking more about areas such as health technology. Most people would prefer to live here in Cambridge, Massachusetts, today than to live as an average person in many developing countries because of the differences in infant mortality, adult mortality, and many other health care differences that we take for granted.

In terms of climate change, it turns out that living with less is really not enough. Even if the average person in the world emitted as much greenhouse gases as the average Chinese person—four times less than the average American—we would still have a terrible climate problem. Solving climate change means getting to zero emissions—and that means new technology and lots of it. Convincing people to live with less could reduce energy demand and perhaps slow the rate of greenhouse gas emissions in the future, but I fear that the widespread adoption of zero-energy technology may come quicker in a rapidly growing economy, with people wanting more and better technology. Of course, we still have a lot of work to make sure that the low-carbon technology is indeed cheaper and better. But therein lies the challenge.

I am worried about the tough choices that lie ahead. How will a social movement for acting on climate change deal with those tough choices? Many of the social movements that I have read about and studied over the years have had relatively simple and relatively few ideas or principles to apply. Again with climate change we face some very hard choices and complex tradeoffs. For example Bill McKibben talked about the virtues of distributed energy; in particular he mentioned the solar panels on his home. Solar panels and photovoltaics are expensive; he is fortunate to be able to afford them. Most people in this country would find the cost prohibitive, at least right now. And there are other hard choices. For example, the density at which you can extract energy from the wind is about one watt per square meter, when you average out the spacing of windmills. By way of comparison, the amount of energy you can extract from a square meter of land in a coal mine in Wyoming is approximately a thousand times that of a wind farm, assuming you extract coal over a hundred years. A coal mine is ugly, but it is very dense and confined to a comparatively small area. I am not trying to minimize the horrible effects of burning coal. However, when we talk about wind power as an alternative, we are not talking about building a few windmills, but thousands upon thousands of them. Already Cape Wind in the Nantucket Sound of Massachusetts has garnered strong resistance. Similarly, environmental groups have opposed plans for a solar thermal plant in the Mojave Desert because of concerns over endangered species.
Over the last forty years, environmental groups around the world, but especially in the United States, have defined themselves and built their memberships on the basis of opposition to development. Part of this is grounded in the idea of wilderness and its conservation: essentially, environmental groups have lobbied against new building. They have espoused the spirit of what McKibben evoked: let us make do with less.

In contrast, fixing climate change will be a bigger construction project than any other in the last fifty years. It will make building the interstate highway system seem trivial. It is about replacing the infrastructure that has driven the industrial revolution around the world over the last 250 years. And it will cost money: more than 1 percent of Gross Domestic Product (GDP) per year is my guess (and probably closer to 2 percent), but it could be more. For the United States that would be at least two hundred billion dollars a year. We are probably willing to spend twenty billion a year; we are not ready to spend two hundred billion. If the United States spent two hundred billion for thirty years and all the other countries in the world spent proportional amounts, we could fix the problem. It is about building; it is about construction; it is about steel in the ground and concrete and massive building projects—and every single one of them will be opposed by some people who do not want that project located at that particular site. I doubt that Bill McKibben wants windmills throughout the Adirondacks, and neither do I. Wilderness is important, too. If we do not want windmills in the Adirondacks or in Nantucket Sound, where do we agree to put them? These are choices with which we have not yet grappled.

We must have a social movement to support the changes that are needed to address global warming, but it will have to be a social movement unlike any other. Those within it will have to step forward and make difficult decisions, supporting tradeoffs. It is difficult to unify people when they disagree about which tradeoffs should be made. How will we navigate these choices?

It is a tough time to be a climate scientist and tough to be anyone who knows and cares about what is happening to our planet. None of us know whether we will be able to organize and alter human systems soon enough to matter. Despite my concerns and caveats, Bill McKibben’s words and actions give us hope for that possibility.

Notes
2. ibid. 2. Similarly, the percentage of those believing that there is evidence of global warming dropped from 71 percent in 2008 to 57 percent in 2009. On the somewhat positive side, the latest survey report shows little decline in those percentages for 2010, with 59 percent believing in global warming and 34 percent believing global warming is due to human activity. See Pew Survey Report, “Little Change in Opinions about Global Warming,” October 27, 2010, 2, http://people-press.org/report/669/.
3. See for example, The Washington Times, “Lobbyists Seek Profit in ‘Going Green,’” April 22, 2009, which quotes the Center for Responsive Politics (CRP) as saying that the number of lobbyists working on energy and environmental issues before the U.S. Congress increased to 7,811, an increase of 6 percent over 2007, while related lobbying fees grew to $389 million, an increase of 43 percent over 2007. The same article also discusses an $8 million advertising campaign by the American Coalition for Clean Coal Electricity (ACCE). See also the Center for Public Integrity’s website section on the global climate change lobby for a general overview (http://www.publicintegrity.org/investigations/global_climate_change_lobby/). As of the end of 2009, they estimated the number of climate change lobbyists in the United States at close to 3,000, a 400-percent increase since 2003, with 80 percent of the lobbyists working to slow down responses to climate change (Marianne Lavelle and M.B. Pell, “The Climate Lobby from Soup to Nuts,” December 27, 2009). See also the CRP’s website and its statistics on lobbying by industry sector (http://www.opensecrets.org/lobby /top.php?indexType=), gathered from the Senate Office for Public Records; for 2010, CRP estimates the energy industry spent $435 million on lobbying (CRP, “Energy and Natural Resources: Sector Profile, 2010”).
5. See the website of Save Our Sound, http://www.saveoursound.org. As the main organization of opposition, they list recent news articles from their perspective.
7. The 2010 GDP of the United States is almost 15 trillion dollars; see Bureau of Economic Analysis, U.S. Department of Commerce, Press Release: “Gross Do-
Flourishing and Its Enemies: The Ideology of Self-Interest as Self-Fulfilling

Barry Schwartz

So far as I am aware, we [i.e., Western society] are the only society that thinks of itself as having arisen from savagery, identified with a ruthless nature. Everyone else believes they are descended from gods... Judging from social behavior, this contrast may be a fair statement of the differences between ourselves and the rest of the world. We make both a folklore and a science of our brutish origins, sometimes with precious little to distinguish between them.

—Marshall Sahlins¹

Suppose you are directing a daycare center and encounter a problem. The center closes at 6 PM, but a significant number of parents habitually pick up their kids ten to fifteen minutes late. This is justifiably annoying to your staff, which regards lateness as a sign of disrespect. You tack up reminders of the daycare center’s hours. You send notices home. But the problem persists. Your warnings become more strident and moralistic, to no avail. You seem to be stuck. Parents know that you cannot close up and leave toddlers outside and alone.

In desperation, you impose a modest fine for lateness, less than the cost of a parking ticket. Will this solve the problem? Uri Gneezy and Aldo Rustichini found out through an experiment at Israeli daycare centers. Prior to the fines, parents were coming late about 25 percent of the time. When the daycare centers introduced fines, the percentage of latecomers rose! As the fine imposition continued, lateness continued to increase, almost doubling by the sixteenth week. The daycare centers then discontinued the fines. Lateness increased even more.²