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## **Liberating Science from Politics**

**The notion that science can be used to reconcile political disputes is fundamentally flawed**

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Wouldn't it be wonderful if science—and scientists—were taken more seriously in the political process? Wouldn't democracy be better served? And wouldn't many difficult problems be more rationally resolved? Take the debates over protecting the environment. It certainly seems that, here, science should be able to cut through political controversy and enable beneficial action. Yet experience mostly shows the opposite: Controversies surrounding environmental problems as diverse as global climate change, genetically modified foods, nuclear energy, biodiversity, air and water pollution, and toxic wastes rarely seem to come to a satisfactory resolution. They are instead characterized by long-term intractability and periodic resurgence of bitter partisan dispute—all in the face of a continual expansion of scientific understanding.

Blame for this unsatisfactory state of affairs is usually assigned to the political process itself, especially to those who use science to advance particular ideological agendas. If only, the complaint goes, those (a) conservatives (b) liberals (c) environmentalists (d) industrialists or (e) ignorant members of the public would understand the facts, or stop manipulating the facts for their own political gain, we could arrive at rational solutions to the problems we face.

Yet this sort of complaint—which I have heard, in one form or another, from innumerable scientists—suffers from a profound misunderstanding of the relation between science and politics. The idea that a set of scientific facts can reconcile political differences and point the way toward a rational solution is fundamentally flawed. The reality is that when political controversy exists, the scientific enterprise is ideally suited to exacerbating disagreement, rather than resolving it.

Consider the contested 2000 presidential election between George W. Bush and Al Gore. Recall that the outcome hinged on Florida's 25 electoral votes and that the vote count was incredibly close, with a margin of victory of about 500 votes out of six million cast. The technical issues surrounding an election are entirely straightforward—count the votes for each candidate and see who has the higher number. The system is closed, the rules are clear, the technical aspects are trivial, and the correct answer is an integer. What could be more amenable to rational, fact-based analysis?

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Here's a thought experiment: Suppose in the days immediately following the election we had assigned a team of disinterested experts to determine the correct result and declare the winner. Wouldn't this approach have quickly yielded the right answer, in a manner untainted by political shenanigans?

Given the many complexities and irregularities associated with the vote count (from "hanging chads" to poorly designed ballots), our team of experts would have had to draw on the strengths of numerous disciplines, perhaps including statistics, mechanical engineering, cognitive neuroscience, material science, physiology and psychology, each of which could contribute to the understanding of what actually went on during the voting and vote-counting. Of course, once the experts began to make their results known, other experts would need to review things, and disagreements over methods, data and conclusions would undoubtedly emerge. Crucially, any conclusion about actual vote tallies would have to be governed not just by technical analysis of the performance of voting technologies and voters, but also by rules about what constitutes a valid vote. For example, the *Miami Herald's* unofficial recount showed that either candidate could have been the winner depending on the criteria used to judge the validity of cast ballots.

Can we really imagine that our multidisciplinary team of experts would have achieved the consensus and legitimacy necessary to determine the "real winner" in a manner that allowed the nation to move forward rapidly with the business of democratic governance? Because it should be remembered that the political and judicial process did just that: It conferred a final decision in 36 days, not through a determination of technical fact (who won, and by how many votes), but through the U.S. Supreme Court's decision to accept the State of Florida's certification of a

contested vote count that showed George W. Bush to be the winner.

## **State of the World**

In the 2000 election, our political process did not turn to technical experts to come up with an answer. In contrast, when environmental problems become mired in politics, we often call on scientists to break the gridlock. This approach is backwards. In seeking to address our environmental challenges, we should instead (and regardless of our political preferences) look to the lessons of the Florida vote count.

My central point is that scientific inquiry is inherently unsuitable for helping to resolve political disputes. Even when a disagreement seems to be amenable to technical analysis, the nature of science itself usually acts to inflame rather than quench debate. One reason for this outcome is what I would term an "excess of objectivity." Science seeks to come to grips with the richness and complexity of nature through numerous disciplinary approaches, each of which gives factual, yet always incomplete, views of reality.

Consider climate change, which may variously be understood as a problem of climate impacts, biodiversity, land use, energy use, water use, agricultural productivity, public health, economic development, demographics and so forth. Each of these concerns involves a variety of interests and values, of potential winners and losers, and each depends on a body of relevant knowledge to help define, understand, anticipate and respond to the problem. The very wealth of reliable scientific information becomes an obstacle to achieving any type of shared understanding of what climate change "means." That is, the problem is not a lack of scientific input so much as the contrary—a huge and evolving body of knowledge with components that can be legitimately assembled and interpreted in different ways to yield competing views of the issue at hand.

This result does not arise from the selective use of facts by partisan players to support a particular position. There is no way to "add up" all the information relevant to a complex problem like climate change to give a "complete" picture of what is going on. So choices must be made, and choices involve values. When an issue is both politically and scientifically contentious, one can usually support one's point of view with an array of legitimate facts that seem no less compelling than the facts assembled by those with a different perspective. Subjectivity and objectivity, it turns out, are not separate and immiscible realms, but opposite sides of the same coin. For every value, there is often a legitimate supporting set of scientific results.

A second reason that science often makes things worse is that specific disciplinary lenses often turn out to be especially compatible with particular interests and values. My point is not that disciplines are ideologically monolithic. But it seems entirely reasonable to expect that the formal intellectual framework used by a scientist to understand some slice of the world may be related to the values that person holds.

The ongoing controversy over genetically modified organisms in agriculture provides a good example. Some disciplines, such as plant genetics, focus on the modification of plants for human benefit, whereas others, such as ecology, investigate the risks that transgenes might pose for ecosystems. These two perspectives, equally fact-based and legitimate, nevertheless reflect different ways of viewing nature (reductionist versus systemic) and provide a factual basis for competing political perspectives (optimism about the agricultural promise of genetically modified organisms versus concern about their environmental risks). Indeed, social-science research has shown that scientists' attitudes about risk (for instance, the dangers of nuclear waste) are tied to disciplinary expertise.

A final reason that more science often doesn't help has to do with the emergence of uncertainty. Again consider the 2000 election. There is no reason to think that the complexities that emerged in Florida are not commonly present in other elections as well. What made these issues important was the closeness of the count combined with the extremely high stakes of the

election. In the parlance of scientific debate, the final vote count became shrouded in "uncertainty." Had one candidate or another achieved a decisive victory in Florida, these uncertainties would still have existed, but they wouldn't have mattered.

This observation provides a final key to understanding why science often makes environmental controversies worse. Rising political stakes catalyze scientific uncertainty. Science does not produce a unified picture of "the environment" on which all can agree. Instead, it provides multiple views, each of which may be valid from a particular disciplinary (or ideological) angle. This diversity of perspectives manifests as an absence of coherence and reliability in our scientific understanding at the system level. "More research" is often prescribed as the antidote, but new results quite often reveal previously unknown complexities, increasing the sense of uncertainty and highlighting the differences between competing perspectives.

## A Better Role for Science

Until the disputes about values that underlie environmental controversies are brought openly into the democratic arena and adjudicated *as such*, science will often just make matters worse. One clear indication of this unhealthy dynamic can be seen when Congress holds hearings where dueling scientists provide technical testimony in support of competing sides of a controversy. Another sign is when reporters and public interest groups begin to call on scientists to support one side or another of a controversy. In such cases, opposing scientific views become a proxy for the conflicting values that underlie the conflict.

One provocative way to nip this pathology in the bud would be to demand that all scientists who are willing to make scientific statements on behalf of a particular political position also indicate their own partisan preferences. Another would be for scientists to impose on themselves a voluntary "quiet period" during which they will not participate in the spectacle of dueling scientists. Lawmakers and stakeholders, with no scientists to hide behind, would thus have no choice but to proclaim their relevant interests and values explicitly.

If such suggestions sound frivolous or even downright irrational, consider that most important political actions, ranging from the Marshall Plan and civil rights legislation to the response to Hurricane Katrina and even the allocation of research and development funds, are made primarily on the basis not of science but of social aspirations codified through political action. Indeed, when most of the nation's environmental laws were enacted during the late 1960s and early 1970s, the state of the relevant science was at best rudimentary. What made these laws possible was a political consensus—one that has since disintegrated, even as our scientific understanding has advanced tremendously.

And what then would become of science? One part of the answer is: nothing. It will still be there, in the background, along with all the other influences on people's knowledge, political interests and behavior. And science will continue to alert us to problems that we might not otherwise easily perceive. The crucial point, though, is that the most positive role for science in support of decision making comes only *after* values are clarified through political debate and *after* goals for the future are agreed on through democratic means. Science can then help us chart the path to our goals, and it can help us monitor how well we are following that path. Indeed, it is only when science is thus liberated from politics that appropriate priorities for scientific research in support of our social aspirations can actually emerge.

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