

## **Climate Change, Uncertainty, and the Relationship Between Science and Society**

In May of this year, the U.N.-sponsored Intergovernmental Panel on Climate Change issued its third report since its 1989 inception. The document, constructed and negotiated by hundreds of scientists from around the world, argues with more force and confidence than previous IPCC reports (1991, 1995) that climate change is occurring, that human activities are helping to drive it, and that the consequences of warming are likely to present serious challenges.

In June, the new Bush Administration requested, as a part of its ongoing review of U.S. climate change policy, a report from the U.S. National Academy of Sciences helping to "identify the areas in the science of climate change where there are the greatest certainties and uncertainties" and asking for "views on whether there are any substantive differences between the IPCC reports and the IPCC summaries." The committee convened to answer these questions included 11 of the best atmospheric scientists in the United States, significantly including the longtime climate change skeptic, MIT Professor Richard Lindzen. The NAS report opens by stating, unequivocally, "Greenhouse gases are accumulating in Earth's atmosphere as a result of human activities, causing surface air temperatures and subsurface ocean temperatures to rise. Temperatures are, in fact, rising."

Meanwhile, newspaper readers were informed this summer first that the Kyoto Protocol had collapsed, and then of broad acceptance of a truncated version in Bonn, Germany. This truncated acceptance is however further weakened by the refusal of the United States to take part in the protocol's binding agreements on limits to greenhouse gas emissions.

In the U.S., the sense of contention and uncertainty about climate change, its effects, and the possible responses to impacts - contrasted with the growing momentum of international environmental advocacy and action - have created a stagnant and somewhat confused political conversation. After promising to "take the lead" on climate change policy, the current administration has so far produced no clear, substantive or practical proposals.

The long-sustained political unwillingness to act decisively has been justified for a decade and more by emphasizing the uncertainties of climate change science, which have been significant. A politically expedient response for environmentalists seeking more evidence for warming, those who stand to gain from

delay, and a scientific community eager for more grant money has been to call for further research, ostensibly in order to remove uncertainties and clarify our options.

During the first half of 2001, a perceptible shift has nevertheless taken place. The corroboration of the IPCC report by the N.A.S. committee has made it much more difficult for the current administration to maintain status quo requests for more research, especially as it proposes energy policies that promote the consumption of the fossil fuels whose use produces the most prevalent greenhouse gases. As the international community moves forward with treaties we choose to ignore, we implicitly accept responsibility to confront the international scientific consensus in some other way.

What's stopping us? In the effort to generate positive and substantive policies, the shadows of uncertainty are very much with us. The Bush Administration's request to the N.A.S. is worded so as to emphasize the developments in our scientific knowledge, rather than questioning whether we have enough scientific knowledge to begin imagining directed action now. This is fair enough, in some ways, considering the history of the issue and the understandable hesitancy to act in ways that may hurt the economy unnecessarily, or that may be simply premature and over-reactive.

The most prominent absence in the current conversation is that of the scientists themselves. This is understandable in many ways. In the early years of global climate change research, anyone crying too loudly on one side of the question, announcing their findings in the media, or attempting to communicate their claims to a wider audience was likely to be branded an advocate of some sort rather than a scientist. The fact was, despite some evidence for warming, that the facts weren't all in. Credibility has often rested on a kind of public equanimity.

One particularly important issue - in climate change research, the stem-cell debate, and elsewhere - is the scientific community's need to guard closely its autonomy. Science's ostensibly appropriate distance from society is extraordinarily important to its practice and goals, because research informed by political concerns cannot claim the objectivity that, paradoxically, is the foundation for claims about scientific truth, and therefore its political power.

However, a more insidious problem lies behind the paradox of objectivity-for-power. So long as scientists vacate the debate over the fruits and possibilities of scientific inquiry, they leave it to politicians and pundits, who use science, predictably, in polemical ways. Scientific uncertainty about climate change,

although it is focused now almost entirely on how much warming will occur, is still spoken of in the United States as a question about the possibility of warming. Further, the IPCC is explicit in its assertion that the uncertainty is related in large part to what we do as an international community - acting will actually reduce the uncertainty we have so far used as an excuse for not acting.

But the primary problem is one of bringing scientific and political communication closer together - it isn't clear to the larger society what is really happening, or if action should be taken now or later.

### **Some Plot Context:**

When science gains knowledge that, in its technological application, can evaporate millions of people with a detonation, or prevent millions more from contracting fatal disease, scientists quickly and justifiably take shape as extra-powerful figures.

The recognition over the past century of scientific inquiry's potential has given urgency to questions about the evolving relationship between scientists and their wider social context. The implied concerns in any discussion of science's multifaceted social role are related to questions about how a community might insure among its scientific members a responsibility to the community's goals, hopes, and values; whether scientists might justifiably question those common values; and what a stronger conversation between science and society might look like.

These concerns are particularly relevant when science is financed heavily by a federal government representing citizens to whom those federally-funded scientists should be, in theory, committed. A long-lamented problem ingrained in the relationship between scientists and the broader political community is the lack of transparency about what scientists actually do, or their specific intentions in doing it. The most difficult are an evil lot, but substantial trust between scientists and the rest of America stagnates so long as the authority of scientific knowledge is based on work performed behind closed doors.

Those doors open two ways, as scientists are often quick to note – there is an obvious lack of scientific literacy among the American populace, but the increasingly specialized nature of scientific research reinforces that trend. It's tempting to place the burden of explanation on the researchers receiving the grants, though that would ignore an American unwillingness to evaluate science in appropriate (scientific) terms. We avoid scientism as much as we do intellectualism, which is probably justifiable in some ways -

few in this busy country has the time or inclination to get caught up in debates comprised of merely scientific terminology.

Still, the difficulty is not alleviated; the majority of American citizens do not fully understand the processes or implications of the research funded by their government, and certainly not that supported by private or semi-private industry. Meanwhile, the power of the results is obvious: health care and life spans are extraordinarily advanced, agriculture is exponentially more productive, and military weaponry is an amalgam of complex and efficient electrical instruments seen on television in an array of explosive green lights every few years. That apparent power, because it has been produced in what appears to be and often is secret, engenders a healthy amount of distrust of the vaguely understood scientific arena.

One idea attempting to negotiate the conflict driven by the scientific demand for autonomy and the social requirement of responsibility is that of the "social contract." Since Vannevar Bush wrote "SCIENCE: The Endless Frontier" at the end of World War II, American science policy has hinged on an implicit, assumed contract between science and society: science receives funding and independence while agreeing to produce a "reservoir" of knowledge from which society can draw whenever necessary. The economic, military, and health benefits are presumed to follow in an automatic fashion.

The key provision in this contract is the stipulation that science shall be fundamentally independent of the political realm. Scientists, to have confidence in their inquiries and judgments, must maintain a certain distance from partisan wrangling, and engaging in public discussion about values or goals is not the best way to do that. They ask for our trust, and because scientific research has been at times so amazingly useful, we hesitate to request more transparency in return. Besides, the process of peer-review and peer-editing seems to guarantee a certain amount of scientific responsibility and adherence to moral norms. In addition, the government often requires that at least a minimum of ethical demands be met - for example, human research subjects must have both free and informed consent, or else funding may be cut and results discredited.

The social contract is a philosophical staple, traditionally describing the mutual agreement of several social components to certain limitations on their individual freedoms in order to insure mutual survival. Robert Frodeman and Carl Mitcham, in an article titled "Beyond the Social Contract Myth," have recently argued that the social contract is no longer an adequate model for the science-society relationship.

Frodeman and Mitcham advance two assertions in their critique of the social contract: first, that "there is no evidence that anything like a social contract ever took place in the formation of any society"; and second, "social contract theory presupposes atomistic individualism as its theory of human nature, a conception that is highly problematic psychologically and sociologically."

The first assertion is probably an unnecessary straw man - Frodeman and Mitcham's initial critics were quick to point out the fact that social contract theories from Kant onward have not even implicitly claimed that there are historically real social contracts. John Rawls, the 20th century Harvard philosopher, stresses the hypothetical nature of his social contract "thought experiment" in the first pages of his most famous work, *A Theory of Justice*.

Their second assertion is more trenchant. Social contract theory, from its foundations up through Rawls, conceives of political actors as decision-makers emptied of any natural concern for other men and women, their environment, or the ability of their political structure to provide for a more positive version of happiness or expansive good. Instead of Aristotle's political animal, the social contract presumes instead that we are more isolated spirits of ferocity and force who limit our interests simply in order to secure a degree of safety in our competitive pursuit of those interests.

### **The Quest for a Quest for the Common Good**

Frodeman and Mitcham argue that the conception of human nature with which social contract thought begins is flawed in important ways; in their view, we are not so wholly individualistic, concerned only with ourselves and our interests, fearful of others, etc. "A truer account of the science-society relationship," they write, "is found in the conception of the scientific and political pursuit of the common good." This vision denies a more positive, interrelated version of human beings that would "affirm social responsibility above and beyond any contractual determinations." That affirmation is tied in their essay to what they call the common good, a theoretical foundation for the re-framing of social relationships broadly, and the science-society relationship in particular.

Frodeman and Mitcham note that scientists are considered professional in a way differing fundamentally from those professional fields, like medicine, law, or education, that explicitly state their goal of providing for the wider community in ethical, necessary, and meaningful ways. Scientists have had

much more trouble articulating their commitment and obligations to the political sphere of which they are a part, and so are professionals mostly by virtue of the fact that they have such an enormous impact on our lives - regardless of the ethical value of their actions. Using the language of the common good, however, Frodeman and Mitcham argue that "scientists will be encouraged to make a case for science as a true contributor to culture," instead of necessarily apart from it.

But the comprehensive nature of the common good makes it vulnerable to questions about its substantive content, or how any one vision of the good might come to be adopted by a broad spectrum of complex people without being completely emptied of meaning. As Joseph Rouse writes in a thoughtful response to their essay,

[Frodeman and Mitcham] fail to adequately recognize the role of power and resistance in contemporary life, a failure exemplified in their idyllic but altogether unrealistic conception.... This oversight exacerbates their inattention to the underlying ethical and political conflicts that contract theories aim to address. To postulate a common good in the face of deep disagreement, while overlooking the power dynamics in which those disagreements are situated, too easily confers moral authority on political dominance.

Frodeman and Mitcham remain unclear about how a society might come to debate or adopt a substantive common good without either eviscerating it or imposing it. They advocate a reflective and deliberative process of public conversation, with "scientists recognizing their own citizenship, and citizens realizing the scientific fabric of their own lives." An openness would be required that doesn't seem to exist in our political climate – too many people feel there is too much at stake professionally, politically, religiously, and otherwise for anyone to expect a measured and dialogue-oriented tone.

Significantly, though, Rouse also writes that "Frodeman and Mitcham are right in saying that we need a more comprehensive normative conception than a contract theory can provide." I want to echo both Rouse's concerns about their gloss of relatively intractable societal power dynamics, as well as his sense that they are on the right track in some way as well. Their writing is a provocative attempt to shift our focus in an important way, from an assumption that the implicit contractual nature of the science-society relationship is the only way things can work, to an ideal of relatively open communication about the common means and ends of the political arena. They are advocating, fundamentally and necessarily, a

change in attitude. In the short space of their essay, I believe they do fail to square adequately with the reality of deep social divisions over issues, like climate change research, involving high political and economic stakes.

Still, the movement of perception they argue for is essential, for both scientists and society. As Frodeman has noted elsewhere, "To recognize the possibility of the common good means that people have committed themselves to a conversation: the conversation itself is a fundamental shift in attitude." And without that conversation, scientific communities risk their own endangerment - if they are not articulating their function, they may find themselves in the same position the U.S. Geological Survey did in the mid-1990's, avoiding elimination by the U.S. Congress only by a very few votes. Without that conversation, society and science both maintain significant risks, particularly the unpredictable consequences of flagrant ignorance.

Because the common good cannot be debated without detailed content, and because those details are largely in the domain of the scientific community, the onus for productive communication and reasonable compromise appears to fall on scientists alone. "Science," write Frodeman and Mitcham, "is not the whole of the common good, and as part of that whole it may sometimes find its work restricted in order to serve more inclusive conceptions of the good life." The continuation of high levels of public funding for scientific research depends upon scientists' appreciation of the image they maintain in the public eye. If they do not acknowledge their influence and power in a way that also recognizes an obligation to the citizens around them, they cannot expect to be supported in an inquiry largely opaque to the populace. But that populace must also admit that the fruits of science can be enormously beneficial, and must accept as well some of the responsibility for evaluating how those benefits might be developed and used.

### **Climate Change and the Inadequacies of the Social Contract**

In 1951, as the Cold War turned wintry, Czeslaw Milosz, a Polish writer who many years later received the Nobel Prize in Literature, published a long essay about the intellectual lure of the twin political poles of the time, Communism and Capitalism. He began his now classic analysis, *The Captive Mind*, with a statement about the relationship between ideas and action; "It was only toward the middle of the twentieth

century that the inhabitants of many European countries came, in general unpleasantly, to the realization that their fate could be influenced directly by intricate and abstruse books of philosophy."

40 years later, the Berlin Wall and the Eastern Block disintegrated with a whimper -- not with the bang that had been anticipated for decades. Simultaneously, many nations within and well beyond Europe were beginning to question scientific data showing possible warming of the Earth's atmosphere as a result of human activity. Now, a decade after the "End of History" and a half-century since Milosz wrote *The Captive Mind*, a much warmer war is being fought, and history seems about as exciting as ever.

Climate change science and policy responses to it, along with perhaps Nuclear defense systems and weapons proliferation, are the most contentious and widely publicized subjects in the international political arena today. As a society we, too, are coming to a realization that our fate, like that of Milosz's generation, is influenced profoundly by intricate and abstruse books of philosophy.

In our case, we have probably exorcized Marx's spectre. But I believe that, like Marx, we perpetuate peculiarly modern mistakes in our conception of human nature -- if there is such a thing. With Frodeman and Mitcham, I want to argue that Social Contract theory presumes, even in its contemporary manifestations, a version of humanity that emphasizes our selfishness and urge toward competitive separation. Rawls writes in the first pages of *A Theory of Justice* that the individuals in a pre-contract situation, in order to enter into contract deliberation without bias or prejudice, are both ignorant of their own specific characteristics and desires, as well as "conceived as not taking an in one another's interests."

It wouldn't be useful or productive to resort to an over-idealized communitarianism in response. But it is necessary to reinforce Frodeman and Mitcham's attempt to shift our cultural attitude, and our individual conceptions, to include one another more consciously in our political conceptions. It is obvious, hopefully, that the idea of a common good is not an attempt to stifle difference or impose a vision. Instead, it's an attempt to generate a discussion of those differences with the aim of providing more substantially for a common good -- an idea whose purpose may not be to generate any one specific image of where we should go as a society, but to catalyze thinking about social choices in a way that emphasizes our interconnectedness at least as much as our more narrow interests.

Since the climate change debate began in earnest in the late 1980's, a tripartite argument has emerged noisily into the public sphere with all the clarity of Godel's Proof. Usually, one end of the argumentative

spectrum is a Birnam's Wood of environmentalists who can sometimes sound a bit alarmist. At the other, a battalion of economists, businessmen and politicians line up to defend our "way of life," economic integrity, and growth. The third party in this debate is the scientific party, looking on with a mixture of irritation and patience.

The conversation between these groups has demonstrated the inadequacy of the Social Contract for Science thinking developed at the beginning of the Cold War. While the scientific community stands by and protects their autonomy, environmentalists and the economically-oriented pillage a lengthening scientific record for one-sided facts, and evidence plastic enough to be distorted according to their particular views. Calls for further research, placating both the fossil-fuel industry and the environmental lobby, certainly benefit the scientists who continue to receive government research grants.

But, questioning the long-standing assumption that science is somehow separate from a society so imbued with its products, it seems clear now, after this year's IPCC and NAS reports, that further research will not satisfy the larger social need for real decision-making. One of our most harmful presumptions has been that science can give us enough certainty to render difficult political deliberations unnecessary. We must give up on that hope -- it's about as tenable the Maldives probably will be in 50 years.

The IPCC report states unequivocally that much of the uncertainty about how *much* warming will occur stems from uncertainty about what we will do to deal with it. Acting and making decisions, no matter how difficult, is the only way to reduce the uncertainties we have so far depended upon to justify inaction. To generate deliberation, the three parties to the debate will have to refer to more than their own values and hopes, although they have often failed to do even that with any openness.

To inch toward a more common good, that failure will have to be improved upon. Moving beyond the newest versions of our collectively captive mind will require, I suspect, a recognition of the influence upon our fate of intricate ideas whose force we have so far neglected to acknowledge. Our divisions are self-imposed. And while it might seem futile to ask for a fuller commitment to one another in our deliberations, it also seems futile to expect that anything more positive will result unless that commitment is made.