

References and Notes

1. S. Winchester, *Krakatoa: The Day the World Exploded: August 27, 1883* (Viking, London, 2003). [Reviewed by T. Simkin, R. S. Fiske, *Science* **301**, 50 (2003)]
2. G. K. Gilbert et al., *The San Francisco Earthquake and Fire of April 18, 1906, and Their Effects on Structures and Structural Materials* (U.S. Geological Survey, Washington, DC, 1907).

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SCIENCE AND POLITICS

Anti-Realism in Government

Naomi Oreskes

In the mid-1990s, a group of scientists led by Paul Gross and Norman Levitt made a grand fuss about attacks on science from the “academic left.” Most of these attacks originated in France and were linked to the philosophical question of how well human-constructed theories can map onto human-independent reality, an academic anxiety if ever there was one. But while Gross and his friends engaged in academic internecine warfare over postmodernist theory, a far more serious attack on science was building on the political right here in the United States, with serious consequences beyond the walls of academe. This attack is the subject of journalist Chris Mooney’s *The Republican War on Science*.

As Mooney recounts, for two decades, influential Republicans—initially in Congress and now also in the White House—in concert with determined allies in private industry and fundamentalist Christian organizations, have systematically denied, disparaged, and misrepresented scientific information on topics relevant to public policy. The list is long: acid rain, global warming, the efficacy of condoms in preventing the spread of sexually transmitted diseases, the health impacts of excess dietary sugar and fat, the alleged link between abortion and breast cancer, the status of endangered species, the efficacy of abstinence-only sex education programs, the therapeutic potential of adult stem cells, and more.

On these issues, a strange-bedfellows alliance has sought to mislead both the voting public and elected representatives about the scientific facts: misrepresenting real debates, exaggerating uncertainty, interfering with the activities of expert agencies, trumpeting the views of outlier scientists whose interpretations are rarely to be found

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in the refereed literature, and attacking the integrity of genuine experts (1). In frighteningly Orwellian fashion, these actions are carried out in the name of “sound science.”

Much of this will be familiar to those who read the 2003 report prepared for California Congressman Henry Waxman, “Politics and Science in the Bush Administration” (2), or the 2004 report of the Union of Concerned Scientists, “Scientific Integrity in Policy-making: An Investigation into the Bush Administration’s Misuse of Science” (3). But Mooney goes further, documenting the roots of these abuses in the Reagan administration and the Congress of Newt Gingrich. Historically, Republicans have often been more sympathetic to scientific elites than populist-oriented Democrats, but the animus growing over the past 20 years has culminated in the present administration, which, being unable to control science, seems determined to undermine it.

Mooney points out that in many cases, the same groups and individuals have been involved in multiple misinformation campaigns. Consider global warming and ozone depletion. Two leading deniers of the reality or severity of anthropogenic global warming—S. Fred Singer and Sallie Baliunas—previously vociferously denied the link between chlorofluorocarbons (CFCs) and depletion of stratospheric ozone. Although his views lie well outside the mainstream of expert scientific opinion and it has been a long time since he regularly published in the refereed literature, Singer has been repeatedly invited to testify in Congress. Both he and Baliunas have links to the George C. Marshall Institute, founded in 1984 to defend Ronald Reagan’s Strategic Defense Initiative against the majority opinion of expert physicists that it was ill-conceived. Since then, the institute has claimed to support “sound science” in public policy while promoting positions that run against the mainstream of scientific opinion but are consistent with an uncompromisingly anti-regulatory ideology. In recent years, it has received funding from ExxonMobil, presumably not coincidentally linked to its efforts to deny global warming (4). The plot thickens further. One of the institute’s founders and its current chairman of the board, Robert Jastrow, has written books promoting intelligent design (5–7). Frederick Seitz, its chair emeritus, is well known in the scientific community as a past president of the National Academy of Sciences. Less well known is his role in the 1980s as a principal adviser to the R. J. Reynolds Tobacco Company in its support of biomedical research that might cast doubt on the links between tobacco and cancer (8).

The Republican War on Science

by Chris Mooney

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How are denials of global warming, the impact of CFCs on stratospheric ozone, and the link between tobacco and cancer; support of missile defense; and advocacy of creationism related? On the face of it, scarcely. But they all involve the promotion of a right-wing political agenda, and they all involve grotesque misrepresentations of scientific evidence. “Doubt is our product” was the slogan of an internal memorandum from the Brown and Williamson Corporation as it set out to deny the scientific evidence linking smoking to cancer well after

the epidemiological evidence was clear, and the same strategy underlines anti-scientific campaigns today (9, 10). The connections Mooney discusses are crucial, because they provide proof that these actions are politically and economically motivated, rather than based on principled scientific worries.

The same people are repeatedly involved in the same obfuscations.

Scientists have traditionally been loath to foray into politics for fear of politicizing science, but Mooney’s book makes it clear that when sensible people stand on the sidelines, a great deal of nonsense can be spread. Scientists and scientific societies have tried in recent years to correct misrepresentations and clarify misunderstandings, but the efforts have been too few and far between. Those who would attack science for political gain are organized, persistent, and well-financed. *The Republican War on Science* makes clear that scientists need to do more to present their knowledge to the rest of society, because there is no shortage of people willing to misrepresent it.

References and Notes

1. To these activities documented by Mooney, add the harassment of researchers by punitive demands for documentation of work already published in peer-reviewed journals. See Donald Kennedy’s Editorial, *Science* **309**, 1301 (26 August 2005).
2. http://democrats.reform.house.gov/features/politics_and_science/pdfs/pdf_politics_and_science_rep.pdf.
3. www.ucsusa.org/scientific_integrity/interference/reports-scientific-integrity-in-policy-making.html.
4. ExxonMobil’s contributions to the Marshall Institute are documented in their annual reports. See www.exxonsecrets.org/html/orgfactsheet.php?id=36 or www.environmentaldefense.org/article.cfm?contentid=3804&CFID=21084385&CFTOKEN=29888831.
5. R. Jastrow, *God and the Astronomers* (Norton, New York, 1978).
6. R. Jastrow, *The Enchanted Loom: The Mind in the Universe* (Simon and Schuster, New York, 1981).
7. www.godandscience.org/love/sld014.html.
8. S. A. Glantz, J. Slade, L. A. Bero, P. Hanauer, D. E. Barnes, Eds., *The Cigarette Papers* (Univ. California Press, Berkeley, CA, 1996).
9. D. Michaels, *Sci. Am.* **292**, 96 (June 2005).
10. On the misrepresentation of science in legal and regulatory settings, see also *Am. J. Public Health (Suppl.)* **95**, S1–S150 (2005).

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(2) Realists, and especially today's neorealists, consider the absence of government, literally anarchy, to be the primary determinant of international political outcomes. The lack of a common rule-making and enforcing authority means, they argue, that the international arena is essentially a self-help system. After the annexation of Czechoslovakia, when the failure of the anti-League realist conservatives gathered around Neville Chamberlain and of this policy became clear, they tried to rebuild the very security system they had earlier demolished. Those who supported collective security were labeled idealists. Morgenthau systematizes realism in international relations on the basis of six principles that he includes in the second edition of *Politics among Nations*. In analytic philosophy, anti-realism is an epistemological position first articulated by British philosopher Michael Dummett which encompasses many varieties such as metaphysical, mathematical, semantic, scientific, moral and epistemic. The term was coined as an argument against a form of realism Dummett saw as 'colorless reductionism'. In anti-realism, the truth of a statement rests on its demonstrability through internal logic mechanisms, such as the context principle or intuitionistic logic, in Realism, set of related theories of international relations that emphasizes the role of the state, national interest, and military power in world politics. Neorealism differed from classical realism in two important respects: methodology and level of analysis. In terms of method, realism was reconfigured as a rigorous and parsimonious social-scientific theory drawing in particular on microeconomics. Regarding level of analysis, Waltz argued that traditional realist arguments about domestic institutions, the quality of diplomacy and statecraft, national morale, and human nature were largely irrelevant.