Sherwood raised three critical points: inconvenient notions that disrupt our view of the world, logical fallacy, and Western lifestyles. Perhaps the most important is logical fallacy, in which people are often inconsistent. On the one hand, we "believe" we are capable of shaping the world around us, as with using gene splicing to create new organisms. Yet nearly in the same breath, many people say it's not possible for us to affect global climates. Situations like that are prime examples of logical disconnect.

Without consistent logic, it's easy for new evidence to shatter "notions that make us feel safe," as Sherwood states. When we don't feel safe, we often fight back to preserve our sense of safety. To that concern, add the consumerism common to many Western lifestyles. Flawed logic makes it easy to justify choices that involve, for example, the use of more and more energy, even when the evidence says such a choice is causing harm. Asking Westerners to change their lifestyle puts them in an uncomfortable place. Yet that is where we need to be if we are to make the necessary changes to limit future human-caused climate change.

The entire article by Somerville and Hassol discusses the important issue of communication. Without efficient and effective communication, the connections between human-caused climate change, logic, notions of safety, and lifestyles will be lost. As the authors state, 97% of those most actively publishing in the field of climate change agree that it's human caused (from their reference 4). That is no doubt a consensus, yet the public thinks otherwise. Imagine if the US Congress voted with a combined 97% agreement on an issue! No one would claim a lack of consensus. Yet why do people consider there is no consensus in the scientific community regarding climate change? Poor communication and information manipulation lead to the logic fallacies that allow people to continue to make lifestyle choices with negative consequences simply because they need to feel safe.

To approach this whole topic from a different perspective, what harm would it do to reduce our consumption of natural resources and production of carbon dioxide, other greenhouse gases, and harmful airborne particulates? Choices that preserve the diversity of plants, animals, cultures, and habitats are much more beneficial than harmful. The core question we need to ask ourselves is whether we want our choices, and hence our actions, to enhance or harm the world. Do we or don't we take action? I choose to take action.

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■ **In the October 2011 issue** of PHYSICS TODAY, Steve Sherwood and, in a separate article, Richard Somerville and Susan Joy Hassol decry the reluctance of the general public to accept that anthropogenic release of greenhouse gases into the atmosphere is the primary driver of current global warming. Yet neither article even mentions nuclear power as potentially the major vehicle for the reduction of greenhouse gas emissions.

If the reduction of annual carbon dioxide emissions to near zero by mid-century is necessary, as Somerville and Hassol show in their figure 5, then development of nuclear power at the fastest imaginable rate would seem to be the only measure remotely equal to the task. People have appreciated by now that the limited and unsteady power generation afforded by windmills and solar panels cannot cope with

a job of that magnitude any time in the near future.

It seems quixotic to me that physicists, of all people, should fail to point out, at every available opportunity, that nuclear power is the only feasible and potentially effective resolution to the challenge posed by global warming. While calling attention to the motes in others' eyes, it would be useful for scientists to contemplate the motes in their own and become champions of nuclear power before it is too late.

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The inspiring article "Science controversies past and present" describes similarities among current climate change debates and some historical ones about the acceptance of Copernicus's heliocentric theory and Einstein's general theory of relativity. However, author Steve Sherwood does not mention an important key feature shared by each of the two historical examples: the accurately and convincingly corroborated predictions made according to the framework of both theories that led to their acceptance (no dogma needed) by the scientific community and ultimately by the public.

General relativity provided a specific prediction for the motion of the perihelion of Mercury, with no room for fakery. As Banesh Hoffmann put it,[1] "There was nothing arbitrary that could be specially adjusted to fit the fact." Similarly, as John Rigden wrote,[2] Urbain Leverrier "did not simply say, 'My calculations prove that something is out there.' Not at all. Leverrier pinpointed a location: right ascension 22 h 46 m; declination, –13°24′." With that precise information, Neptune was seen for the first time, was added to the map of known planets, and definitively indicated the Copernican system.

Perhaps the link missing from Sherwood's article is a pointer to a precise prediction of a specific consequence of climate change.

References

1. B. Hoffmann, in collaboration with H. Dukas, *Albert Einstein, Creator and Rebel*, Viking Press, New York (1972), p. 124.
2. J. S. Rigden, *Am. J. Phys.* **73**, 1094 (2005).

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I was extremely disappointed to see Steve Sherwood's article comparing resistance to heliocentrism half a millennium ago with modern resistance to the idea that dire consequences will result if urgent action is not taken soon to reduce carbon dioxide emissions. How can those ideas even be put on the same footing? The first is a physical theory whose validity poses a single, clear question, while the second involves a large set of issues, some scientific, some economic, some technological, and some political, with answers that are not yes or no but involve matters of degree and prudential judgment.

There are legitimate questions about how much recent warming is due to CO_2, how much warming will occur in the future, how harmful it will be, how effective different mitigation strategies will be, how reasonable it is to expect action from enough of the world to make a difference, and what the cost–benefit calculation will be. Sherwood's psychological judo maneuver of comparing those pushing back against demands for immediate drastic action against CO_2 emissions with those who resisted heliocentrism delegitimizes any push-back efforts. The following portion of Sherwood's article ought to have been a clear tip-off that the intent was not to further scientific understanding and communication but to shut it off:

> Many who are unwilling to accept the full brunt of greenhouse warming have embraced a more comforting compromise reminiscent of the Tychonic system: that CO_2 has some role in climate but its importance is being exaggerated. But accepting a nonzero warming effect puts one on a slippery slope: Once acknowledged, the effect must be quantified, and every legitimate method for doing so yields a significant magnitude. As the evidence sinks in, we can expect a continued, if slow, drift to full acceptance.

Excuse me, but what the heck can that mean? What does "full acceptance" mean? That we must cut CO_2 production to zero tomorrow? Anything less can be construed as less than "full acceptance." And what does "significant magnitude" of warming mean? Must every warning of even worse warming or worse consequences be accepted or else one is guilty of standing on the "slippery slope"?

I have respected PHYSICS TODAY for its previous excellent historical pieces. It is therefore a shock to see such a blatantly political article published in the magazine.

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