

Twisted Revision

The most precious intangible any scientist can earn is a reputation for the courage to change directions when new evidence compels a switch. Similarly, I suspect, respectability for a journalist is the ability to sort the shallow from the deep and to ensure that all quotations have been checked for accuracy and context.

I (along with Vice President Al Gore) am branded by Charles Krauthammer ["Global Warming Fundamentalists," op-ed, Dec. 9] as being "inflexible and intolerant" for my concern over the potential seriousness of global warming. To us "global warming fundamentalists," Krauthammer asserts, "uncertainty is a foreign feeling." For a scientist, that is a pretty serious charge.

The prime evidence for this attack is a few snippets quoted from a 1971 scientific paper of which I—then a graduate student—was junior author. Krauthammer quotes me as saying carbon dioxide from industrial sources "is unlikely to produce a runaway greenhouse effect on Earth" as if that 28-year-old belief refutes my current concerns for the two dozen billion tons of carbon dioxide we humans dump annually into the air.

Ironically, though, this polluting would not have produced a "runaway greenhouse effect" in 1971—nor would it today. Krauthammer seems unaware that "runaway greenhouse" is jargon for conditions on Venus, where oven-like temperatures result from a massive carbon dioxide greenhouse effect. In the context of earth, I have never been such a catastrophist, then or now, as this quotation proves, even if the column turns it upside down to make an opposite point.

Krauthammer goes on to note that in that same paper I calculated that global increases in aerosols (i.e., hazes from industrial and agricultural activities) could cause very large-scale cooling, greater than the warming then projected.

That I did do, but Krauthammer neglects to mention that I explicitly said very little was known about the extent of these aerosols. We simply cited existing literature (not making our own predictions) that suggested that global dust content was increasing significantly. Within a few years, it became clear—in no small measure because of inquiry stimulated by this controversial paper—that aerosols were mostly a regional problem

and that greenhouse gases were more significant a climate threat than I had previously calculated.

Only a few years later this shift toward warming over cooling (and the open admission of a large degree of uncertainty over details) was explicitly noted in another

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scientific article (*Journal of the Atmospheric Sciences* 1975). This 1975 correction to the cooling hypothesis that had been current in 1971 was not published by one of today's senior "contrarians"—a group of maybe a dozen scientist-dissenters backed up by millions of dollars from the fossil fuel industry's public relations campaigns—but by me.

All I was doing then was precisely what scientists are trained to do: follow the evidence where it leads, revise our opinions as new data or theories emerge and state the conclusions with uncertainties attached. I have written dozens of scientific papers with uncertainty as a prime theme and have run several meetings on ways to quantify uncertainties so that wild opinions can be separated from more likely estimates to help the policy process proceed more rationally.

This brings me to the worst accusation that Krauthammer huris: He alleges that I try to suppress opposing views, quoting me as believing it is "journalistically irresponsible to present both sides." This out-of-context quote is a gross distortion of my oft-published views in which I argue that it is irresponsible to cover science as if it were a political contest—that is, quote the Democrat then get the other side, the Republican. Such balance is appropriate in covering two-party politics, but there are rarely only two sides in science and, more important, not all opinions are equally credible.

To quote a hundred-scientist assessment in one sentence and then "balance" the story by giving equal space and credibility to one of a handful of contrarian scientists who represent a tiny minority of knowledgeable opinions is irresponsible journalism in my opinion. Such false balance projects a distortion of the main-

stream knowledge base of the scientific community because it represents all opinions as somehow being equally credible, even though thousands of scientists have worked for years to sort out the likely from the unlikely—and we're still doing that because science is never 100 percent certain of anything.

Krauthammer's column is subtitled "nuclear winter without the nukes." That's ironic, because in the actual controversy over nuclear winter, it wasn't the contrarians whose scientific work and public outreach convinced a skeptical scientific community (and an even more hostile peace activist community) that the original conception of "nuclear winter" in 1983 needed revision. Rather, it was I and my former students Curt Covey and Starley Thompson. Thompson and I not only did the revisionist science but, in a move rare for scientists, visibly explained (in *Foreign Affairs*, 1985) the revisions to the non-scientific world—and took the political heat for the correction that followed: "nuclear fall."

In short, I am not now and never have been in the ends-justify-the-means club.

Krauthammer ends his column with a call for "a modicum of humility before we go ahead and wreck the good life we've developed over 200 years in the name of a theory." But the vast bulk of published studies in the economics literature (save one consulting company's calculation now being ballyhooed by media ads of the polluting industries—which of course don't say that this study is based on absurdly pessimistic assumptions) suggest that most proposed policy strategies to help mitigate global warming would cost the world economy anywhere from a net benefit to only a percent or so loss of GDP.

I do believe in characterizing uncertainty and in reporting the many sides of a scientific debate, but only if the relative credibility of each position is stated. And, finally, I do believe that global warming, while not certain, is a significant potential threat that deserves some efforts to slow down the rate at which we use the atmosphere as a free sewer.

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