

# Philip E. Tetlock & Michael Oppenheimer

## *The boundaries of the thinkable*

Be it conservatism or liberalism, Marxism or libertarianism, or our topic at hand – environmentalism – all ‘isms’ come with conceptual boundaries – and litmus tests for which opinions fall inside or outside the bounds of reasonableness for that ‘ismatic’ worldview. Can a good conservative back abortion rights or higher marginal tax rates? Or a good liberal condone racial profiling? Or a good communist support China’s

transformation into a capitalist state? Or a good pacifist endorse military intervention in Darfur? Or a good environmentalist support pollution trading permits, French-style nuclear-energy programs, or the Copenhagen Consensus’s low-priority ranking of the threat posed by global warming?

These questions resist precise answers because ‘isms’ don’t obey the norms of classical logic (notwithstanding the occasional efforts of thought police to lay out well-defined necessary and sufficient conditions for category inclusion and exclusion). ‘Isms’ are best viewed as fuzzy sets with porous, shifting boundaries – and as organized around prototypes. This means that although it is easy at any given juncture in history to design a prototypic ‘ismatic’ belief system (informed observers can rattle off with high interjudge agreement the positions, pro and con, that the prototypical ‘true believer’ should take), it is hard to say at what point one has added or subtracted enough features to or from the prototype that it no longer falls in its original category – and the liberal has become a conservative or vice versa (hence the frequent need for transition categories like ‘neoconservatives’ and ‘neoliberals’).

Political psychologists have a long-standing interest in how communities

---

*Philip E. Tetlock holds the Mitchell Endowed Chair at the Walter A. Haas School of Business at the University of California, Berkeley. He is the author of “Expert Political Judgment: How Good is It? How Can We Know?” (2005) and coeditor of “Unmaking the West: What-If Scenarios That Rewrite World History” (with Geoffrey Parker and Richard Ned Lebow, 2006).*

*Michael Oppenheimer is Albert G. Milbank Professor of Geosciences and International Affairs at Princeton University. He is the author of more than eighty journal articles and coauthor of “Dead Heat: The Race Against the Greenhouse Effect” (with Robert H. Boyle, 1990). He is also a science advisor to Environmental Defense, but the views expressed here are his own.*

---

© 2008 by the American Academy of Arts & Sciences

of cobelievers define the boundaries of the thinkable and where they set their thresholds for issuing fatwas, excommunicating deviants, excluding former participants from coalitions, or just shunning someone at a cocktail party. Our starting point is Tetlock's sacred value protection model (SVPM),<sup>1</sup> which takes as its starting point an undeniable fact of political life: the tendency of like-minded souls to coalesce into communities of cobelievers dedicated to defending and advancing shared values. The SVPM posits that cobelievers seek reassurance from each other that their beliefs are not mere social conventions but rather are anchored in backstop or sacred values beyond challenge. These values can be as diverse as the causes around which human beings cluster: in pro-life communities, it would be bizarre to challenge the sacred mission of saving the unborn; in libertarian communities, it would be bizarre to challenge the sacred status of property rights; and in scientific communities or groups relying on scientific expertise, it would be bizarre to challenge the notion that assertions about nature can be tested objectively (within a range of uncertainty) and deep truths revealed. Those foolish enough to ask why sacred values are so special – what is wrong with stem cell research or faking data or redistributive taxation? – reveal themselves to be dim-witted or ill-intentioned outsiders who just don't get it.

Here it is worth pausing to note that our topic at hand – elite environmentalist organizations – already poses a special challenge to our analytic framework. Insofar as these organizations attach a

sacred status to both moral values, such as a commitment to be good custodians of the planet for the sake of future generations, and scientific values, such as a commitment to abandoning preconceptions about what constitutes good custodianship in response to dissonant evidence, these organizations inevitably straddle the boundaries of politics, science, and increasingly religion. Straddlers, so defined, are especially vulnerable to the most psychologically painful type of value conflict – that between competing sacred values. The canonical dilemmas are those in which either fidelity to scientific norms requires acknowledging evidence that undercuts a policy stance one prefers on moral grounds, or fidelity to moral-political objectives requires ignoring or discounting evidence that one knows has probative scientific value. Hypothetical examples of the former dilemma might be: 'I detest the nuclear power industry but increasingly see it as a key part of the solution to global warming,' or 'I find emissions trading ethically distasteful but must admit that it seems to work quite well.' Examples of the latter might be: 'If I acknowledge this flaw in these computer models of global climate, critics will seize on it to stall even more,' or 'If I concede that this geoengineering proposal has merit, it opens the door to a wave of far more dangerous schemes.'

These sources of ambivalence complicate applying the SVPM, for it is much easier to predict the behavior of individuals and organizations not torn by clashing sacred values – those with no compunctions about suppressing inconvenient facts or about inventing convenient ones.

With these caveats, we push forward. Drawing on a long list of social scientists over the past century, especially Emile Durkheim, the SVPM identifies two typ-

1 P. E. Tetlock, "Social-Functionalist Frameworks for Judgment and Choice: The Intuitive Politician, Theologian, and Prosecutor," *Psychological Review* 109 (2002): 451 – 472.

ical methods that moral communities use to defend sacred values: moral outrage and moral cleansing. The model also identifies a powerful class of variables capable of modulating moralistic responses: real-world constraints.

The model defines moral outrage as an aversive arousal state, with cognitive, affective, and behavioral components: harsh trait attributions to norm violators, anger and contempt aimed at them, and enthusiastic support for thought police charged with enforcing both norms and the meta-norm of punishing those who fail to punish norm violators. It is worth stressing that the model predicts sharp reactions against even those caught contemplating taboo trade-offs or contaminated compromises. The psycho-logic here is that of 'constitutive incommensurability': our commitments to other people require us to deny that certain things are comparable (e.g., valuing lives in dollars). Constitutive incommensurability arises whenever treating a value as commensurable subverts one of the values in the trade-off calculus. In this sense, taboo trade-offs are morally corrosive. The longer observers believe that a decision maker has contemplated an indecent proposal, the harsher their assessments of that person's character, even if that person ultimately comes around and makes the right choice and affirms the sacred value.

Moral cleansing is identity repair, efforts by those who feel contaminated by psychological proximity to norm violations to persuade in-group members not to direct moral outrage at them. For instance, the closer one's working relationship with a norm violator, the greater one's need will be to engage in symbolic acts of moral cleansing that reaffirm one's solidarity with the moral community. In the antique language of psychoanalysis, one overcompensates

by becoming a superpatriot or a super-environmentalist. As with moral outrage, moral cleansing can be triggered by merely seriously entertaining taboo trade-offs, even if one ultimately returns to the ideological fold and 'does the right thing.'

The SVPM accepts that people are often sincere when they express moral outrage and engage in moral cleansing. But the model also portrays a delicate mental balancing act. People regularly run into decision problems in which the costs of upholding sacred values become very steep – arguably prohibitive. If parents dedicated their net worth to reducing to a probability of zero all threats to their children's safety, for example, they would rapidly impoverish themselves. Likewise, a society committed to guaranteeing state-of-the-art health care for all citizens would soon devote an unacceptable proportion of its GDP to the project. The model predicts that when there is no pressure to confront secular-sacred trade-offs, people and political movements will adopt the low-mental-effort solution of accepting their own side's no-trade-off rhetoric at face value. Such low-effort options are easiest to deploy in the political sphere when one's movement is in an oppositional role (as environmentalists mostly feel they have been during the Bush administration) and has no responsibility for making policy.<sup>2</sup> However, trade-off denial is not an option when one is compelled to develop and advance politically viable solutions, not just denounce the solutions proposed by others.

2 P. E. Tetlock, K. Hannum, and P. Micheletti, "Stability and Change in Senatorial Debate: Testing the Cognitive Versus Rhetorical Style Hypotheses," *Journal of Personality and Social Psychology: Attitudes and Social Cognition* 46 (1984): 979 – 990.

*The boundaries of the thinkable*

Having laid our framework, we now explore the potential utility and limitations of this model for understanding the evolution of policy stands of environmentalist organizations in the United States over the last twenty-five years. Our approach is of necessity largely anecdotal, and based mostly on the experiences of one of us (Oppenheimer) as a professional environmentalist between 1981 and 2001 – as well as an observer of environmental policy and occasional advocate up to the present. The subjective and impressionistic nature of our approach underscores the relative scarcity of academic literature analyzing the structure, *modus operandi*, funding, and motivations of U.S. environmental organizations and individual environmental activists, a shortcoming that cries out to be rectified, given the current centrality of ‘green’ politics. We hope this essay will encourage others to dig into the extensive archival material available and to interview key participants in the debates.

Our overview of how several controversies have played out in the environmental community and larger political arena underscores how hard it is to fit any one-size-fits-all theoretical model. Terms that theorists casually bandy about have sharply contested meanings in the real world. For instance, ‘taboo’ proves to be a *Rashomon* concept, connoting principle and resolve to those determined to defend the boundaries of the thinkable, and rigidity and dogmatism to those determined to cross the boundary. Whose definition prevails in the battle for public opinion and political-regulatory favor determines whose policy agenda prevails.

Here we consider four examples of how this political-psychological tug-of-war has unfolded in environmental policy debates: the disposition of the Arc-

tic National Wildlife Refuge (ANWR), nuclear power, emissions trading, and geoengineering of the climate. In each case, we identify how the most ardent environmental organizations have defined the issue as a matter of principle (What are the sacred values at stake? What options should be considered taboo?) and examine how successful these organizations have been in mobilizing uniformly solid opposition to policy options that threaten to breach the principle/taboo boundary: Were there ever – or are there now – significant dissenters within the environmentalist community? Were these dissenters the targets of moral outrage? Did those linked to the dissenters feel the need to engage in moral cleansing? In each case, we also pose questions viewed as taboo by morally resolute boundary defenders but as mandatory by those who see environmentalism as the application of the analytical tools of science to public policy. The recurring identity-defining questions will be: What would change your mind? How far would the generalized cost-benefit calculus need to tip for you to modify or even abandon your policy positions?

Legally protected since 1960, the Arctic National Wildlife Refuge (ANWR) occupies the far northeast corner of Alaska, running from the Arctic Ocean south across the Brooks Range into the Yukon Valley. It has been referred to (not uniquely) as America’s Serengeti because of the annual caribou migration that passes through, in addition to the grizzly bears, wolves, and other resident fauna, an appellation that neatly sums up its iconic status.

With the convergence of two oil supply crises in the 1970s and the consideration of the Alaska Lands Act to determine disposition of hundreds of millions

of acres of land among federal, state, and Native American governance as a delayed consequence of Alaska statehood, the issue of whether to allow drilling for oil in the area became pointed. Distrust of the environmental reliability and fiscal probity of oil companies, who were already developing a pipeline and drilling complex to the west at Prudhoe Bay, ran high. Views on native rights sometimes conflicted, with some based on sacred views of the land and others on financial interest in drilling. The U.S. environmental movement became committed to opposing drilling entirely (Oppenheimer visited the area in 1975 and testified in Congress in favor of leaving it pristine, a position he maintains today), and the final legislation forbade drilling without further permission from Congress. Such permission, fought over sporadically for thirty years, has never been granted, as environmental opposition has remained steadfast.

Among the cases we examine, ANWR is the only one in which a taboo seems to have functioned as a nearly absolute bar to repositioning. How have environmentalists managed to be so successful in holding the taboo line on ANWR? We see a number of possibilities. First, the attack has not been nearly as ferocious as it could have been if the oil industry itself had been more committed to prevailing. The industry is worried about drilling costs, and the bad publicity and legal liabilities that would attach to accidents – and may well perceive other drilling opportunities as more profitable investments. To some degree, the political fight over ANWR may be a diversionary maneuver while these firms attempt to gain access to other, less noticed reserves. Second, the remoteness of ANWR may paradoxically add to ANWR's allure and iconic status as untouched natural land. From

one point of view, its remoteness means that the vast majority of Americans will never visit it, and many may never have heard of it. But the success in protecting the ANWR region over thirty years has reinforced its uniqueness, made it more renowned as a special place, and strengthened the utility of taboo as a political gambit.

Although trade-offs have been discussed, such as bartering permission to drill in ANWR for agreement to increase the stringency of Corporate Average Fuel Economy Standards for motor vehicles, it is unclear whether these discussions ever came close to being a serious 'deal.' For one thing, the deal would not have been a simple trade-off: those who might benefit directly from drilling (oil companies) are not the same group as those who might suffer from an increase in fuel-economy stringency (auto companies and their workers). Yet a third group, environmentalists and those they represent, would lose from drilling but gain from increased stringency on fuel economy, but different constituencies within the movement might see the gains and losses differently. Such compromises are not easily arranged. Furthermore, the total reserves in the Refuge correspond to only about six months of U.S. consumption, which, even if economically recoverable, is equivalent to an amount of consumption that could be avoided by a small increment in vehicle fuel economy without any trade-off (making the trade-off look superficial).

To gauge how robust this – or any other taboo – has become, one needs to subject it to counterfactual stress testing and explore the willingness of respondents to change their minds in response to increasingly tough hypothetical arguments: for example, if oil companies could reduce the likelihood

*The boundaries of the thinkable*



of significant spills to zero; if the value of reserves exceeded five or more years' worth of consumption; or if excess profits could be used in part to compensate local communities or to protect endangered species elsewhere.

A more directly relevant hypothetical would be trading complete protection of a large, imminently threatened area of Arctic wilderness (the Kamchatka Peninsula, for example) for permission to drill in ANWR. It is unclear what transnational entity would have such power, but assuming it existed, the willingness of the environmental community to entertain such a trade would still be highly doubtful.

The most resolute antiutilitarian defender of the taboo would be a respondent who refuses to participate on the ground that the questioning process is morally corrosive (to compare is to destroy): a process akin to asking how much money it would take to sell your children to slave traders. The next level down would be those who insist that there is no remotely plausible cost-benefit calculus that would change their minds. The next levels down now put us on a potentially slippery-slope continuum of affixing increasingly plausible numerical values to questions that open the door – to varying degrees under varying contingencies – to compromise. These latter respondents may pride themselves for their pragmatism but risk the moral wrath of the taboo defenders should the bar on ANWR development ever come under serious political threat.

The pros and cons of nuclear power have been discussed at great length elsewhere, and we shall not repeat them in detail. On the 'pro' side are electricity production free of direct emission of air pollution and greenhouse gases, and rel-

atively low operating costs. On the 'con' side are the threat of radiation releases (and resulting cancer incidence) during mining and transport of fuel and plant operation (including core meltdown); no implemented plan for long-term waste disposal; possible diversion of wastes for weapons production; targeting of plants by terrorists; and in the United States, high cost of construction despite various subsidies. Accidents at Three Mile Island and Chernobyl – and since then, the continual stories of leaks at aging plants – have kept public concern at the level where a majority in the United States do not want one built in their neighborhood. Yet nuclear power delivers 20 percent of U.S. electricity, recently renovated plants have been operating smoothly and efficiently, and some countries have had a fairly good record of safety and efficiency, if not a solution to the waste-storage issue.

Perhaps more than any other example, nuclear power is an issue that carries iconic status on both sides. In contrast to the skepticism expressed by many environmentalists, the 'other side' poses support for nuclear power as a litmus test of environmentalists' seriousness about clean energy, and attempts to position opponents as Luddites: 'You want to reduce carbon dioxide emissions? If you are serious, rather than just an enemy of electric power companies, economic growth, and progress for humanity, surely you must support nuclear power, or at least be willing to contemplate it as a serious part of solving the problem.' Substitute acid rain or air pollution for carbon dioxide (or the desire to avoid building hydropower dams on iconic rivers like the Colorado), and you have the raw outlines of a conversation going back many decades. In fact, many of these conversations seem to have less to do with specific electric-power options

as they do with symbolism, as in: 'Are you man enough to accept nuclear power?' Such rhetorical gambits have probably only intensified the polarization.

Meanwhile, many environmentalists see nuclear power as a symptom of mega-project-itis: a bloated, highly subsidized (through public-research funding and limits on liability for accidents), unnecessarily centralized way to generate power, attention to which deflects political and financial resources from lower-impact, distributed technologies that increase efficiency and employ renewable options, like solar power.

Are environmentalists in fact willing to countenance relaxation of the apparent taboo without exiling those guilty of doing so? Here the record is less clear. Recently, some environmental leaders have indicated a willingness to reconsider the movement's near-total aversion to nuclear power;<sup>3</sup> and while this arguably new stance has elicited criticism for 'going soft,' in fact the same groups still work together at about the same level of cooperation (and sometimes lack thereof) on the same issues as they did previously. Although there have been skepticism and annoyance over the perceived taboo violations, there is little evidence of either ostracism or a perceived need for moral cleansing. Of course, the 'reconsideration' may be little more than a repositioning to divert, deflect, or transcend the 'manliness' argument, and opponents of altering the view may read it as such, reducing their need to ostracize.

In any event, the repositioning was part of the first steps in wheeling-and-dealing over climate-change legislation, providing a real-life test of just how taboo nuclear power is: despite the apparent shift in attitude on the part of some

<sup>3</sup> See "Old Foes Soften to New Reactors," *The New York Times*, May 15, 2005.

environmentalists, several senators reversed their support for global-warming legislation proposed by Senators McCain and Lieberman and voted against it due to the insertion of a provision encouraging nuclear power. But since the legislation had no chance of passage anyway, this outcome was more a visible way to take a shot across the bow, rather than a firm, final position. However, it is expected that the issue will be revived again over the next two years because the chances of successful federal legislation have increased. Then the trade-offs involved in supporting the building of new nuclear plants (using existing technology) to reduce carbon-dioxide emissions may become quite pointed because the problems with nuclear power that provide the rational basis for taboo remain.

Theoretical solutions to all the technical problems of nuclear power abound; whether they can be implemented at a cost competitive with other carbon-free options is an unanswered question. Until it is answered, the question of whether the taboo is absolutely applicable to all nuclear technology, or just the current versions, will remain hypothetical. Rather, the skirmish in the political arena may be over whether an arguably faulty and expensive technology with little immediate prospect for expansion is worth further subsidy and other inducements to get controls on greenhouse-gas emissions.

The question of whether an 'irrational' taboo is at work may be buried under layers of plausible argument and counterargument. The only way we know to answer the question is via systematic counterfactual stress testing. The nuclear industry argues that it can build reactors that produce very low levels of waste that can be safely disposed of, and that entail no significant poten-

*The boundaries of the thinkable*

tial for attack or diversion for production of weapons. If all this could be accomplished at a cost competitive with other sources, would – and should – a majority of opponents relent? The sign of a taboo – in something resembling the original anthropological sense of the term (unconditional disgust unmediated by reason) – is a categorical ‘no,’ coupled with deep annoyance that you would even ask the question.

After remaining buried in the economic literature for decades with scant attention paid to it in the policy arena, the idea of controlling pollution by distributing free or through auction a limited number of rights-to-pollute (called emissions allowances), which could be traded as commodities, was implemented on a large scale in the 1990 Clean Air Act Amendments. The triggering event was the emergence of bipartisan consensus on the need to reduce acid rain. And the outstanding success of the program in reducing pollution at much lower cost than command-and-control approaches that mandate particular technologies has led to its being labeled the favored means to limit emissions of the greenhouse gases, both in the United States (assuming such a program will be implemented at the federal level) and in Europe (where it is currently in use to implement the Kyoto Protocol).

But the early history of emissions trading was marked by controversy, and many critics remain. Its initial rejection in some quarters as a proposed solution to the acid-rain problem reflected numerous concerns, including: that the creation of a property right and a market in pollution amounted to letting polluters buy their way out of an obligation, posing an ethical issue involving potential inequities; that trading would result in a geographic distribution of pollution

reductions dependent on an economic calculus rather than environmental targets; that the ability of electric utilities to switch to low-sulfur-content coal under a trading system would shift the distribution of employment in the coal-mining industry; and that the entire system of accounting for emissions reductions and trading was too complex and would allow gaming, lessening the actual emissions reduction obtained.

One environmental group, the Environmental Defense Fund (now named Environmental Defense), took an aggressive pro-trading stance, to the displeasure of most of its colleagues in the movement. Many of the latter never fully embraced the system and stood aside from taking a position on the draft legislation, of which they otherwise approved, because of the presence of this feature (and its potential side effects, noted above). Years later, when the effectiveness of the trading system was beyond dispute, some environmentalists made a point of emphasizing (correctly) that the concomitant costs savings were partly attributable to reductions in rail rates for shipping coal, not the inherent efficiency of trading.

But despite considerable opprobrium (low to moderate moral outrage), it would go too far to assert that Environmental Defense was ostracized. Support for trading began a long series of disputes between those in the advocacy community that supported flexible, incentive-based approaches to regulation and those who preferred command-and-control regulation. These disputes are still evolving, and today center on the global-warming problem. Some individuals and organizations attacked pro-trading groups directly, while others wriggled uncomfortably on the sidelines, occasionally indulging in acts that may fit the description of moral cleans-



ing. The attacks were often not for supporting trading per se but for other perceived wrongdoing involving issues of procedure within the environmental coalition. But the substantive differences over trading aggravated these controversies. Despite such stresses and strains, cooperation in the community has remained the dominant mode and no group has been banished for support of emissions trading.

On the other hand, many of those opposed to trading have softened their positions in response to, first, the reality of the effectiveness of the acid-rain program as a regulatory scheme and, second, the political and economic reality of the efficacy of trading. In the first category fall certain environmental organizations that either opposed or remained neutral with respect to the trading elements of Title IV of the 1990 Clean Air Act Amendments. Some of these soon gave the highest compliment to the originators of Title IV, including Environmental Defense, by claiming partial credit for its design once its success was clear. An example of the second case is the European Union (and some environmentalists therein), which originally opposed designing implementation of the Kyoto Protocol around an emissions-trading system. Nevertheless, the agreement reached in 1997 embodied the trading framework with a structure generally following the lines of the U.S. proposal. The EU, having grudgingly ceded to the United States on this point, and then, along with other Kyoto parties, suffered the rebuff of U.S. withdrawal from the Kyoto process in 2001, nonetheless maintained emissions trading as a key means for implementing the Protocol. The intervening four years had seen too much negotiation on the details of the system to countenance ripping it up and starting over, and some non-EU parties

were already positively disposed toward trading. The period also provided governments with the opportunity to learn more about the efficacy of trading. Furthermore, many in the EU retained a belief in the possibility of reengaging the United States even before the end of the Bush administration. Consequently, the EU proceeded to become the world's leading experimenter in trading greenhouse-gas allowances and, ironically, is now a strong proponent of this approach while the United States stands aside (for the moment). Thus, the taboo has become the accepted practice.

Emissions trading still engenders argument but less over its ethical basis and more over its consequences in specific applications. Mercury emissions from coal-burning electric power plants provide a case in point. Mercury is a neurotoxin with no known dose threshold for causing damage, particularly in fetuses. The Bush administration proposed to control mercury emissions with a trading system that would inevitably create disparities in emissions reduced at one location versus another, and therefore in human exposure (in contrast to carbon dioxide, which becomes globally uniform after emission, or to acid-causing emissions, for which a separate set of regulations limits local exposure and from which no significant geographic 'hot spots' of acid rain have been produced by the trading program). The reaction was immediate and uniformly negative in the environmental community. If there were supporters of this approach among trading proponents, they kept their counsel.

This episode underscores at least one strong, and arguably rational, basis for the taboo in specific instances: trading can result in dramatic inequities in local impacts. So the idea of trading aggravated a long-standing dispute between lo-

*The boundaries of the thinkable*

cal environmental groups (sometimes unfairly and derisively called 'NIMBY' groups, i.e., Not in My Back Yard), who focus on local pollution, and the national, professionalized groups, who often see issues through the prism of national or global environmental consequences. For the latter groups, obtaining larger overall cuts in pollution appeared at times to take precedence over these local concerns. It is fair to say that the sensitivity of the national groups has substantially increased after a considerable drubbing by the locals, who brought pressure to bear on the nationals through the media and also via funders such as foundations. Risking the death of a small number of identifiable people, usually poor, for the greater statistical good was just not a viable position for a movement that draws a substantial part of its membership and support from egalitarian progressives – and is often accused of reflecting the tastes and preferences of affluent professionals. In effect, ignoring equity concerns became a new and effectively enforced taboo – as we can now see by the uniform response in the case of mercury.

It is worth reconnoitering the ever-shifting boundaries of the thinkable. Assuming no local inequities, would opponents of trading accept it if all permits were auctioned, eliminating the onus created by a seemingly free 'right to pollute' that is established when they are distributed to polluters (e.g., power companies), as they largely were under the acid-rain program? And, assuming local inequities cannot be brought down to zero, would sufficient compensation to local communities alleviate the disparate impacts that would occur in the case of a pollutant, like mercury, with local impacts? Although it seems plausible that the former proposal would gain some adherents (especially considering

the expected returns to the government from the auctions), the latter proposal raises issues related to monetizing life – one of the most taboo subjects of all.

A very current example is provided by proposals to geoengineer the climate in response to the threat of global warming. The idea here is to take action to oppose the effect of the buildup of greenhouse gases by implementing measures that would either remove the warming gases, e.g., carbon dioxide, from the atmosphere after emission, or alter the Earth system so as to reduce sunlight sufficiently to negate the warming. An example is a proposal to loft particles that reflect sunlight high in the atmosphere in sufficient quantity to cancel the increasing greenhouse effect.

There are many good reasons to oppose such approaches without resort to stigmatizing them altogether as taboo. Many are arguably more costly than measures to reduce emissions and avoid much of the warming in the first place. They raise complex political issues because any country could effectively decide to geoengineer everyone's climate unilaterally. Finally, and most salient, many or all such proposals entail potential side effects that could in the end rival the consequences of warming. For example, reflecting particles could add to the damage of the ozone layer, and would do nothing to reverse acidification of the oceans by dissolved carbon dioxide. Furthermore, such geoengineering only masks warming, and should the approach become unsustainable, a large greenhouse-gas buildup, and accompanying warming, would be revealed.

It is not just the ability to cite such consequences but the expectation of *unintended* consequences that troubles opponents. After all, such proposals are effectively experiments on the whole

Earth system, and uncertainties in predicting how the system would respond are vast.

But beyond this point, and drawing strength from it, lies a principle that many environmentalists and scientists adhere to: it is simply wrong to fix one environmental problem by increasing the risk of another. It is better to relieve the prime causes (e.g., fossil-fuel combustion and deforestation) than to apply massive engineering techniques with uncertain outcomes. Some also fear that the very existence of a last-resort option would reduce pressure to remediate emissions. It is this principle that has placed geoengineering into the nearly taboo category, relegated to slender consideration over at least twenty-five years in voluminous analyses of how to solve the climate problem. The recent publication of a special issue of the journal *Climatic Change* dedicated to papers on geoengineering was accompanied by an unusual advance campaign to deflect the inevitable criticism and shield the scientists publishing the papers from collegial abuse.

Yet the uneasy feeling that countries could postpone action on greenhouse gases long enough to make emergency engineering measures necessary to avoid draconian consequences (like complete meltdown of the Greenland ice sheet) provides a strong rationale for at least allowing theoretical research to proceed. The issue of whether to allow or encourage small-scale demonstration experiments is much more controversial.

One could argue that the perception of a rapidly changing climate has already allowed reality to lessen the taboo. Nevertheless, geoengineering is likely to remain a more or less taboo subject, at least in the sense of marginalization compared to other remedies, unless a consequence-free approach is compel-

lingly presented or the climate does indeed get out of control.

To tease apart the relative importance of the various reasons for opposing geoengineering, consider two tests of the limits of this taboo: First, if our knowledge changed suddenly and it became apparent that Earth were headed into an ice age, would we entertain ways, such as speeding up greenhouse-gas emissions, to maintain the stable global climate of the last several millennia? Second, would geoengineering be an appropriate response to natural warming, were the latter shown to be large, life-threatening, and imminent?

The environmental movement represents a complex amalgam of ideas, interests, and styles of thinking. Some environmentalists (and environmental organizations) have a clear commitment to the scientific method – and they feel that the scientific norm of falsification requires them to view a broad range of their beliefs as testable hypotheses. The inability to answer the question, ‘What would it take to convince you that you are mistaken?’ would be a source of professional discomfort. The thought experiments with which we end each section are the types of questions that such advocates would likely be willing to entertain. At the other end of the epistemic continuum, some organizations may be caricatured as displaying a quasi-religious devotion to protecting natural systems. Some of the thought experiments with which we close each section are, quite literally, unthinkable – and those who ‘play the game’ do not understand the moral stakes. Yet within such organizations are cleavages on how to approach particular issues. Many ‘expert’ groups have several dyed-in-the-wool values-based staff members, and some staffers at values-driven organizations

*The boundaries of the thinkable*

are devoted to a science-based approach. Even the views and approaches of individual environmentalists shift from issue to issue, with greater or less focus on science versus other values.

From a scientific point of view, the rigorous articulation of a belief system – with airtight partitioning of facts and values, crystal-clear specification of trade-off functions, and candid acknowledgement of what would count as falsifying evidence – is an unalloyed (if often unattainable) good. But it would unfairly handicap environmentalists to hold them to burdensome standards of introspective rigor that no other political movement accepts. What are the limits that attach to willingness to acknowledge trade-offs between one's epistemic commitments to objectivity and one's moral-political commitments to like-minded souls struggling for causes one deems just? We suspect that the short-term challenges of policy campaigning require sweeping such nettlesome trade-offs under the rhetorical rug, but the long-term challenges of governance ultimately require thinking more deeply about how we think.

We again stress the exploratory nature of our survey of the boundaries separating the 'thinkable' from the 'unthinkable.' But our modest effort has brought to light serious complications that we hope future, more systematic efforts will address. On one hand, we discover what seem to be strong pockets of taboo cognition – policy domains in which even speculative forms of cost-benefit analysis (would you change your mind if ...?) are likely to provoke sharp resistance. On the other, we discover numerous exceptions and qualifications. It requires more presumptuousness than we can muster to label strong policy positions as examples of taboo cognition when the defenders of these positions can gener-

ate reasonable scientific and economic objections that cannot be reduced to an emotive 'ugh' reaction. (Distinguishing reasons from rationalizations is a deep problem with which social psychologists have wrestled for many decades.) And, even if we had a surefire method of identifying true cases of taboo cognition, it strikes us as unfair to characterize an entire school of thought as upholding a taboo when there is as much diversity within and between organizations and individuals as we find among environmental organizations.

The core complication may well be that taboos are hard to maintain in any community of cobelievers in which the funding sources are as diverse as those for environmental organizations. Each has its own culture, preferred issues, and specialized approaches to solving them. Donors, be they foundations or individuals, can shift support from one to another, making enforcement of a monolithic party line difficult, if not impossible. Such diversity can be viewed as both political weakness and strength. It is a weakness inasmuch as concerted cooperation is necessary to pull together minimum winning coalitions in competitions for power in democratic politics. And it is a strength inasmuch as diversity signals a degree of openness to debate and compromise within at least portions of the environmental community. This very American combination of characteristics leads us to suspect that the 'boundaries of the thinkable' among environmentalists will be subject to frequent challenges in the twenty-first century – challenges driven by technological innovations, economic pressures, shifting political alignments, and new data on the fragility or robustness of the complex natural systems that make life possible on this odd planet on the outskirts of the Milky Way.