Chapter 5

The Origins of Denial

> Doubt is our product since it is the best means of competing with the "body of fact" that exists in the mind of the general public.
>
> —Unnamed tobacco executive, Brown & Williamson (1969)

In the 1990s, as the scientific evidence for human-caused global warming grew stronger and calls for action to curtail greenhouse gas emissions grew louder, fossil fuel industry executives made a critical decision. Rather than concede the potential threat climate change posed and the necessity of ultimately reducing fossil fuel use, they would instead engage in a massive, media-savvy public relations campaign. The strategy was simple: While presenting a seemingly forward-thinking, pro-environmental public face, oil companies and allied economic and political interests would, behind the scenes, use various means to sow doubt about the validity of the underlying science on climate change. It was a finely tuned balancing act intended to forestall any governmental policy action to regulate greenhouse gas emissions while seeking to maintain a positive corporate image.

Doubt Is Their Product

The source of the chapter's opening quote is David Michaels's *Doubt Is Their Product*.[1] The book describes the corporate public relations campaigns that the tobacco and other industries used for decades to discredit research demonstrating adverse health impacts of their products—a campaign that was successfully satirized in the 2005 movie *Thank You for Smoking*. The striking similarity with the tactics of climate change denial did not go unnoticed by former *Science* magazine

editor-in-chief Donald Kennedy, who commented on the book's jacket, "if you're worried about climate change, keep worrying, because the same program is underway there."

In *The Republican War on Science,* Chris Mooney argues that the corporate-funded public relations campaigns of recent decades aimed at discrediting the science behind policies designed to protect our environment and health arose from conservative distaste of governmental regulation.[2] Those campaigns came to a head, he suggests, in the extreme antiregulatory atmosphere of the George W. Bush administration of 2000–2008. Legislation such as the Data Quality Act of 2001 saddled government agencies with onerous requirements on how they must respond to demands and complaints from industry groups regarding any data or scientific studies used in establishing government policy. It was, in Mooney's words, "a science abuser's dream come true," and it signaled the increasing politicization of science at the very time the hockey stick was coming to prominence.

Industry groups sought to frame the public discourse by constructing, to use the characterization of Naomi Oreskes and Erik Conway in *Merchants of Doubt,*[3] a virtual Potemkin village of pseudoscience institutions—think tanks, journals, news sites, and even a cadre of supposed experts, ideally with prestigious affiliations—to promote their own scientific (or, more aptly, antiscientific) messaging. These professed experts were used to promote industry-favorable views in the framing of policy-relevant matters of science, to manufacture doubt about mainstream scientific findings disadvantageous to their client, and to generate pseudoscientific sound bites that could be presented to the public under the auspices of neutral-sounding groups.[4] Using this tactic, industry advocates have, in the words of famed Stanford environmental scientists Paul and Anne Ehrlich, "sowed doubt among journalists, policymakers, and the public at large about the reality and importance" of an array of societal and environmental threats.[5] The Ehrlichs coined the term *brownlash* to characterize this orchestrated backlash against "green" policies.

The choice of language employed in antiscientific attacks is worthy of particular attention, as it has been exploited by purveyors of disinformation in a distinctly Orwellian manner, often to great effect in the public discourse. Their lexicon features simple, pithy terms like "sound science" that are repeated as mantras. Who, after all, could be against

sound science? Implicit in this motif, however, is the notion—wholly inconsistent with the way science actually works—that the scientific enterprise must offer absolute proof if it is to be used to inform policy. Like a defense lawyer, industry special interests seek to introduce some measure of doubt into the public mindset. The demand for sound science is made for a curiously selective array of findings, be they the ozone-depleting properties of the chlorofluorocarbons (CFCs) once used in spray cans, or the adverse health effects of industrial mercury pollution. The true metric applied by industry special interests is, of course, not the actual quality of the underlying science, but simply this: Are the scientific findings in some way inconvenient to their clients (the health insurance industry, the pharmaceutical industry, the chemical industry, the fast food industry, or, of course, the fossil fuel industry)?

If so, those findings are quickly labeled "junk science" and are purported to represent the flawed or even fraudulent claims advanced by a cabal of ostensibly corrupt university professors, scientists, journal editors, and governmental science funding agencies. Mooney notes that, from the language being used, "you would think that environmental science, as conducted by America's leading universities, suffers from endemic corruption on a scale reminiscent of Tammany Hall."[6] The effort seeks simultaneously to paint scientists as enemies of the people and to spread doubt and confusion about established scientific findings. Meanwhile, it encourages educators to "teach the controversy"[7] when—scientifically speaking—there is none.

There is rich irony here, as the clearest cases of true junk science seem to have resulted from the corruptive influence of industry itself. Particularly striking examples can be found in the area of biomedical science and pharmaceuticals, where there have been numerous high-profile scandals involving companies that either ghostwrote articles for scientific journals singing the praises of their particular pharmaceutical product[8] or suppressed, through threat of litigation, scientific publications damaging to the credibility of their advertised claims.[9]

The attacks are typically carried out by organizations and groups with names like "Citizens for a Sound Economy" that masquerade as grassroots entities but in reality represent powerful industries, and have hence been termed "Astroturf" organizations. These groups employ ideologically aligned media outlets and a network of lawyers, lobbyists, and politicians to advance their message. Their efforts are aided

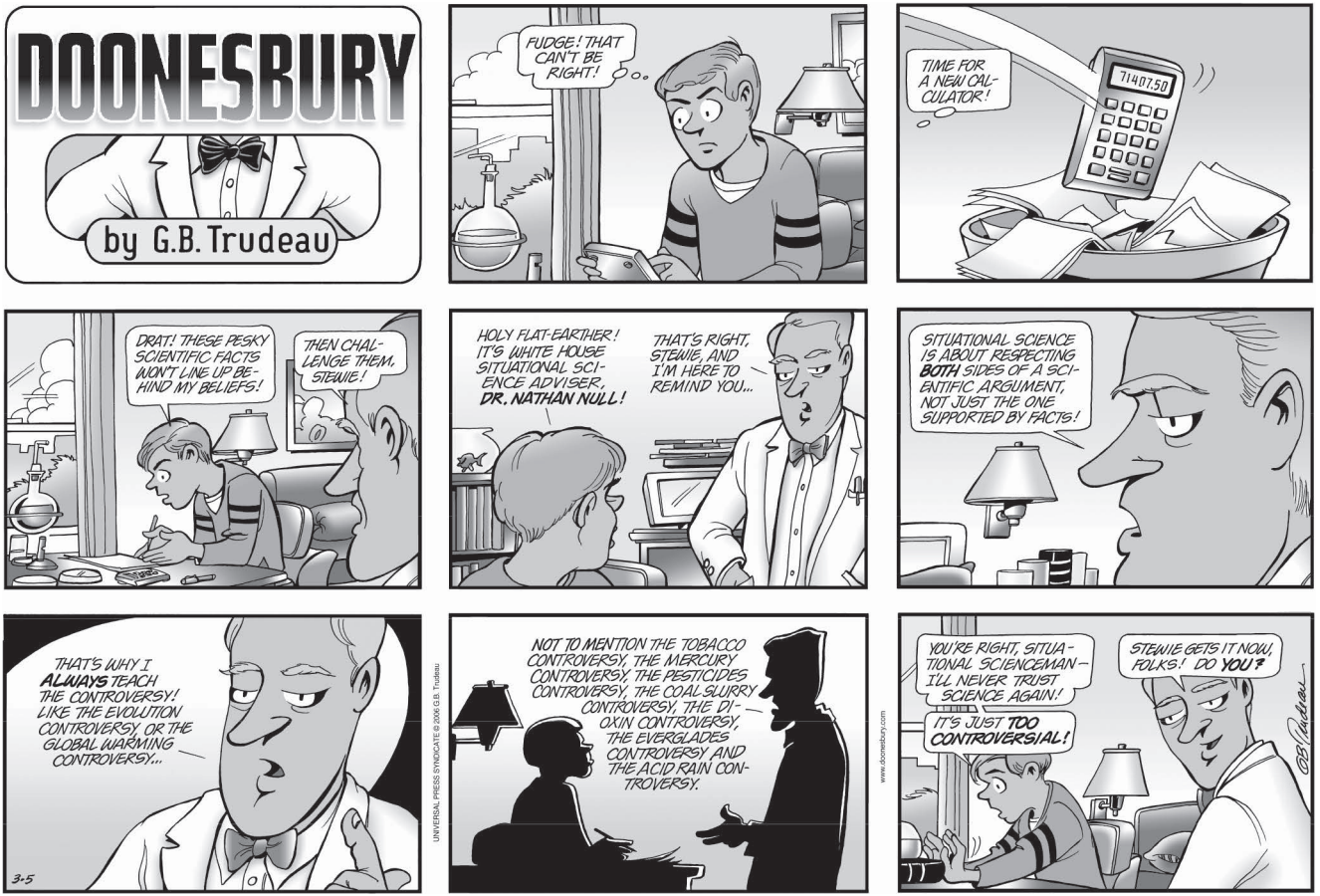

Figure 5.1: Teach the Controversy

A Doonesbury cartoon encapsulates the spirit of attacks on the science relevant to environmental and consumer protections. [DOONESBURY © G. B. Trudeau. Reprinted with permission of UNIVERSAL UCLICK. All rights reserved.]

by honest citizens, and sometimes even by mainstream media outlets, who are taken in and exploited, often unwittingly, to create an echo chamber of mass disinformation that permeates our airwaves and television screens and the Internet.

A central focus of many of these campaigns in recent years has, of course, been the discourse over global warming and climate change. For more than a decade, the scientific community, in its effort to communicate the threat of climate change, has had to fight against the headwind of this industry-funded disinformation effort. The collective battles are what I term the "climate wars."

The Climate Wars

The evidence for a well-organized, well-funded, and orchestrated climate change disinformation campaign has been laid out in detail on public interest group Web sites,[10] in articles in popular magazines,[11] and by an increasingly rich array of scrupulously researched books on the topic.[12] The campaign has its roots in the larger industry-funded public relations efforts that emerged during the 1970s and 1980s over acid rain, ozone depletion, missile defense, stem cell research, biodiversity loss, and a host of other issues.[13] Foreshadowing the climate change denying tactics outlined in the 2002 Luntz memo were the activities of the Global Climate Coalition (GCC). Formed in the late 1980s, the GCC was a consortium of more than fifty companies and trade associations representing chemical, mining, automotive, transportation, fossil fuel, shipping, farming, power, defense, pharmaceutical, and manufacturing industries with the purpose of funding and organizing opposition to emerging policy efforts aimed at greenhouse gas emission reductions. They played a critical role, it may be recalled, in the attacks on Ben Santer, accusing him of "political tampering" and "scientific cleansing" following publication of the IPCC Second Assessment Report.

In April 1998, just days after the publication of our original hockey stick article, new revelations surfaced about a prominent GCC member, the American Petroleum Institute (API). Internal documents leaked to the *New York Times* showed it was hatching a plan to "recruit a cadre of scientists who share the industry's views of climate science and to train them in public relations so they can help convince

journalists, politicians and the public that the risk of global warming is too uncertain to justify controls on greenhouse gases."[14] The GCC itself was disbanded in 2001 following the defection of prominent members such as British Petroleum that—with some irony, in retrospect—were concerned about the negative public relations of being associated with an anti-environmental agenda.[15] While the GCC no longer itself exists, the denialist campaigns continued unabated. Other fossil fuel interests—oil giant ExxonMobil being a big player among them—have continued to fund groups spreading climate change disinformation for years.

Wealthy privately held corporations and foundations with close interests in, or ties to, the fossil fuel industry, such as Koch Industries[16] and the Scaife Foundations,[17] have become increasingly active funders of the climate change denial campaign in recent years. Unlike publicly traded companies such as ExxonMobil, these private outfits can hide their finances from public view, and they remain largely invulnerable to outside pressure. In recent years, as ExxonMobil has been pressured by politicians on both sides of the aisle to withdraw from funding the climate change denial movement,[18] Koch and Scaife have stepped up, contributing millions of dollars to the effort.

Many organizations have settled in the Potemkin village of climate change denial. Among them are the American Enterprise Institute, Americans for Prosperity, Advancement of Sound Science Center, Competitive Enterprise Institute, Cato Institute, Hudson Institute, George C. Marshall Institute, Fraser Institute, Heartland Institute, Alexis de Tocqueville Institution, Media Research Center, National Center for Policy Analysis, and Citizens for a Sound Economy (better known now as Freedomworks). There are literally dozens of others.[19]

Among the willing accomplices in the campaign of deceit are the various media outlets that often propagate climate change disinformation in their editorial and opinion pages. These venues include newspapers such as the *National Post* and *Financial Post* in Canada; the *Daily Telegraph, Times*, and *Spectator* in the United Kingdom; and U.S. newspapers such as the *Washington Times* and the various outlets of the Murdoch, Scaife, and Anschutz conservative media empires, which include not only prominent outlets such as Fox News and the *Wall Street Journal*, but syndicates such as the regional Examiner.com network and Web sites like Newsbusters.

Agents of Denial

Not only are there connections between the current campaign to attack the science of climate change and past industry-funded campaigns to deny other industrial health and environmental threats such as the dangers of smoking tobacco and of acid rain, environmental mercury contamination, and ozone depletion. Some of the very same scientists have been employed as advocates for not just one or two, but many of these issues. Think of them as all-purpose deniers.

The grandfather of all-purpose denial was Frederick Seitz, a solid-state physicist possessing impressive scientific credentials. Seitz was a former head of the U.S. National Academy of Sciences and in 1973 was awarded the prestigious Presidential Medal of Science. Seitz found common cause with two other similarly minded physicists—Robert Jastrow, founder of the NASA Goddard Institute for Space Studies (GISS) laboratory now directed by James Hansen, and William Nierenberg, one-time director of the Scripps Institution for Oceanography—in supporting and advocating for President Ronald Reagan's 1980s missile defense program.[20] The Strategic Defense Initiative was controversial enough that the issue of whether it was wise, let alone efficacious, divided the physics department faculty at UC Berkeley where I was doing my degree at the time.[21]

In 1984, the three scientists joined together to form the George C. Marshall Institute—a conservative think tank that *Newsweek* magazine called a "central cog in the denial machine."[22] Their chief mission was to combat efforts by Cornell University planetary scientist Carl Sagan and others who sought to raise awareness about the potential threat of "nuclear winter." The massive detonation of nuclear warheads during a thermonuclear war, Sagan and others hypothesized, might produce a global dust cloud as devastating for humanity as the asteroid-induced global dust storm that ended the reign of the dinosaurs. The concept had even penetrated into popular culture with the 1983 song "Walking in Your Footsteps" by the Police.[23] That nuclear winter projections were based on climate models brought climate modeling onto the radar screen of Seitz, Jastrow, and Nierenberg, and it set the stage for their later role as key climate change deniers.

Upon retirement from academia in the late 1970s, Seitz worked for the tobacco giant R.J. Reynolds for roughly a decade. In this capacity,

he accepted more than half a million dollars while lending his scientific credibility to advocacy efforts aimed at downplaying the health threats posed by the smoking of tobacco.[24] In the early 1990s, Seitz went on to chair the George C. Marshall Institute full time, where he campaigned against the reality of global warming and the threat CFCs posed to the ozone layer.[25]

In 1998, in conjunction with yet another climate change denial group, the Oregon Institute of Science and Medicine, Seitz spearheaded a petition drive opposing the Kyoto Protocol to limit greenhouse emissions, mailing the petition with a cover letter and an article attacking the science of climate change to a broad list of recipients. He portrayed these materials as having the imprimatur of the National Academy of Science (NAS) by formatting the article—"Environmental Effects of Increased Atmospheric Carbon Dioxide" by Arthur B. Robinson, Noah E. Robinson, and Willie Soon—as if it had been published in the prestigious *Proceedings of the National Academy of Science* (*PNAS*), which it definitely had not been. Seitz even signed the enclosed letter using his past affiliation as NAS president. The NAS took the extraordinary step of publicly denouncing Seitz's efforts as a deliberate deception, noting that its official position on the science was the opposite of that expressed in Seitz's letter. The matter, coincidentally enough, played out just days before the publication of our 1998 hockey stick article in *Nature*.[26]

The "Oregon petition," with thirty-one thousand nominal "scientist" signatories, has often been touted as evidence of widespread scientific opposition to the science underlying human-caused climate change. However, a subsequent analysis by *Scientific American* found that few of the signatories were even scientists (the list included the names Geri Halliwell, one of the Spice Girls; and B. J. Hunnicutt, a character from the TV series MASH).[27]

Questionable petitions, misleading articles, and, as we'll see, even one-sided conferences constitute key *modi operandi* in the world of climate change denial. There was indeed a distinct feeling of déjà vu in fall 2007, when I, and many other scientists and engineers, received a packet in the mail consisting of an updated "article" by several of the same authors promoting the same myths and half-truths (e.g., the medieval warm period was warmer than today, the Sun is driving observed temperature changes, and so on). This article, too, was formatted to

look as if it had been published as a peer-reviewed journal article,[28] and yet again was accompanied by a petition demanding the United States not sign the Kyoto Protocol. The origin of these materials was, once again, the Oregon Institute of Science and Medicine.

That group's activities seemed to be part of a coordinated effort. One year earlier, Kenneth Green of the American Enterprise Institute (AEI) was implicated in what at least appeared to be an attempt to solicit pieces from climate scientists critical of a recently published IPCC report in return for a cash award of $10,000.[29] In addition, in recent years, the Heartland Institute, a group that has been funded by both tobacco (Philip Morris) and fossil fuel (Exxon, Koch, Scaife) interests, has financed a series of one-sided conferences on climate change, featuring a slate of climate change deniers, many with no discernible scientific credentials, and most with financial connections of one sort or another to the fossil fuel industry or groups they fund.[30]

S. Fred Singer, whom we met in previous chapters, followed in Seitz's footsteps. Like Seitz, Singer's origins were as an academic and a scientist, and like Seitz, he left the academic world in the early 1990s[31] to advocate against what he called the "junk science" of ozone depletion, climate change, tobacco dangers, and a litany of other environmental and health threats.[32] He founded an entity in 1990 called the Science and Environmental Policy Project (SEPP)[33] that he used to launch his attacks and has also received considerable industry funding for his efforts.[34] Singer was the principal behind the denialist response to the IPCC Fourth Assessment Report, the so-called Nongovernmental International Panel on Climate Change (NIPCC) funded by the aforementioned Heartland Institute, and characterized by ABC News as "fabricated nonsense."[35]

Singer, like Seitz, has been accused of having engaged in serious misrepresentation, in this case involving the great scientist Roger Revelle.[36] Revelle was instrumental in our early understanding of human-caused global warming and the potential threat of continued fossil fuel burning. He is also credited with having inspired many of today's leading climate scientists and is cited by former U.S. vice president Al Gore as the origin for his concern about climate change. In 1991, shortly before Revelle's death, Singer added Revelle as a coauthor to a paper he published in the Cosmos Club journal *Cosmos*. The paper attacked the science of climate change and was nearly identical in both title and content to a paper that Singer had previously authored alone.[37] Reports

from both Revelle's personal secretary and his former graduate student Justin Lancaster suggest that Revelle was deeply uncomfortable with the manuscript, and that the more dismissive statements in the paper were added after Revelle—who was gravely ill at the time and died just months after the paper's publication—had an opportunity to review it.[38]

While Seitz and Singer may have been the most prolific and versatile of the denialists, other scientists have served as specialists in the climate change denial movement. Frequently, though not always, they do so with either direct or indirect financial compensation and support from the fossil fuel industry.[39] Many write op-eds and opinion pieces for conservative-leaning newspapers or outlets supported by industry, such as TechCentralStation. Often they are sponsored to go out on the climate change denial lecture circuit, or they write books that are promoted, marketed, and even published by fossil-fuel friendly groups.

One of the more formidable among them is Richard Lindzen. His credentials, like those of Seitz, are impressive; he is a chaired professor at MIT and a member of the National Academy of Sciences. Lindzen—who also has received money from fossil fuel interests[40]—is perhaps best known for his controversial views that climate models grossly overestimate the warming effect of increasing greenhouse gas concentrations. It all has to do with the issue of climate feedbacks. Feedbacks, as we have seen, are mechanisms within the climate system that can act either to amplify (positive feedback) or diminish (negative feedback) the warming expected from increasing greenhouse gas concentrations. If a climate scientist has spent a career looking for missing feedbacks in climate models that are always of the same sign (positive for a "true believer" and negative for a "denier"), one might reasonably suspect that the endeavor has not been entirely objective. (Ironically, the one missing feedback I've argued for in the climate system is a negative one[41]—a rather inconvenient fact for those who would like to label me a "climate change alarmist.")

Lindzen has made a career of searching for missing feedbacks, but apparently only negative ones. Indeed, it seems as if he has never met a negative feedback he didn't like. And he has been quick to trumpet his claims of newly found negative feedbacks in op-eds, opinion pieces, and public testimony,[42] arguing time and again that his findings point to an overestimation of warming by models and are an indication that cli-

mate change is an overblown problem. Yet each of his past claims has evaporated under further scrutiny.

For years, Lindzen has argued that hypothesized but as yet unestablished negative feedbacks in the climate system will offset the very large positive feedbacks arising from increased evaporation of water into the atmosphere and melting of snow and ice associated with global warming. He has argued that a doubling of CO_2 concentrations will consequently only raise global average temperatures by roughly 1°C (and with zero uncertainty!). Yet the diversity of evidence from the paleoclimate and modern climate record suggests that less than 2°C warming for CO_2 doubling is highly unlikely.[43]

In 1990, Lindzen argued that a drying and cooling of the upper troposphere would mitigate global warming,[44] but later in effect conceded that further work had demonstrated that the mechanism he had proposed was not viable.[45] In 2001 he promoted a new hypothesis, the so-called "iris" effect,[46] in which warming ocean temperatures would supposedly lead to fewer high clouds, causing surface temperatures to cool down.[47] Once again, this hypothesis didn't hold up under scrutiny by other scientists.[48]

Undeterred, Lindzen claimed to find evidence for an additional, new negative cloud feedback, this time based on a putative statistical relationship between tropical sea surface temperatures and satellite measurements of the radiation escaping to space.[49] He claimed that when the tropics warm up, there are more low reflective clouds, causing more solar radiation to be returned to space, thus tending to cool the surface. When climate researcher Kevin Trenberth of the National Center for Atmospheric Research (NCAR) and his collaborators examined Lindzen's claims closely,[50] however, they found the data points Lindzen had chosen to be curiously selective, and the claimed relationship not supported when a more objectively chosen sample was used.[51] A subsequent analysis by other researchers concluded that the available data may actually support a positive overall cloud feedback, not a negative one.[52]

Pros and Amateurs

People like Seitz, Singer, and Lindzen have been in the front lines of professional climate change denial. But others have participated as well.

There is a whole corps of columnists and commentators who help promote climate change disinformation. In the United States, they include prominent radio and TV commentators such as Rush Limbaugh, Glenn Beck, and Sean Hannity, as well as many other lesser known, but similarly active and effective protagonists. Some, such as Bret Stephens of the *Wall Street Journal* and Debra Saunders of the *San Francisco Chronicle*, also operate with the imprimatur of ostensibly mainstream news organizations.

The boundaries between journalist, commentator, and paid industry advocate have become increasingly blurred with the development of the new media. Consider in the United States, for example, individuals such as Christopher Horner of the Competitive Enterprise Institute and James Taylor (no, not the singer-songwriter made famous by "Fire and Rain" and "Sweet Baby James") of the Heartland Institute. Though employed as lobbyists or lawyers by the industry-funded Competitive Enterprise Institute, they are regularly granted a forum by conservative news outlets to pen pieces attacking climate science and climate scientists. Tobacco and fossil fuel industry lobbyist Steven J. Milloy sometimes appears as a "junk science expert" on Fox News.[53] He runs a site called junkscience.org, billing himself, with no apparent sense of irony, as the "junk man." In the United Kingdom, Christopher Booker of the *Telegraph* has such a biased record of reporting on environmental issues that it has earned him the title of "patron saint of charlatans" from award-winning *Guardian* journalist George Monbiot.[54]

Video also has played an increasingly important role in climate change denial. Martin Durkin of the United Kingdom produced the ironically entitled documentary "The Great Global Warming Swindle." British media regulator Ofcom found that the film "did not fulfill obligations to be impartial and to reflect a range of views on controversial issues" and that it "treated interviewees unfairly."[55] This problem was particularly evident in Durkin's interview of MIT physical oceanographer Carl Wunsch, who was upset by the way his words were edited to imply a contrarian viewpoint very much at odds with his actual views.[56]

Then there is the recently deceased science fiction writer Michael Crichton. One of Crichton's last novels, *State of Fear,* was a thinly veiled climate change denialist polemic masquerading as an action adventure novel. Crichton even was invited as a witness in a U.S. Senate committee hearing held by Senator James Inhofe (R-OK) to sow doubt on the

reality of climate change. It is telling that Inhofe had to turn to a science fiction novelist to make his case.

The United Kingdom has produced some of the more colorful climate change deniers. Christopher Monckton, the third viscount Monckton of Brenchley, has emerged on the denial scene in recent years. He claims to be an expert on climate change, though he has no formal scientific training. Richard Littlemore of the fossil fuel industry watchdog group DeSmogBlog tells us that Monckton has been caught on several occasions "indulging in deliberate manipulation of scientific data to arrive at misleading conclusions about climate science."[57] Monckton's assertions aren't confined to science; he has even claimed, falsely, to have won the Nobel Prize.[58] After he had repeatedly represented himself publicly as a member of the House of Lords, the clerk of Parliament took the unprecedented step of publicly demanding he cease and desist making this false claim.[59]

Then there are the amateurs down in the trenches who execute the ground game in the climate wars. Many of these individuals are simply ill informed, and are no doubt acting in good faith in expressing what they believe to be honest skepticism. But strident claims without substance abound, as do absurd accusations against others. Some of the amateurs are more than willing to engage in some degree of mischief, whether it be taking advantage of the IPCC open review process by flooding its authors with countless frivolous comments (each of which must be responded to, according to IPCC rules) or exploiting the Freedom of Information Act (FOIA) and related laws to launch frivolous requests for documents and private correspondence of scientists. A since deceased Tasmanian named John Daly, with his Web site "Still Waiting for Greenhouse," provided an early proof-of-concept for how a single individual with nothing more than a Web site could battle mainstream climate science by peddling contrarian views and maligning the work of dedicated scientists.

Today, much of the trench warfare takes place on the Internet. Former mining industry consultant Stephen McIntyre is especially well known for his broadsides against established climate science. McIntyre frequently uses his Web site climateaudit to launch attacks against climate scientists themselves, often leveling thinly veiled accusations of fraud and incompetence—once, for example, titling a post about a highly respected NASA climate scientist with the rhetorical question "Is Gavin Schmidt Honest?"[60]

Since then, a number of other amateur climate change denial bloggers have arrived on the scene. Most prominent among them is Anthony Watts, a meteorologist for a Fox News AM radio affiliate in Chico, California, and founder of the site "Watts Up with That?" which has overtaken climateaudit as the leading climate change denial blog. Watts also started the Web site SurfaceStations.org, which purported to identify poorly sited meteorological stations in the United States in an effort to demonstrate that the instrumental record of warming temperatures is hopelessly compromised by instrumental measurement biases. With the assistance of the Heartland Institute, Watts published a glossy, very official-looking report about the project, showing lots of photos of ostensibly badly sited meteorological stations, with plots of the supposedly compromised records.[61]

Curiously absent from that report, however, was any direct comparison showing what the surface temperature record looks like both with and without the sites that Watts deemed unworthy. Scientists at the National Oceanic and Atmospheric Administration (NOAA) went ahead and calculated it themselves, producing versions of the continental U.S. average temperature curve both with and without the records in question. You can probably anticipate the result: It was difficult to distinguish the "with" and "without" versions within the thickness of the plot curves. Eliminating the "suspect" data made virtually no difference at all; in fact, the small bias that was found was of the opposite sign. The "corrected" record showed slightly more warming![62] This is just one example of a favored *modus operandi* among climate change contrarians: hyping real or imagined errors that make no difference to any significant scientific conclusions—the scientific equivalent of identifying a typo in a report.

Finally, there is the front line of the climate change denial ground attack. It consists of anti-climate-science activists and conspiracy theorists who operate largely under the radar screen but nonetheless play an essential role in the denial agenda. Their primary tool is the "cut-and-paste," the repetition of contrarian talking points in arguments with friends, neighbors, relatives, and coworkers; in letters to editors of local newspapers; in online newsgroups; in comments sections of Internet news articles; and on blogs. Their role is not to be underestimated, as false statements repeated often enough help create the echo chamber of climate change disinformation.

Not all "amateurs" are what they appear to be. A primary goal of the disinformation machine is to manufacture an illusion of grassroots support. This can be achieved by hiring ringers to pose as ordinary citizens, posting standard contrarian talking points and responses in online news threads, blogs, and the like. Prominent climate change deniers have occasionally been identified making use of a so-called sock-puppet (a "fake online identity to praise, defend or create the illusion of support for one's self, allies or company"[63]). Stephen McIntyre, for example, was found leveling online attacks hiding behind the sock-puppet "Nigel Persaud," while Michael Fumento of the Hudson Institute, perhaps best known for his attacks on environmental activist turned cinematic heroine Erin Brockovich, was once discovered posting self-supporting comments as "Tracy Spencer."[64]

Swiftboating Comes to Climate Change

One of the more unseemly features of the climate change denial campaign has been its use of character assassination as a tool for discrediting climate science itself. It is the art of the smear campaign that has come to be known as "swiftboating." The connection with the term is in fact remarkably direct.

Marc Morano got his start working for radio commentator Rush Limbaugh before moving on to work for the ExxonMobil and Scaife-financed Conservative News Service (now Cybercast News Service).[65] There, Morano was directly implicated in the original swiftboat attack on presidential candidate Senator John Kerry in the run-up to the 2004 presidential election.[66] That attack had taken one of Kerry's greatest strengths—he had been awarded three Purple Hearts for his service in Vietnam, while his opponent, George W. Bush, had avoided active duty—and, through a perversion of revisionist history, turned it instead into a perceived weakness.

Morano went on to become the pit bull of the climate change denial movement, launching swiftboat-like attacks as before, but this time directed against climate science and climate scientists. Among his many unsavory aspersions, he called NASA's James Hansen a "wannabe Unabomber" (suggesting it may be "time for meds").[67] I too have been at the receiving end of Morano's smears, having been

called a "charlatan" responsible for "the best science that politics can manufacture."[68]

Beginning in 2006, Morano's efforts were funded on the taxpayer dime: He became a paid staff member on the Senate Environment and Public Works (EPW) Committee for Senate climate change denier Senator James Inhofe. From this perch, Morano promoted climate change denial talking points and launched attacks against climate scientists on the EPW Web site and through an e-mail listserv reaching large numbers of journalists and politicos. Undaunted after his position with Inhofe was terminated in 2009,[69] Morano headed back through the revolving door, this time hired by a Scaife- and ExxonMobil-funded[70] entity known as the Committee for a Constructive Tomorrow (CFACT) to run a new Web site called ClimateDepot.com. The site, which bills itself as "the Senate EPW website on steroids,"[71] provides Morano with a platform from which he can continue his barrage against the climate science community. In 2010, for example, he proclaimed that climate researchers "deserve to be publicly flogged" for speaking out on the threat of human-caused climate change.[72]

Shoot the Messenger

While the tactic of swiftboating or "shoot the messenger" may have been honed by people like Marc Morano, it has a deeper history when it comes to environmental science in America. Rachel Carson, whose book *Silent Spring*[73] in the early 1960s exposed the environmental threats from widespread use of the pesticide DDT, was the first to experience the wrath of industry-funded smear campaigns. The president of Monsanto Corporation, the largest producer of DDT, for example, called her "a fanatic defender of the cult of the balance of nature."[74] Despite the fact that her scientific findings have stood the test of time, attacks against Carson continue to this day. The Competitive Enterprise Institute boasts a Web site, rachelwaswrong.org, aimed solely at discrediting Carson's legacy. The thinking seems to be, if they can bring down Rachel Carson, they can bring down the entire environmental movement.

Then there was Paul Ehrlich, with his *The Population Bomb* in the late 1960s, which introduced the public to the notion that our patterns of consumption and population increase were on a collision course with

environmental sustainability. Among the many others who denounced Ehrlich as an alarmist purveyor of doom and gloom was Julian Simon of the Cato Institute, who accused Ehrlich of having led a "juggernaut of environmentalist hysteria."[75] Yet Ehrlich's early warning has ultimately proven prophetic. In the 1990s, a group of more than fifteen hundred of the world's leading scientists, including half of the living Nobel Prize winners at the time, concluded that "Human beings and the natural world are on a collision course," inflicting "harsh and often irreversible damage on the environment and on critical resources."[76] The major national academies of the world have issued similar joint statements.[77]

A similar story holds for Herbert Needleman—like Rachel Carson, a fellow Pennsylvanian. Needleman's research in the 1970s identified a link between environmental lead contamination and the impairment of childhood brain development. Lead industry-funded scientists accused him of misconduct in his analysis of data.[78] He was ultimately exonerated after a thorough investigation by the National Institutes of Health, and his research findings have been validated by numerous independent studies over the decades.

Each of these scientists helped instill a wider recognition of the dangers posed by unprecedented, uncontrolled, and unchecked human alteration—be it biological, chemical, or physical—of our environment. Carson, Ehrlich, and Needleman were the forerunners of the climate scientists who would be similarly denounced for their inconvenient findings.

Stanford University's Stephen Schneider was among the most articulate scientific voices in the climate change debate from the 1970s through his untimely passing in 2010. He was particularly effective in the way he confronted specious claims by climate change deniers with humor and his own brand of pithy witticisms.[79] A respected scientist and member of the National Academy of Sciences, Schneider made seminal early contributions to the science of modeling Earth's climate system and performed some of the key early climate change experiments. Later in his career, he spearheaded efforts in interdisciplinary climate science, such as integrated assessment—coupling projections of climate change and its potential effects with economic models in order to inform real-world decision making. He was a leading voice in the public discourse over what actions we must take to mitigate potentially devastating future changes in our climate.

Needless to say, Schneider was a target. In the early 1970s, when it was still unclear[80] as to whether the warming effect of human-generated greenhouse gases or the cooling effect of sulfate aerosols would predominate, S. Ichtiaque Rasool and Schneider speculated, quite reasonably, that the latter might indeed win out if emissions of aerosols continued to accelerate.[81] As it turns out, the world's nations chose to follow a scenario in which the greenhouse warming would instead win out, an unintended consequence of the passage of clean air acts in the United States, Europe, and other industrial nations that required aerosols to be "scrubbed" from smokestacks prior to emission, primarily to solve the acid rain problem. But it easily could have turned out otherwise. The Rasool and Schneider paper nevertheless remains the source of the favorite contrarian talking point that goes something like: "Back in the 1970s, Steve Schneider was warning the world about global *cooling!*"

The attacks against Schneider didn't stop with the global cooling myth. One of the most persistent smears relates to a statement he gave in a 1989 interview with *Discover* magazine:

> On the one hand, as scientists we are ethically bound to the scientific method, in effect promising to tell the truth, the whole truth, and nothing but—which means that we must include all the doubts, the caveats, the ifs, ands, and buts. On the other hand, we are not just scientists but human beings as well. And like most people we'd like to see the world a better place, which in this context translates into our working to reduce the risk of potentially disastrous climatic change. To do that we need to get some broadbased support, to capture the public's imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have. This "double ethical bind" we frequently find ourselves in cannot be solved by any formula. Each of us has to decide what the right balance is between being effective and being honest. I hope that means being both.[82]

Contrarians, like Martin Durkin in his "The Global Warming Swindle" polemic, are fond of editing Schneider down to the misleading snippet "we have to offer up scary scenarios, make simplified, dramatic state-

ments, and make little mention of any doubts we might have" without the critical context, including the three sentences that followed it.

James Hansen was the first scientist to publicly testify to Congress that greenhouse warming was indeed upon us. In a sweltering Senate hall in the hot dry summer of 1988, Hansen asserted that "It is time to stop waffling. . . . the evidence is pretty strong that the [anthropogenic] greenhouse effect is here."[83] Though he has been criticized for that statement, in hindsight it appears that Hansen may have been correct that the signal of human-caused climate change had already emerged, albeit only weakly, by the late 1980s. The Reagan administration appeared to be unhappy with Hansen's public testimonies; as a NASA civil servant, he was not immune from their efforts to control his message. Representatives from the Office of Management and Budget repeatedly edited the drafts of his written congressional testimonies. Finally, in 1989, he'd had enough, and in bombshell testimony revealed that his words had been altered by the Bush administration.[84]

As Hansen has grown increasingly outspoken in recent years, the attacks against him by climate change deniers have grown more vicious. Critics have attempted to impugn his science by implying that he supplants objective scientific inquiry with political ideology. Among the baseless accusations have been that he received money from progressive activist George Soros and that he is secretly a Democratic Party operative because he received the Heinz Award in the Environment (in reality, Hansen has been a lifelong Republican, and the award was established to honor the memory of Republican politician John Heinz III, a Pennsylvania senator who placed great value on environmental stewardship). The politically motivated attacks against Hansen over the years have been so extensive and profound that a separate book has been written on the topic.[85] But this is to get ahead of the story.

In chapter 1 we saw an early instance of an assault on climate scientists in the attack on Ben Santer for his groundbreaking work in the mid-1990s that helped establish a "discernible human influence on climate." He saw his integrity impugned as part of an industry-funded smear campaign, and his job and even his life were at times threatened.[86] The attacks against Santer were a sign of what was to come—for me. As Santer himself put it in an interview with the *New Scientist* a decade later, "There are people who believe that if they bring down Mike Mann, they can bring down the IPCC."[87]