## Global Warming: An Insignificant Trend?

**AN ALARMING VIEW OF GLOBAL WARMING,** reflecting the summaries of the United Nations' Intergovernmental Panel on Climate Change (IPCC), was presented by Donald Kennedy in "An unfortunate U-turn on carbon" (Editorial, 30 Mar., p. 2515). However, the overwhelming balance of evidence shows no appreciable warming trend in the past 60 years; hence, it is unlikely to be significant in the future.

Support for this view comes primarily from weather satellites, which provide the only truly global data, independently confirmed by balloon sondes, and endorsed in a National Research Council report (*1*). Also, surface data from U.S. weather stations show the warmest years of the twentieth century as being around 1940 (*2*). The post-1940 global warming claimed by the IPCC comes mainly from distant surface stations and from tropical sea surface readings, with both data sets poorly controlled in both quality and location. Furthermore, there are no "fingerprints," such as a characteristic geographic distribution, that might link such a claimed warming to increasing greenhouse-gas emissions.

Climate models all predict a faster warming for the atmosphere than for the Earth's surface. This throws further doubt on the reality of the reported surface warming and lowers our confidence in model-predicted future changes. Independent evidence against current climate models and the IPCC surface record comes from a variety of non-thermometer "proxy" data. While showing temperatures rising up to about 1940, they do not show a warming trend thereafter. The recent shrinking of glaciers and of Arctic sea ice, while real, is most likely a delayed consequence of the pre-1940 warming; so is the warming of the deep ocean.

**"[T]he warming trend... during the past 20 years is undoubtedly real"**

**"[E]vidence shows no appreciable warming trend in the past 60 years"**

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Finally, sea-level rise has gone on since the peak of the last Ice Age, and will doubtless continue at the present rate (of ~18 cm per century) for several more millennia as Antarctic ice continues to melt slowly—independent of any human actions. Quite apart from these scientific points, economists suggest that a moderate warming would produce net benefits, raising the gross national product and average income, especially for the agriculture and forestry sectors (*3*). On the other hand, enforcing the Kyoto Protocol—reducing energy use by more than 30% within a decade—would not only be very costly but also ineffective. Even if rigidly enforced, it would reduce calculated temperatures in 2050 by an insignificant 0.06 °C (*4*). However, these shortcomings of the Kyoto Protocol in no way invalidate "no regrets" policies, like striving for increased conservation and higher energy efficiencies wherever they make economic sense.

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2. S. F. Singer, testimony to Senate Commerce Committee (July 18, 2000), www.sepp.org/NewSEPP/senatetestimony.htm
3. R. Mendelsohn, J. E. Neumann, Eds., *The Impact of Climate Change on the United States Economy* (Cambridge University Press, Cambridge, 1999).
4. M. Parry *et al.*, *Nature* **395**, 741 (1998); S. F. Singer, *Hot Talk, Cold Science: Global Warming's Unfinished Debate*, (The Independent Institute, Oakland, CA, ed. 2, 1999), p. 68.

### Response

**SINGER MAKES MUCH OF THE ALLEGED** discrepancy between satellite and surface measurements, and references the National Research Council report (*1*). Here is what the Executive Summary of that report says: "In the opinion of the panel, the warming trend in global-mean surface temperature observations during the past 20 years is undoubtedly real and is substantially greater than the average rate of warming during the twentieth century. The disparity between surface and upper air trends in no way invalidates the conclusion that surface temperatures are rising."

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**WITH ITS ARDENT RHETORIC ABOUT** President Bush's caution against immediate action on climate change, Donald Kennedy's editorial undermines the proper role of *Science*. That role is to provide scientific analyses, not to argue for specific politically derived proposals. To join that fray is to endanger the credibility scientists still have with a public that is increasingly cynical about its sources of information.

It is the job of policymakers to consider all factors, including economics and international political issues, before setting policies and taking actions. Stephen Schneider of Stanford University, a leading expert in atmospheric research, has said, "Of course, whether to act is not a scientific judgment, but a value-laden political choice that cannot be resolved by scientific methods" (*1*). Bush has declined to classify carbon dioxide as a pollutant under the Clean Air Act. Since, like water, it is essential to all life, his decision seems a reasonable one and it does not prejudice future actions. He also had the courage to end years of dithering about the Kyoto Protocol after concluding that it was unworkable, inappropriate, and unjustified, a conclu-

sion that echoes a view long held by economists. And this decision also does not prejudice future action.

I am a regular reader of climate-related articles in *Science*, and it seems they tell us that while progress is being made, much more research remains to be done in the daunting task of understanding the climate system. *Science* should take a leading role in communicating this progress. It should not pollute this role by jumping into the political arena.

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## Or, Global Warming: A $25-Billion Challenge?

**WHETHER OR NOT GLOBAL WARMING IS AN** identifiable phenomenon attributable to specific causes, including $CO_2$ generated largely from burning fossil fuels, is a question that has now exercised the judgment of innumerable experts in both the United States and Europe. Nevertheless, these studies have such profound policy implications that President Bush has recently appeared to modify his earlier unequivocal opposition to the Kyoto Protocol, and U.K. Ministers have come under pressure from their media and the "Green Movement" to persuade him to move even further in support of its provisions.

Because of entrenched prejudice against nuclear power, politicians are generally unwilling to accept the conclusions of virtually unanimous analyses indicating that it is the only available long-term substitute for fossil fuels. They avoid their obligations to humanity by supporting what are known to be grotesquely inadequate, unreliable, or uneconomic "renewable" sources, such as wind power in the United Kingdom. In the United States, because its dependence on fossil fuels is immense and the economic impact of foreseeable adjustments so large, the administration has sought justification for a "do nothing now" policy in the skepticism generated by a number of studies that question the existence of global warming or the ability of scientists to identify causes beyond reasonable doubt.

Both the House of Commons committee, which reported on this issue in 1990 (*1*), and the Royal Society and the Royal Academy of Engineering, which issued two reports in 1999 and 2000 (*2*), were convinced that the phenomenon was real, the causes identifiable, and the consequences of inaction likely to be at best serious and at worst catastrophic. Both suggested that