

NIEMAN REPORTS

THE NIEMAN FOUNDATION FOR JOURNALISM AT HARVARD UNIVERSITY

VOL. 59 NO. 4 WINTER 2005

Digital Reprint [Multimedia Version]

Global Warming

- 2 Introduction
- 4 Science and Journalism Fail to Connect BY DAN FAGIN
- 6 Knowing Uncertainty for What It Is BY DAVID MICHAELS
- 8 Disinformation, Financial Pressures, and Misplaced Balance
BY ROSS GELSPAN
- 11 Observing Those Who Observe [audio/video] BY DANIEL GROSSMAN
- 17 The Disconnect of News Reporting From Scientific Evidence
BY MAX BOYKOFF
- 19 Context and Controversy: Global Warming Coverage
BY JESSICA DURFEE AND JULIA CORBETT
- 20 Weight-of-Evidence Reporting: What Is It? Why Use It?
BY SHARON DUNWOODY
- 22 Global Warming: What's Known vs. What's Told
BY SANDY TOLAN AND ALEXANDRA BERZON
- 26 How Do We Cover Penguins and Politics of Denial? BY BILL MOYERS
- 28 Accepting Global Warming as Fact BY MARKUS BECKER
- 30 Culture Contributes to Perceptions of Climate Change
BY HANS VON STORCH AND WERNER KRAUSS
- 34 Trying to Achieve Balance Against Great Odds BY JACQUES A. RIVARD

“... to promote and elevate the standards of journalism”

—Agnes Wahl Nieman, the benefactor of the Nieman Foundation

Publisher

BOB GILES

Editor

MELISSA LUDTKE

Assistant Editor

LOIS FIORE

Editorial Assistant

SARAH HAGEDORN

Design Editor

DIANE NOVETSKY

This Nieman Reports eMprint™ newsbook was produced in cooperation with the Donald W. Reynolds Journalism Institute at the Missouri School of Journalism. eMprint is a trademark of the Curators of the University of Missouri.

The contents are digitally reprinted from the Words & Reflections section of the Winter 2005 Nieman Reports.

Copyright 2005 by the President and Fellows of Harvard College.

Telephone:

(617) 496-2968

E-Mail Address:

nreditor@harvard.edu

Internet Address:

www.nieman.harvard.edu

Global Warming

In his opening essay, **Dan Fagin**, associate director of New York University's Science and Environmental Reporting Program, plows the common ground beneath the coverage of intelligent design and global warming. Science, he observes, is not "adept at feeding the media's craving for novelty, since the credibility of science depends on meticulous process in which each hypothesis builds incrementally on all the work that has come before. In science, nothing ever really comes out of left field. In journalism, it's our favorite position." Then we move on from his words to articles examining reporting about global warming.

David Michaels, a research professor in environmental and occupational health at The George Washington University School of Public Health and Health Services, describes how public-information campaigns, funded by the fossil fuel industry, insert skeptical views into journalists' reporting on global warming. "... the skeptic's assertions are often reported without identifying their corporate sponsors or letting readers know the person's credentials for raising such doubts," Michael writes. **Ross Gelbspan**, author of "Boiling Point," criticizes reporters for their misplaced use of "balance" in the telling of the global warming story and writes that "it seems profoundly irresponsible for them to pass along a story that is 'balanced' with opposing quotes without doing the necessary digging to reach an informed judgment about the gravity of the situation." In reporting on science and the environment for radio, print and the Web, **Daniel Grossman** travels with scientists to research sites as they study impacts of climate change. In a photo essay from his trips, many of which have taken him near the earth's poles "since the Arctic and Antarctic are heating up faster than anywhere else," Grossman shows and describes what he has observed.

Max Boykoff, a doctoral student in environmental studies at the University of California, Santa Cruz, reports findings from a study he coauthored about "balanced reporting" in newspaper coverage of global warming. The conclusion: "... the reporting was found to be strikingly out of alignment with the top climate science." University of Utah doctoral student **Jessica Durfee** and associate professor **Julia Corbett** examined how context and controversy in stories about global warming affect readers' perceptions of the issue. One finding: "It is heartening to know that the simple inclusion of scientific context might help

Publisher

BOB GILES

Editor

MELISSA LUDTKE

Assistant Editor

LOIS FIORE

Editorial Assistant

SARAH HAGEDORN

Design Editor

DIANE NOVETSKY

This Nieman Reports eMprint™ newsbook was produced in cooperation with the Donald W. Reynolds Journalism Institute at the Missouri School of Journalism. eMprint is a trademark of the Curators of the University of Missouri.

The contents are digitally reprinted from the Words & Reflections section of the Winter 2005 Nieman Reports.

Copyright 2005 by the President and Fellows of Harvard College.

Telephone:

(617) 496-2968

E-Mail Address:

nreditor@harvard.edu

Internet Address:

www.nieman.harvard.edu

mitigate the readers' level of uncertainty." **Sharon Dunwoody**, who teaches science and environmental journalism at the University of Wisconsin-Madison, wants journalists to use "weight-of-evidence" reporting in covering this issue. It is not up to journalists "to determine what's true but, instead, to find out where the bulk of evidence and expert thought lies on the truth continuum and then communicate that to audiences." University of California at Berkeley journalism professor **Sandy Tolan** and graduate student **Alexandra Berzon** provide an overview of coverage of this topic, and Tolan describes a class he designed, "Early Signs: How Global Warming Affects Commerce, Culture and Community," in which journalism students learn how to document "the social, cultural, political and economic impact of climate change around the world."

In excerpts from a speech television journalist **Bill Moyers** delivered to the Society of Environmental Journalists, he offers ways to connect storytelling about global warming to evangelical concerns about preserving the earth. **Markus Becker**, who heads the science department at Spiegel Online, contrasts U.S. and German approaches and notes that American news media "are so intent on hearing both sides in a debate that they often are virtually incapable of showing where the majority opinion lies." **Hans von Storch**, who directs the Institute for Coastal Research in Germany and **Werner Krauss**, who teaches at the University of Texas at Austin, explain how cultural orientations in the U.S. and Germany affect public perceptions about climate change and reporting about it. And former Canadian Broadcasting Corporation correspondent **Jacques A. Rivard** describes why his editors rarely requested that he include "opposing views about global warming." ■

Science and Journalism Fail to Connect

‘How can we expect Americans to know anything beyond what they happen to remember from science class? Journalists certainly don’t tell them.’

By Dan Fagin

Evolution is “only a theory.” Global warming is “unproven.” And science itself is “just another opinion.”

Critics of mainstream science seem to be everywhere these days, and we, as journalists, just can’t seem to get enough of them. It’s just about impossible to pick up a newspaper or watch CNN for an hour without being confronted by someone attacking ideas that most scientists think are so settled that they aren’t even worth discussing any more. Meanwhile, the topics that many scientists are working on—the almost daily advances in nanotechnology and genetics, to pick just two—are largely absent from mass-market media coverage. What’s going on?

Nearly 50 years ago, the British physicist and novelist C.P. Snow published his famous “two cultures” essay, which deplores the widening gulf between scientists and their intellectual counterparts in the arts. If Snow was alive today, I think he might have extended his argument to apply to the chasm that now exists between science and just about everyone else in society, including journalists.

No longer seen as the public figures that many were in the days of Albert Einstein and Edward Teller, scientists now are more reluctant than ever to venture out of their ivory towers. Shunning messy public controversies, they tend to communicate only to each other and through the rarified language of peer-reviewed journals. Meanwhile, far below, where the air is thicker, warring special-interest groups hurl slogans and accusations, their every fractious word amplified by media companies struggling to catch the attention of a jaded public,

if only for a moment.

A few respected scientists do make it a priority to speak out on the compelling issues of the day: E.O. Wilson and Richard Dawkins, to name two, though neither has the public profile of his predecessors. And a few mass-market media outlets still cover scientific developments in a sophisticated way: *The Economist* and *The New York Times*, to name two, though neither is as comprehensive as it once was. The best coverage, as always, comes from many niche publications, but they reach relatively small audiences. Most consumers of news never hear about the work of contemporary science: the meticulous testing, honing and retesting of hypotheses—the process that ended the Dark Ages and continues to illuminate dark corners of our world.

So we shouldn’t be surprised that about 46 percent of American adults don’t know it takes a year for the earth to orbit the sun, according to a 2004 survey by the National Science Foundation, and that more than half of Americans think the earliest humans lived at the same time as dinosaurs, not 60 million years later. But those errors of fact aren’t nearly as damaging as the widespread ignorance of what “science” is and what it isn’t. Most of us know almost nothing about bedrock scientific ideas such as the importance of being able to replicate an experiment, the meaning of statistical significance, and the use of control groups. According to the same survey, for instance, most Americans wrongly think that it’s better to test a drug by giving it to 1,000 people than to give it to just 500 and compare their health to 500 others who weren’t given the drug.

It turns out that most of us not only don’t know science, we don’t even understand why it matters.

How can we expect Americans to know anything beyond what they happen to remember from science class? Journalists certainly don’t tell them. When is the last time you heard a reporter explain in print or on the air that a scientific hypothesis is elevated to a “theory” only after it is supported by overwhelming observational and experimental evidence and is widely accepted by the scientific community? Sure, evolution is a theory—and so is Mendelian heredity and Newtonian gravitation.

When is the last time you heard a journalist explain that the scientific process is not about “proving” anything? Instead, it’s about constructing a hypothesis, disproving it, and then developing a better one that offers a slightly fuller explanation of the natural world as we experience it. The cycle never stops. Science will never prove, in an absolute sense, that emissions of carbon dioxide from man-made sources are contributing to global warming, but science can show—and has shown—that no other idea comes anywhere nearly as close to explaining what’s happening to our world.

And when is the last time you heard a journalist explain that science’s supposed “weaknesses” are actually its great strengths? Always self-critical, the best scientists freely acknowledge the uncertainties that remain in even the most sophisticated theories. That’s the way science corrects its mistakes, but it is a grave shortcoming in a sound-bite world that prefers brash sloganeering. Nor is science adept at feeding the media’s craving for nov-

elty, since the credibility of science depends on a meticulous process in which each hypothesis builds incrementally on all the work that has come before. In science, nothing ever really comes out of left field. In journalism, it's our favorite position.

Scientific Reasoning for Journalists

We shouldn't be naive about efforts to bridge the chasm between mass-market journalism and mainstream science. The market forces driving journalism away from serious science coverage are too strong to wish away with a five-point action plan. But surely there are some steps we can take to improve coverage.

For starters, teaching journalists scientific reasoning is vital. We should give that training not only to reporters who are new to science-related beats, but also to those who cover business, politics, culture or work in just about every other corner of the newsroom, and to editors, too. In one way or another, all of those journalists cover science, whether or not they realize it.

Just as importantly, graduate and undergraduate journalism programs must offer, and even require, more science-related courses. Again, the emphasis should be on scientific reasoning, not merely the acquisition of dry facts. At New York University (NYU), I help to run a program that has been training science journalists for 24 years, but I also teach science writing to students in the general journalism department because we believe that journalists aren't fully prepared to thrive in the professional world unless they know something about statistical analysis and the scientific method.

With this training, our goal should be to give reporters enough confidence to make reasoned judgments about the scientific legitimacy of competing arguments whenever they're doing a story about a controversial issue, whether its global warming, stem cells, intelligent design, or some-

thing else. We need to show reporters how and why to resist the journalistic perversion of Newton's third law of motion: For every assertion in a news story, there must be an equal and opposite assertion. Phony "balance" is the bane of science journalism.

And finally, we have to be obsessive about the importance of storytelling, especially in science journalism geared to mass audiences. At NYU's Science and Environmental Reporting Program, even as we teach the subtleties of cutting-edge science, we never stop talking about compelling narrative, clear explanation, and coherent organization. Because if a reporter can't tell a story, it doesn't matter how much science she knows.

In short, we need to do all we can to show reporters how, even within the tight constraints of the sound-bite society, it is possible to cover science stories in ways that do credit to both science and journalism. Once we start doing that, you can bet your Bunsen burners that scientists will start climbing down from those ivory towers, and maybe our readers and viewers won't be quite so quick to assume that all opinions are created equal. ■

Dan Fagin is an associate professor of journalism at New York University (NYU) and the associate director of NYU's Science and Environmental Reporting Program. Now a writer of books and magazine articles, he was the environmental writer at Newsday for 14 years. In 2003, his stories about cancer epidemiology won both of the best-known science journalism prizes in the United States. Last summer, he was a Templeton-Cambridge Fellow in Science and Religion at the University of Cambridge. Fagin is also a former president of the 1,500-member Society of Environmental Journalists.

✉ dan.fagin@nyu.edu

NIEMAN REPORTS

THE NIEMAN FOUNDATION FOR JOURNALISM
AT HARVARD UNIVERSITY

ALSO FROM THE
WINTER 2005 ISSUE

Intelligent Design

Science and Journalism
Fail to Connect

By DAN FAGIN

Strengthening the Line
Between News and Opinion

By JEFF BRUCE

Editorial Pages and
Intelligent Design

By CYNTHIA TUCKER

In Kansas, the Debate
About Science Evolves

By DIANE CARROLL

When the Conflict Narrative
Doesn't Fit

By DIANE WINSTON

Courtroom Testimony Offers
an Excellent Road Map
for Reporters

By PAUL R. GROSS

Probing Beneath the Surface
of the Intelligent Design
Controversy

By GAILON TOTHEROH

Intelligent Design Has Not
Surfaced in the British Press

By MARTIN REDFERN

eMPRINT™ NEWSBOOK

DIGITAL REPRINTS AT:

WWW.NIEMAN.HARVARD.EDU

Knowing Uncertainty for What It Is

In reporting on the science of global warming, journalists contend with powerful, well-funded forces using strategies created by tobacco companies.

By David Michaels

For decades, the tobacco and asbestos industries have worked hard to manufacture more than just their products. While aggressively marketing what they make, they've also been successfully creating public-information campaigns designed to create uncertainty in the minds of people about claims made against the destructive and lethal characteristics of their products. Though discovery of these efforts has come too late for many of their victims, documents unearthed in lawsuits have revealed concerted efforts to avoid the imposition of government regulation by impugning public health science.

These days, the most well-known (and likely also the best funded) of these campaigns is the one in which the fossil fuel industry manufactures uncertainty about environmental and public health claims raised by scientists and others regarding climate change. When confronted by an overwhelming worldwide scientific consensus on the impact of human commerce in the global warming of the past century, the industry and its political allies follow the tobacco road. Evidence of this was illuminated when Frank Luntz, a leading Republican political consultant, sent a strategy memo to his clients revealed in 2003, and his words were widely circulated among scientists and policymakers. In it Luntz asserted that "*The scientific debate remains open*. Voters believe that there is *no* consensus about global warming in the scientific community. Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly." (Emphases in the original memo.)

Because journalists often report

on political and scientific debates that arise about this issue, they can find themselves transmitting information that conveys this frame of mind to readers, listeners and viewers. In part, this happens when reporters feel obligated to offer space and credibility to skeptical perspectives, even when those who espouse these views are funded and promoted by corporations whose activities disproportionately contribute to the problem, which in this case is global warming. Further, the skeptic's assertions are often reported without identifying their corporate sponsors or letting readers know the person's credentials for raising such doubts.

Recognizing the power of a sound bite and memorable phrase, industries responsible for creating what scientists contend are causing the climate to warm often cry "junk science" at the appearance of studies reporting what they regard as unfavorable findings, even when the quality of the research is high. Junk-science advocates allege that many of the scientific studies (and even scientific methods) used in the regulatory and legal arenas are fundamentally flawed, contradictory or incomplete, contending that it would be wrong or premature to regulate the exposure in question or compensate the worker or community resident who might have been made sick by the exposure.

Certainty vs. Inaction

Every first-year public health student is taught how John Snow in 1854 stopped a cholera epidemic in London. During a 10-day period in September during which more than 500 Londoners died from the disease, Snow used a city map to mark the location of each household with a case of cholera. He quickly de-

termined that those who drank from one particular water source were at the highest risk for the disease, and he recommended removal of the handle from the pump supplying drinking water from that source. By using the best evidence available at the time, hundreds of additional deaths were avoided. If government officials in London had demanded absolute certainty, the epidemics might have continued for another 30 years until the cholera bacterium was identified.

In our time, it seems, debate over science is replacing debate over policy, and this can threaten the ability of the government to protect the public's health and environment. As Snow's story demonstrates, the desire to establish absolute scientific certainty is both counterproductive and futile. This recognition is realized in the wise words Sir Austin Bradford Hill, a renowned biostatistician, delivered in an address to the Royal Society of Medicine in 1965:

"All scientific work is incomplete—whether it be observational or experimental. All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone action that it appears to demand at a given time.

"Who knows, asked Robert Brown-ing, but the world may end tonight? True, but on available evidence most of us make ready to commute on the 8:30 next day."

Yet in our time, the wisdom of Hill's words is being both twisted and ignored. For example, take the case of Philip A. Cooney, chief of staff for the

White House Council on Environmental Quality, extending a political hand into the editing of a federal report on climate change to magnify the level of uncertainty. Before his appointment to a top environmental protection job by President Bush, Cooney worked as a lobbyist with the American Petroleum Institute (API), one of the nation's leading manufacturers of scientific uncertainty. Subsequently he left the White House for employment with ExxonMobil, where his job title might have changed but not his mission.

Another example of tearing down scientific findings in the name of certainty happened with a chemical called benzene, a byproduct of oil production and use, and exposure to it is known to cause leukemia. Recently, a team of U.S. and Chinese scientists confirmed that workers with exposure to benzene (a known human carcinogen) at levels that meet the current workplace standard in the United States have an increased risk of blood disorders. The medical message is clear: The current standard is not protective; it needs to be tighter.

Facing such a specter, the API raised more than \$20 million to conduct its own study whose results were expected to, according to internal documents, "establish that adherence to current occupational exposure limits do [sic] not create significant risk to workers exposed to benzene." But how does API know what the results will be before the study even begins? It's a common trick of the trade, one that any of the key players in the "product defense" (which is their own term) industry can pull off easily. They are talented experts at subverting science at the behest of their corporate clients, and they hire product defense scientists who won't *deny* that a relationship exists between the exposure and the disease, but are quick to conclude that "the evidence is inconclusive."

But much scientific "uncertainty" about the causes of disease is manufactured, designed to impede the inconve-

nience and economic consequences of public health protections. For 50 years, tobacco companies employed a stable of scientists to assert (sometimes under oath) that they did not believe there was conclusive evidence that cigarettes caused lung cancer. Scientists paid to manufacture such uncertainty would dissect every study, then highlight flaws and inconsistencies. Less well-known but following the same pattern are the campaigns mounted to question studies documenting the adverse health

It is important for people to understand—and for journalists to help them do this—that our nation's public health programs will not be effective if absolute proof is required before we act; instead, the best available evidence must be sufficient.

effects of exposure to lead, mercury, vinyl chloride, chromium, beryllium, benzene and a long list of pesticides and other toxic chemicals.

Manufacturing uncertainty is now so commonplace that it is unusual for the science behind an environmental regulation *not* to be challenged. Yet it is important for people to understand—and for journalists to help them do this—that our nation's public health programs will not be effective if absolute proof is required before we act; instead, the best available evidence must be sufficient.

Observing the Strategy

I observed the work of the product defense industry when I served as assistant secretary for environment, safety and health in the Department of Energy (DOE) from 1998 to 2001. In that role, I was the nuclear weapons complex's chief safety officer, responsible for protecting the health of workers, the communities and environment around some of the most dangerous and polluted sites in the country. One of my chief concerns was beryllium, a

lightweight metal vital to nuclear weapons production. Hundreds of weapons workers have developed chronic beryllium disease (CBD), a sometimes-fatal lung disease associated with breathing tiny amounts of the metal.

Beryllium's victims included not only machinists and others who worked directly with the metal, but also others who were in the vicinity of beryllium work, often for very short periods of time. One accountant had developed CBD after working for a few weeks each year in an office near where beryllium work was underway.

In 1998, when I was appointed by President Bill Clinton, both the Occupational Safety and Health Administration (OSHA) and DOE (whose facilities were not covered by OSHA) were applying a 50-year-old standard for protecting workers from beryllium exposure, a standard that was widely recognized as inadequate. As both agencies began the time-consuming legal process of updating their rules, the beryllium industry mounted what has become a predictable response: They hired Exponent, Inc., one of the leading product defense firms, to assert that there is too much uncertainty in the science on the ability of beryllium to cause CBD to warrant a new standard.

Sharing authorship with product defense specialists, beryllium industry-associated scientists published a series of papers suggesting it was possible that beryllium particle size, or particle surface area, or particle number, are more important than previously thought in the development of beryllium disease. They also raised the hypothesis that skin exposure could play a larger role in CBD risk. The hired guns concluded that, even though the current standard was not protective, more research was needed. They even suggested that once these questions were answered, the new beryllium standard "could easily be among the most complex yet established."

After reviewing the extensive evidence and taking testimony from indus-

try and independent scientists, DOE concluded that, while more research is always desirable, we had more than enough information to protect workers immediately. Over the industry's objections, we issued a much stronger standard, reducing the acceptable workplace exposure level by a factor of 10. This new standard, though, applies only to nuclear weapons workers; beryllium-exposed workers in the private sector don't have the same protection. In 1998, OSHA declared its intention to issue a similar standard to protect workers in the private sector, but dropped beryllium from its regulatory agenda once the Bush administration took over in 2001.

In the past, corporations and public relations firms hired individual scientists as part of their uncertainty campaigns; the product defense industry represents an evolution into specialization. After all, today scientists themselves control many of these firms, and because they understand the workings of science better than the usual public relations person, they are better able to design campaigns that successfully raise questions and promote doubt. As they do so, journalists need to be prepared to ask tougher questions about the evidence they are shown, to inquire about funding behind the "science," and inform their readers, listeners and viewers about any links

they find between those who supported the research and its findings. Until such connections are made visible by journalists and commentators, the uncertainty being manufactured will achieve its goal to the detriment of both science and health. ■

David Michaels is research professor and associate chairman of the Department of Environmental and Occupational Health at The George Washington University School of Public Health and Health Services in Washington, D.C.

✉ eohdmm@gwumc.edu

Disinformation, Financial Pressures, and Misplaced Balance

A reporter describes the systemic forces that work against the story of climate change being accurately told.

By Ross Gelbspan

One central fact—as simple as it is overwhelming—informs the current understanding of global climate change: To allow our inflamed climate to stabilize requires worldwide cuts in our use of coal and oil of about 70 percent. This is the 10-year-old consensus finding of more than 2,000 scientists from 100 countries reporting to the United Nations' Intergovernmental Panel on Climate Change—the largest, most rigorously peer-reviewed scientific collaboration in history.

To act on climate stabilization in the way that science guides us threatens the survival of the coal and oil industries that constitute one of the biggest commercial enterprises in history. Conversely, the findings of most scientists who study this issue indicate that a failure to address this issue rapidly and comprehensively threatens the continuity of

a coherent civilization. (Already visible are some financial stresses that show up in the escalating losses by some of the world's property insurers.) Yet despite its scope and potential consequences, global climate change is probably the most underreported story.

Instead, stories about aspects of global climate change should be in newspapers at least three times a week and on radio and TV newscasts more frequently, too. In addition to reporting about its science, the climate issue involves the emergence of extreme weather events (debates about increasing strength of hurricanes is just one example), technology developments, oil industry movements, terrorism and national security, economic stability, diplomatic tensions, and significant policy differences between many state governments and the administration in Washington.

Why Climate Change Isn't Covered Well

Looking at how the news business works, however, there are several reasons why this is happening.

At one level, environment reporters usually focus their energies on mastering intricacies of the science and the mechanisms of ecological interactions. Were they to compliment this reporting with some investigative training, their treatment of the climate crisis might broaden significantly. The reason is that most reporting about the environment involves tracking conflicts about money, and these conflicts generally pit a specific environmental vulnerability against an industry, a business, or a developer. If reporters approached these stories through a wider investigative lens—and had the training necessary to know how to follow the money—they'd

be bringing better tools with them to evaluate the responses they receive from corporate interests and likely be better equipped to sniff out the use of front groups, dubious economic claims, disguised or concealed lobbying strategies, and pressure tactics that are not readily apparent.

On the level of institutional culture, one barrier to comprehensive reporting about climate change can be seen in the career path to the top at news outlets. Normally the path follows the track of political reporting, as top editors tend to see nearly all issues through a political lens. While there have been predictable feature stories about climate change from Alaska and small, buried reports of scientific findings, global warming gains news prominence only when it plays a role in the country's politics. During the 1992 elections, for instance, the first President Bush slapped the label of "ozone man" on Al Gore because of his book, "Earth in the Balance." It is likely not coincidental that Gore ran away from the climate issue during the 2000 presidential campaign. The issue was prominently covered in 1997 when the Senate voted overwhelmingly not to ratify the Kyoto Protocol. These stories spoke not to the substance of the scientific debate but to the political setback the Clinton administration experienced at the hands of a rebellious Senate. News coverage resurfaced when President George W. Bush withdrew the United States from the Kyoto process and again focused on resulting diplomatic tensions between the United States and the European Union and not on the climate change impacts.

Prior to his withdrawal from Kyoto, President Bush declared he would not accept the findings of the United Nations' Intergovernmental Panel on Climate Change (IPCC) because they represented "foreign science" (even though about half of the 2,000 scientists who contribute to the IPCC are from the United States). Instead, Bush called

on the National Academy of Sciences (NAS) to provide "American science." In reporting this story, few members of the Washington press corps bothered to check the position of the NAS. Had they done so—while publishing and broadcasting the President's words—they would have been able to inform the public that as early as 1992, three years before the IPCC determined that humans are changing the climate, the NAS urged strong action to minimize the impacts of human-induced global warming.

When we look at reporting that

... if journalists want their coverage to be balanced, their stories should reflect the relative weight of opinion in the scientific community. If that happened, the views of mainstream climate scientists would be the focus of 95 percent of the story, while the dissenters' views would be mentioned less prominently and less often.

comes from international correspondents, we find that foreign editors and reporters have not shared with the public information about the major divide on this issue that exists between the United States and much of the rest of the world. At the time when the Clinton and Bush administrations have refused to impose mandatory emissions reduction goals in the United States, Holland has begun the work of cutting emissions by 80 percent in 40 years. The United Kingdom has pledged to cut its use of carbon fuel by 60 percent in 50 years. Germany has committed itself to 50 percent cuts in 50 years. Several months ago, French President Jacques Chirac called on the entire industrial world to reduce emissions by 75 percent in the next 45 years.

Each of these policies adheres to the dictates of the science. But other than fleeting coverage of large demonstrations in Europe that followed the U.S. withdrawal from the Kyoto process, these differences in policy and practice have been barely explored in

the mainstream press. Unfortunately, the culture of journalism is generally a political culture that is often institutionally arrogant toward nonpolitical areas of coverage.

A second reason for the failure of the press to adequately cover the climate crisis lies in an extremely effective campaign of disinformation by the fossil fuel lobby. For the longest time, this industry's well-funded disinformation campaigns have duped reporters into practicing a profoundly distorted form of journalistic balance. In the early 1990's, the coal industry paid a tiny handful of dissenting scientists (with little or no standing in the mainstream scientific community) under the table to deny the reality of climate change. Just three of these "greenhouse skeptics" received about a million dollars from coal interests in the mid-1990's in undisclosed payments. More recently ExxonMobil has emerged as the major funder of the "climate-change skeptics" and their institutions.

The campaign's success can be measured by how effective it has been in keeping the issue of global warming off the public radar screen. Its effectiveness is underscored by two polls done by Newsweek. As early as 1991, 35 percent of respondents (in the United States) said they thought global warming was a very serious problem. Five years later, in 1996, even though the scientific evidence had become far more robust and the IPCC declared that it had found the human influence on the climate, the 35 percent had shrunk to 22 percent. This is striking testimony to the impact of the industry public relations campaign. (With recent visibility of this issue and the escalating pace of change, public awareness has almost certainly increased during the last few years.)

A key ingredient of this success has been the insistence by the public relations specialists of the fossil fuel

lobby that reporters adhere to a balanced presentation of views about an issue. And the press did this when they accorded the same weight to this tiny handful of skeptics that it did to the views and findings of peer-reviewed scientists. But this is a misapplication of the ethic of journalistic balance. When balance should come into play is when the content of a story revolves largely around opinion: Should society recognize gay marriage? Should abortion be legal? Should our schools provide bilingual education or English immersion? In such coverage, a journalist is ethically obligated to provide roughly equivalent space to the most articulate presentation of major competing views.

When the story focused on an issue in which various facts are known, it is the reporter's responsibility to find out what those facts are. During the past 15 years our understanding of climate changes and its likely causes have been informed by an unprecedented accumulation of peer-reviewed science from throughout the world. This is about as close to truth as we can get. As one co-chair of the IPCC said, "There is no debate among any credentialed scientists who are working on this issue about the larger trends of what is happening to the climate." Regrettably, that is something you would never know from the U.S. press coverage.

Of course, a few credentialed scientists who dismiss climate change as relatively inconsequential have published their findings in the refereed literature. Given this other perspective, if journalists want their coverage to be balanced, their stories should reflect the relative weight of opinion in the scientific community. If that happened, the views of mainstream climate scientists would be the focus of 95 percent of the story, while the dissenters' views would be mentioned less prominently and less often. This is beginning to happen—though very belatedly.

Finally, journalists seem to have gone out of their way to ignore some

of the more visible manifestations of a warming atmosphere. One of the first impacts of climatic instability is an increase in weather extremes—longer droughts, more heat waves, more severe storms, and the fact that more of our rain and snow falls in intense, severe downpours. Increases such as these have been documented by numerous sources, including the U.N.'s World Meteorological Organization.

As one co-chair of the IPCC [Intergovernmental Panel on Climate Change] said, 'There is no debate among any credentialed scientists who are working on this issue about the larger trends of what is happening to the climate.' Regrettably, that is something you would never know from the U.S. press coverage.

Not surprisingly, extreme events also occupy a much larger portion of news budgets than 20 years ago. With the convergence of more coverage and information, one might assume that journalists working on these stories would include the line, "Scientists associate this pattern of violent weather with global warming." But they don't. A few years ago a news editor at a major broadcast outlet was asked why this connection wasn't made between the escalating incidence of natural disasters and climate change. "We did that," he said. "Once." The story involved a major flood in Mozambique in 2000. The editor explained that when the network suggested a possible link to global warming, several auto and gasoline industry representatives threatened to withdraw all their advertising if the outlet persisted in making that connection.

Apart from the fear of industry pressure, the climate issue exposes a deeper betrayal of trust by journalists. By now most reporters and editors have heard enough to know that global warming could, at least, have potentially catastrophic consequences. Given this, it seems profoundly irresponsible for

them to pass along a story that is "balanced" with opposing quotes without doing the necessary digging to reach an informed judgment about the gravity of the situation. To treat this story in this way seems a violation of the trust that readers, viewers and listeners put in those on whom they count to provide an informed interpretation as conveyors of the news.

Ultimately, the urgency and magnitude of this issue should keep this story at the top of news budgets. It pits the future of our highly complex and vulnerable civilization against the profit and survival of an industry that generates more than one trillion dollars a year in commerce worldwide. This is an immense drama with an uncertain outcome, which means it is a terrific news story with many legs. From the point of view of pure professional gratification, it is hard to imagine a more consequential or compelling story for any journalist to report. The challenge will be to report it well. ■

Ross Gelbspan is a retired 30-year journalist with the Philadelphia Bulletin, The Washington Post, and The Boston Globe, where he shared a Pulitzer Prize for a series he conceived and edited. He is the author of "The Heat Is On: The High Stakes Battle Over Earth's Threatened Climate" (1997), and "Boiling Point: How Politicians, Big Oil and Coal, Journalists, and Activists Have Fueled the Climate Crisis—and What We Can Do to Avert Disaster" (2004). He maintains a Web site at www.heatisonline.org.

✉ ross@TheWorld.com

Observing Those Who Observe

A journalist travels to the ends of the earth and reports from ‘distant, inaccessible places [that] have a grip on the popular imagination’

By Daniel Grossman

Researchers have known for more than a century that carbon dioxide released into the air when coal, oil and other fossil fuels are burned could trap extra heat in the atmosphere, causing the planet to heat up. But it is only in the past decade or two that scientists have accumulated convincing evidence that the planet actually is getting warmer and that humans are a (if not the) major cause. Today, no credible scientist questions that humans are warming the earth. Far less is known about what warmer temperatures will mean for earth’s inhabitants, human and otherwise. I have devoted the last several years to accompanying scientists to some of the research sites where they are studying the impacts of climate change. Much of this research takes place near earth’s poles, since the Arctic and Antarctic are heating up faster than anywhere else. Felicitously, such distant, inaccessible places have a grip on the popular imagination that I believe attracts greater attention to my writing than would reporting from less exotic sites.

When Flowers Bloom

In 1965, Mary Manning, a schoolteacher from Norwich, England, noticed that daffodils in her backyard were blooming well before Easter. Her mother, this teacher then realized, used to think it a rare blessing if these harbingers of spring blossomed in time to decorate the church for the Easter service. Ever since that year, Manning has been recording the first blossoming dates of aconites, crocuses, snowdrops and many other flowers in her garden, as well as the presence of migratory birds. She says she hasn’t failed to observe

her garden for a single day. “It’s not the jolliest thing to do,” she says about making observations on frosty December mornings, “but its got to be done.”

Climate researchers say such extended observations of the timing of plant and animal behavior (a kind of study known as phenology) help reveal how global warming is affecting ecosystems. Few scientists collect such long-term data, especially since the 19th century, when experimental research began to overtake observational studies. So contributions from amateurs like Mary Manning are welcome. Tim Sparks, a researcher at Great Britain’s Centre for Ecology and Hydrology, has collected records from about 100 such “closet phenologists.” In one paper he published using Manning’s 40-year-long nature journal, he showed that five plants were flowering more than five days earlier per decade. Primrose, the record holder, flowered 10 weeks earlier during the 1990’s than it did between 1965 and 1980. Sparks is worried because if different members of plant and animal communities that interact with each other change at different rates, ecosystems could literally come undone. “The communities, the types of woodlands,” he says, describing the impact he expects to result from these changes in timing, “will not be similar to those that we have now.”



Mary Manning in her garden. Photo by Daniel Grossman

When Ecosystems Decouple

Marcel Visser of The Netherlands Institute of Ecology oversees a 50-year-long study of a bird known as the great tit. Visser's research, in the De Hoge Veluwe National Park in the middle of the Netherlands, is one of the world's few studies to examine how a cascade of changes caused by global warming can ripple through an ecosystem.

In early spring, breeding tits feed voracious hatchlings highly nutritious caterpillars. The caterpillars, in turn, nourish themselves by feeding on tender, newly opened leaves of oak trees. Twenty years ago these three organisms—the oak trees, the caterpillars, and the tits—passed the phases of their life cycles in synchrony like the choreographic feats of ballet dancers who twist and leap together in time to a rhythmic beat. But today, like performers dancing to slightly different rhythms, the members of this short food chain are becoming, as Visser puts it, “decoupled.” It appears that each of the three organisms is responding differently to global warming. Spring temperatures in De Hoge Veluwe Park have increased by about two degrees Celsius in the past 20 years. The birds' behavior has remained virtually unchanged: They lay their eggs almost exactly when they did in 1985. The caterpillars, in contrast, seem to have responded to increased temperatures by hatching earlier. Today the peak availability of caterpillar flesh occurs about two weeks earlier than in 1985. As a result, by the time the tits hatch, their food is already on the wane. Now only the earliest chick gets the worm.

Oak trees are also waking up from the winter earlier in the spring. But, in contrast to the caterpillars, the leaves of oaks open only 10 days earlier than they did 20 years ago. So the caterpillars, which used to synchronize their lives with the arrival of the oak leaves, now have to wait for food for an average of about five



Marcel Visser with the bird he studies.

Photo by Daniel Grossman

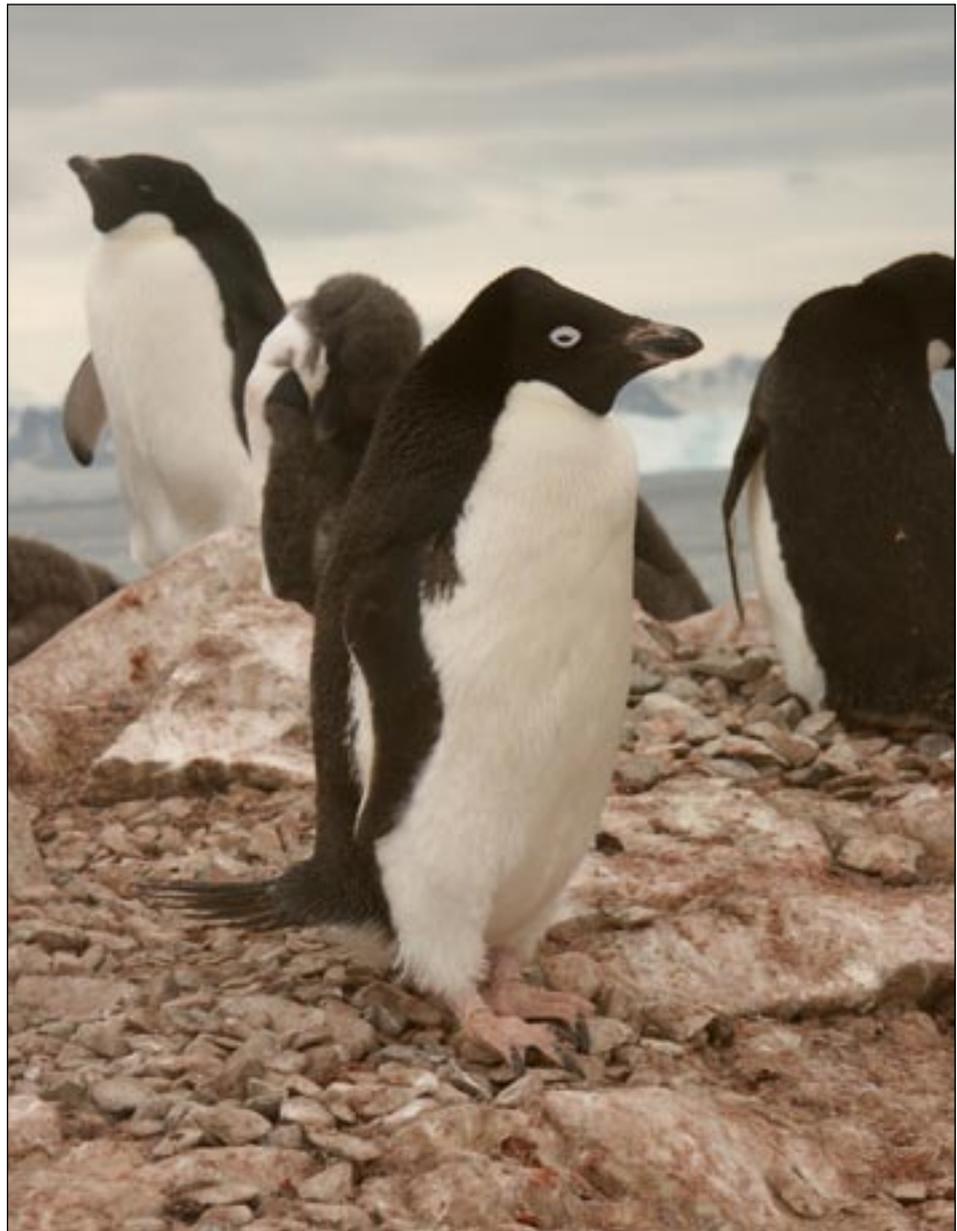
days extra. Apart from small declines in caterpillar numbers and changes in tit-chick health, Visser has yet to show that the ecosystem is actually suffering from the changes. However, in a system where “timing is everything,” he says “it only a matter of time before we see the population come down.”

When Penguins Breed

Bill Fraser, an ecologist from Montana, says that Adelie penguins near America's Palmer Station research base on the Antarctic Peninsula are being wiped out by global warming. In the approximately 30 years since Fraser first visited Palmer Station, the number of Adelies there has dropped by about 70 percent. Winter temperatures in the Antarctic Peninsula have warmed a remarkable six degrees Celsius in the past 50 years. As a result, sea ice, which covers the ocean for hundreds of miles for much of the year with an impermeable cover, is less extensive than it used to be. That means more water vapor can evaporate into the atmosphere and return to earth as additional rain or snow. And so, counterintuitively, global warming has increased snowfall along the Antarctic Peninsula, which Fraser says is reducing breeding success of these penguins.

Fraser shows how the spatial pattern of Adelie declines provided him with essential clues. The scientist discovered that Adelie colonies at the base of south-facing slopes had been hit worst. In the photograph on page 14, he points to one such hillside, where the prevailing winds of winter storms deposit snowdrifts. In the southern hemisphere, southern slopes get less sunlight and thus are the last to become snow-free in the spring and summer. Increased snowfall has left these areas snow-covered much later than in the past (a small drift is seen just behind Fraser's outstretched hand in the middle of the Antarctic summer). Adelies cannot breed successfully until their gravel nest sites are snow-free. Sometimes impatient birds will try to nest on top of the snow of late-melting nesting sites. However, their nests flood and their eggs are destroyed when the sites finally clear. When Fraser began his surveys, the entire flat base of this island was covered with Adelies. Now all that remains of the once-teeming colony is the handful of birds seen in the background to the left of Fraser's head.

Fraser says he expects the colonies



Adelie penguins in the Antarctic.

Photo by Daniel Grossman

around Palmer Station to be completely gone within a decade. The researcher, who has spent his entire professional career studying the decline of these birds, mourns their disappearance. Nonetheless he says he is gratified at the thought that their loss might, by alerting the world to the threat of global warming, be a gain for animals elsewhere. "The Adelies," he says, "are an honest barometer of global changes."

When Penguins Breed



Bill Fraser points to a snowy hillside.

Photo by Daniel Grossman



Melting sea ice near the Antarctic Peninsula.

Photo by Daniel Grossman

When Drift Ice Melts

On the fringes of North America, Asia and Europe, ringing the top of the world like the collar of a hand-knit sweater, is a fragile ecosystem known as the high Arctic. Conditions there are hostile, possibly at the limit of what complex organisms on earth can endure. For months at a time the sun never rises. Winter temperatures commonly drop to tens of degrees below zero Celsius. And so little precipitation falls each year that this polar region is considered a desert. Nonetheless the high Arctic is home to a diverse collection of birds and mammals, including the polar bear, arctic fox, muskox, lemming, snowy owl, plover and falcon.

Zackenbergl Station, located in the high Arctic of northeast Greenland, is the second most northerly research base in the world. It is the only place in Greenland, and one of the few on earth, where very long-term observations are made of a broad range of attributes of the environment, including plant and animal life and climate, river, soil and snow conditions. The station, operated by Denmark since 1995, was founded on the principle that in order to truly understand the impact of climate change on earth's plants and animals, data must be collected for 50 years or more.

Hans Meltofte, Zackenberg's founder, says it is too early to draw any conclusions about the impact of climate change on the station's high-Arctic habitat. However, he says that in the decade since the base opened, researchers there have made discoveries that raise serious concerns. For instance, climatologists predict that drift ice, the rivers of densely packed Arctic icebergs that steam down Greenland's coasts, will become less extensive as temperatures rise. This ice is like a lid on the sea, reducing evaporation and keeping snowfall low. Less ice could thus mean more snow, and more snow, in turn, could



Hans Meltofte works in the high Arctic of northeast Greenland. *Photo by Daniel Grossman*



Researchers believe that reduced sea ice caused by global warming could create problems for polar bears who normally live and hunt on pack ice. *Photo by Daniel Grossman*

When Drift Ice Melts



Danish scientists are trying to discover how warmer conditions, which are expected to cause more snow accumulation, will affect vegetation like the cotton grass and wildlife that depend on it.

Photo by Daniel Grossman.

mean birds that require bare ground after the winter's snows have melted to nest will have to wait until later in the season to lay eggs. Their chicks would have less time to mature before migrating, threatening their survival. Alternatively, if breeding birds try to stay on schedule by nesting in less optimal areas, eggs could be more vulnerable to predators like foxes. Warmer temperatures could also cause ice crusts to form on snow, making it difficult for the muskox to forage. In other parts of the world, ecosystems might be able to respond

to warming by moving north. But at the top of the world, the high Arctic has nowhere to go but the Arctic Ocean. Asked if the plants and animals here could be exterminated, Meltofte pauses then says, "It is a hard word to say for an ecologist. But it is not unlikely." ■

Daniel Grossman is a radio producer and print and Web journalist whose reporting focuses on science and the environment. His radio documentary, "The Penguin Barometer," won the 2004 Media Award

for Broadcast Journalism from the American Institute of Biological Sciences and an award from the Society for Environmental Journalists for outstanding in-depth radio reporting. His Web site on Madagascar won the 2005 Science Journalism Award for online media from the American Association for the Advancement of Science. Grossman's work can be seen and heard at www.wbur.org by searching at that site, using his name.

✉ grossmad@colorado.edu

The Disconnect of News Reporting From Scientific Evidence

Balanced coverage results in a 'misleading scenario that there is a raging debate among climate-change scientists regarding humanity's role in climate change.'

By Max Boykoff

The procession of hurricanes through the Caribbean Basin, lashing the southeastern United States, has served to spur an increase in news media coverage of various aspects of climate change. These devastating hurricane events provide a news hook through which many journalists have started to investigate the complex nexus of interacting natural forces and potential human influences. Debates regarding links between increased intensity of hurricanes Katrina, Rita and Wilma and global warming notwithstanding, these discussions illustrate the ongoing and contentious battles about what is taking place in our carbon-based industry and society.

These highly politicized debates can be contrasted with the overwhelming scientific consensus regarding the issue of human contributions to climate change (a.k.a. anthropogenic climate change). Since the late 1980's, climate scientists have stated with increasing confidence that humans play a distinct role in changes in the climate. Acting on the science, the world community took initial steps to combat anthropogenic climate change in the form of the Kyoto Protocol; 128 countries have ratified it, but the United States is not among them.

The United States's obstinate anti-Kyoto stance, combined with more recent events, has prompted many foreign leaders, environmental groups, concerned citizens, and local officials to blame the Bush administration for its inaction in this critical issue. For

example, German Environment Minister Jürgen Trittin recently said, "The Bush government rejects international climate protection goals by insisting

It is clear that science and policy shape media reporting and public understanding. However, it is also true that journalism and public concern shape ongoing climate science and policy decisions.

that imposing them would negatively impact the American economy. The American President is closing his eyes to the economic and human costs his land and the world economy are suffering under natural catastrophes like Katrina and because of neglected environmental policies."

Measuring the Effects of Balanced Coverage

While much focus of ire and frustration has focused on the Bush administration, another significant, yet often underconsidered point of resistance to international cooperation on climate change also revolves around the media's ongoing adherence to the journalistic norm of balanced reporting. By adhering to this norm, the news media presents both sides of a story, with attempts often made to do so in equal measure. But when balance has been applied to the critical environmental issue of anthropogenic climate change, it has served to distort the findings of the world's top climate-change scientists.

My research empirically examined this disconnect. Through content analysis of U.S. newspapers, as well as interviews with key actors at the interface of climate science, policy, media and the public, I looked at how discourse on anthropogenic climate change is framed through the media, thereby affecting public understanding, discourse and action.

Since previous research found that the public generates much of its knowledge about science from the mass media, it is crucial to reflect on the role of the mass media in shaping public understanding of climate science and policy. Interactions between climate science, policy, media and the public are complex and dynamic. It is clear that science and policy shape media reporting and public understanding. However, it is also true that journalism and public concern shape ongoing climate science and policy decisions. Journalist Dale Willman, a veteran correspondent and field producer with CNN, CBS News, and National Public Radio, has commented, "in terms of agenda-setting ... the media don't tell people what to think, but they tell them what to think about."

In a peer-reviewed study published in 2004, coauthor Jules Boykoff and I examined this issue of balance in leading U.S. newspapers—The New York Times, The Washington Post, the Los Angeles Times, and The Wall Street Journal. Each of these newspapers has a daily circulation of more than 750,000. The study found strong adherence to balanced reporting since 1990. This balanced presentation of anthropogenic climate

change that was seen from 1990 to the end of the study in 2002 differs significantly from the perspective put forth in the findings of climate science during this time. While it ought to be the job of journalists to make sure that scientific consensus is conveyed accurately, the reporting was found to be strikingly out of alignment with the top climate science. The principal finding was that U.S. news media effectively provided consistently deficient coverage of anthropogenic climate change.

By adhering to balance, these influential news sources greatly amplified the views of a small group of climate contrarians who contest the notion that humans are contributing to changes in the climate. Over time, these dissonant views on anthropogenic climate change have been frequently granted roughly equal space alongside the research and recommendations of the most reputable climate-change scientists from throughout the world. Therefore, through this type of reporting in the U.S. news media, the American public and policymakers have been presented with the misleading scenario that there is a raging debate among climate-change scientists regarding humanity's role in climate change.

Newsroom Pressures

There are a number of factors and pressures that affect newspaper content, and these are interrelated and therefore very difficult to disentangle. While many of them are codified and explicit, others are shaped by social convention as well as larger political, economic and cultural trends, making them more implicit and difficult to pinpoint. However, the interactions of a number of key processes in journalism have contributed to a distorted discourse about anthropogenic global climate change. Some examples follow:

- In many newsrooms decreased budgets have resulted in more journalists working as generalists, who cover

many areas of news, rather than specialists on a particular news beat. Some people have found this trend has had an influence on the quality of reporting. Malcolm Hughes, climate scientist at the University of Arizona, observes, "A lot of the time [when] you give an interview ... there is a huge gulf in the nature of the questions and concerns that come from people working very broadly [as generalists]."

- Inherent challenges exist in translating scientific findings into information for the public in news reports. Scientists have a tendency to speak in

Journalists need to acknowledge that their long-cherished norm of balance has become a form of informational bias.

cautious language when describing their research and have a propensity to discuss implications of their research in terms of probabilities. For journalists, this lexicon can be difficult to transform into crisp and clear reporting. Henry Pollack, professor of geophysics at the University of Michigan, refers to this as the challenge of "translating error bars into ordinary language."

These difficulties cause distortions in communications about anthropogenic climate change, such as inaccurate amplification of uncertainty by relying on climate contrarians' counterclaims.

To serve the American public responsibly, U.S. media coverage of the human impact on climate change must improve. Journalists need to acknowledge that their long-cherished norm of balance has become a form of informational bias. What is needed is a more accurate depiction of the existing scientific consensus. And if those who represent the U.S. policy position continue to distort science in pursuit of an agenda that benefits special interests, then journalists must provide the crucial scientific context for the public. In this realm of coverage, journalistic credibility is on the line.

This critique is not meant as an attack on individual journalists. Rather, our focus as researchers has been on examining the institutional features of the news media in its coverage of this issue. But it is true that change will come most likely through the aggregate improvements of individual journalists, editors and publishers. Nor should the focus for improvement solely be on the news media. Political, economic and cultural factors from many sources contribute to this historical tapestry of intransigence: well-paid and skillful lobbyists pressuring national representatives on behalf of fossil fuel interests, the oil and coal industries' tanker-load of contributions to the campaign chests of federal policymakers, and the connections between members of the Bush administration and the oil industry. Responsibility also rests in the scientific and policy communities, as well as

with the public.

By the information it receives, members of the public can either be galvanized into action or resigned to passivity. Our research aims to improve the coverage of these climate science issues. The question becomes whether awareness of these journalism practices will result in more accurate coverage of anthropogenic climate change. Perhaps it is too soon to tell, but what we do know is that with the recent hurricanes in the Atlantic Basin new opportunities exist to expand and improve how aspects of climate change are framed and discussed. It will be up to journalists to decide if they will grab them. ■

Max Boykoff, who is completing his doctorate in the environmental studies department at the University of California, Santa Cruz, has conducted research examining how U.S. news media coverage influences public understanding of the causes and consequences of climate change. The Web link to the 2004 newspaper study is <http://people.ucsc.edu/~Emboykoff/Boykoff.Boykoff.GEC.2004.pdf>.

✉ mboykoff@ucsc.edu

Context and Controversy: Global Warming Coverage

‘... it is heartening to know that the simple inclusion of scientific context might help mitigate the readers’ level of uncertainty.’

By Jessica Durfee and Julia Corbett

For most citizens, knowledge about science comes largely through the mass media, not through scientific publications or direct involvement in science. As sociologist Dorothy Nelkin has explained, the public understands science less through experience or education but through the filter of journalistic language and imagery. This is especially true for unobtrusive or invisible issues such as global warming with which a person lacks real-world experience that could help shape opinion and understanding. Even if someone lives through the hottest summer on record, severe drought, or forest fires, that person still relies on the news media to connect such events to scientific evidence.

In media coverage of global warming, scientists were the primary sources of information early on, but more recently politicians and interest groups have been cited more frequently in stories. As this happens, an issue ripe for examination is what messages media coverage communicate about global warming as sources of information change. Some researchers have found that as their sourcing changed, journalists tended to overemphasize the level of uncertainty about global warming. This conclusion has been reached by academic researchers and echoed by journalist Ross Gelbspan, who wrote “Boiling Point,” a book about global warming. [See Gelbspan’s article on page 8.]

Some media researchers suggest that journalistic practices—such as objectivity and striving for balance—contribute to conveying this message of uncertainty. When sources offer conflicting claims, for example, reporters tend to use one of two strategies: 1. try to be objective, or 2. try to balance the conflicting claims within the story, which

leads to sides in the debate being given equal weight, even when the majority of scientific evidence might fall to one side while the other side consists of industry-supported, fringe science.

Media coverage can send the message to readers that the science is uncertain without ever mentioning “uncertainty.” To deliver that perception requires the balancing of competing scientific views without a clear context to explain how the evidence lines up in the scientific community. But until we set out to test readers to determine whether story elements—such as conflict and context—contributed to or created a sense of uncertainty, no researcher had examined the impact of this journalistic practice. Our experiment would assess how newspaper readers respond to journalists’ writing on global warming, while exploring specifically how controversy and context influence readers’ perceptions about the certainty or uncertainty of global warming.

Testing Public Understanding of Global Warming

For our experiment, we created four versions of a news story based on a story of an actual scientific study that found a section of the Antarctic ice sheet was thickening. We used this subject matter because the finding suggested uncertainty about global warming, and therefore it would be a good test: We were curious to learn whether the addition of scientific context would be able to mitigate uncertainty or if the addition of conflict further heightened the uncertainty.

To find out, we wrote a few paragraphs about controversy. Another few paragraphs we wrote emphasized the context of this particular study.

Controversy was inserted into one version of the story, context into another. To another version, we added both paragraphs—about controversy and context. In another, we placed neither paragraph but supplemented the thickening Antarctic ice story with general, encyclopedia-facts that were related to its size and formation. We also added some of these “encyclopedia-facts” to the other versions to make all of the news stories approximately the same length. Then we formatted them so they resembled a photocopy from a real newspaper.

We also designed a survey to assess the readers’ level of certainty about global warming after reading the article. Combined with questions that specifically assessed the participants’ level of uncertainty, other questions were related to the participants’ prior knowledge about global warming and general attitudes toward environmental issues. Each participant read one version of the story; all of the readers then completed the same survey. (Specifically, 209 undergraduate students participated in the experiment; 54 read the controversy story, 51 read the context story, 51 read the controversy and context story, and 53 read the story with neither controversy nor context.)

To evaluate the responses, we compared the survey answers relative to the version of the news story read. As expected, the students who read the news story with context reported the highest level of certainty regarding global warming, whereas students who read the story with neither controversy nor context appeared to be least certain about global warming. [See accompanying graph that illustrates the levels of certainty relative to the news story the participant read.]

What We Learned

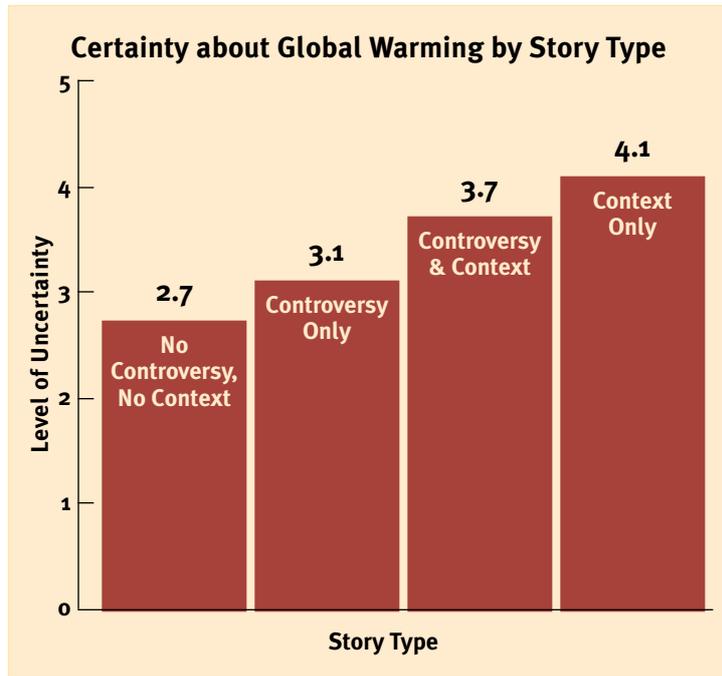
This experiment was an attempt to test whether common elements in news stories—controversy and context—influence readers' perceptions. The media's attraction to controversy is unlikely to wane, but it is heartening to know that the simple inclusion of scientific context might help mitigate the readers' level of uncertainty. The goal of our research was to bring these findings into a broader context for future research and counsel for science communicators and journalists.

Research like ours represents only a snapshot, replete with limitations and shortcomings—just as the picture of science presented by the news media is a snapshot. In comparison, the process of science can be viewed as a long movie, so it should not be surprising that members of the public struggle to put the movie together from their media exposure to scientific snapshots. As Henry Pollack, author of “Uncertain Science . . . Uncertain World” explained: Enough snapshots strung together can begin to look like a movie to the public. Eventually, through repetition and attention to context, the public will better understand global warming and other large-scale environmental concepts.

On a final note, we suggest that global warming needs a more salient metaphor

that emphasizes its seriousness, immediacy and scientific credibility. In the United States, when reporters ask people on the street what they think about global warming, a typical response is that a few degrees warmer might not be so bad. These responses make clear that U.S. media coverage has not communicated the graveness of the phenomenon nor the negative consequences for daily life. It ultimately might be up to scientists, science communicators, and journalists to find ways to communicate the seriousness of global warming to a general public that will be increasingly affected by it. As our experiment demonstrated, including scientific context in the construction of news stories is one strategy to improve public certainty about the science behind global warming. ■

Jessica Durfee is a PhD student in the



department of communication at the University of Utah. Julia Corbett is an associate professor in this department. She is finishing a book, “Green Messages: Communication and the Natural World.” A complete version of this study was published in *Science Communication* (volume 26, number 2) in December 2004.

✉ jessicadurfee@yahoo.com

✉ julia.corbett@utah.edu

Weight-of-Evidence Reporting: What Is It? Why Use It?

Journalists ‘find out where the bulk of evidence and expert thought lies on the truth continuum and then communicate that to audiences.’

By Sharon Dunwoody

When it comes to the news media's coverage of contested science, global warming stories are the favorite whipping boys of everyone from academics to pundits. Commonly, complaints take aim at such journalistic practices as objectivity and balance and conclude, as did a 2004 news media research re-

port by Max Boykoff and Jules Boykoff, published in *Global Environmental Change*, that “the continuous juggling act journalists engage in often mitigates against meaningful, accurate and urgent coverage of the issue of global warming.” [See article by Max Boykoff on page 17.]

They are right. But they and others

excoriate long-standing behaviors of journalists that arose to help reporters manage some pretty intractable problems. At this juncture, I urge a modicum of respect for those norms—objectivity and balance—but I am also willing to critique their employment in coverage of controversial science issues. And in light of those criti-

cisms, I would propose an alternative: weight-of-evidence reporting.

Normative behaviors do not survive haphazardly within occupations. Rather, those behaviors that confer value on their practitioners will be sanctioned and vigorously defended. Objectivity and balance are two such norms in the journalism world. Other scholars, such as University of California-San Diego Professor Michael Schudson, have explored the history of these norms. I simply want to argue that one important reason for their establishment is that, although journalism exists in principle to help individuals make reasoned decisions about the world around them, journalists are rarely in a position to determine what's true. Objectivity and balance have evolved over time to serve as surrogates for truth claims.

Why can't journalists be responsible for reporting what is true? For one thing, most journalists have neither the background nor the time to develop enough expertise about a particular topic or issue to make validity judgments possible. Science writers, for example, are defined as specialists among journalists, yet most cover a wide variety of topics, from nanotechnology to stem cells. There's solid evidence that years in the saddle is a good predictor of one's knowledge base as a journalist—science writers who have been covering the beat for a couple of decades know a great deal about many things—but even experienced journalists cannot grasp the factual intricacies of all they cover.

And even if a journalist were an expert at something, readers will react badly to an effort to declare one position on an issue “more true” than another. In our American culture, journalists are assigned a transmitter role, for better or worse, and going outside the role is often recognized by readers as a violation of expectations.

Objectivity and Balance

If a reporter cannot determine what's true, what is she to do? The “objectivity norm” responds that, if you cannot tell what's true, then at least capture truth claims accurately. Objective journalism

effectively reproduces the views of its sources.

The benefit of such a norm within a contested arena is that it absolves the reporter of having to ferret out truth and sets an accuracy standard in its place. Validity is replaced by a measure of the goodness of fit between the source's message and the reporter's story. If the reporter has faithfully captured the meaning and intent of the source, she has done good work.

The “balance norm,” on the other hand, declares that if you cannot tell what's true, then be sure to include all possible truth claims in the story. Again, the reporter need not determine who's telling the truth (and who is not). By including a variety of viewpoints, the reporter instead declares that “the truth is in here somewhere.” Lobbying a variety of viewpoints into the public domain sits well with a society that values the “marketplace of ideas,” so once again the reporter has done good work.

These norms deserve to be valued. Determining truth is a hazardous, messy business even for experts, and we should not expect journalists to accomplish that feat. Validity claims confront the occupation with an almost intractable dilemma, and journalism has done a reasonably savvy job of evolving coping strategies to manage the problem.

Why Change Practices?

While journalists have developed reasonable surrogates for validity claims, these normative practices may mislead audiences. Extensive research on audience reactions to media messages suggests that individuals believe what they read and hear. While surveys of public perceptions of the press indicate growing skepticism of journalistic performance these days, it is still the case that news media coverage of a topic legitimizes it in the public eye. Issues covered by the media are considered to be more important than those not so well covered.

This legitimizing effect is at work even for specialists who encounter media coverage of issues in their own fields. One fascinating study some years ago

examined the topic by dividing research papers published in *The New England Journal of Medicine* into those that got picked up and turned into stories by *The New York Times* and a set matched on all other variables but that did not garner coverage. A search of the science citation literature subsequently found that those research papers covered by the *Times* received almost 75 percent more citations in the peer-reviewed literature than did their matched counterparts. Media visibility made this research more important—and, presumably, true—even among other scientists.

What this means, then, is that a journalist can work to meet the high standards of accuracy set by the objectivity norm but might still mislead readers into thinking that a source's position on an issue is important and potentially true. Adding points of view to satisfy the balance norm can mislead in other ways. As most journalists know, balance typically gets put into operation as the presentation of two contrasting points of view, a strategy that can place a deceptively simple interpretation of an issue before the public.

Equally problematic is the meaning given by audiences to balanced stories. Remember that the journalist is trying to communicate to his readers/viewers that “the truth is in here somewhere.” Communication scholars who have fed balanced stories to readers and then captured their reactions find that audiences interpret such stories in a different and more ominous way—as telling them that “no one knows what's true.”

Presenting an Alternative

I suggest another strategy that would permit journalists to retain their emphasis on objectivity and balance but still share with their audiences a sense of where “truth” might lie, at least at that moment. I call this strategy “weight-of-evidence” reporting. It calls on journalists not to determine what's true but, instead, to find out where the bulk of evidence and expert thought lies on the truth continuum and then communicate that to audiences. Reporters are still responsible for capturing points

of view accurately (objectivity) and for sharing with audiences the existence of more than one contrasting point of view (balance). But added to that mix would be information about which point of view has captured the hearts and minds of the majority of experts, information about where they think the truth lies at that moment.

For example, before sitting down to write this essay I came across a story in the news section of the October 21, 2005 journal *Science* titled “Confronting the Bogyman of the Climate System.” Its author, Richard Kerr, reports on climate experts’ evaluations of the possibility that warming temperatures could melt too much ice at the poles, which in turn could shut down the exchange of warm and cold waters in the Atlantic Ocean. Bringing the oceanic “conveyor belt” to a halt could drastically chill parts of the globe, the European continent among them; this phenomenon was the central

climate actor in the recent movie, “The Day After Tomorrow.”

The catastrophic potential of a failed oceanic conveyor belt has been the subject of many media stories and deservedly so. Experts who met at the Aspen Global Change Institute last summer to discuss “abrupt climate change,” however, have concluded that the best available data indicate that increasing greenhouse gases might lead to a slowdown but not to a collapse of the conveyor belt. That conclusion was the focal point of Kerr’s article.

Kerr’s piece is what I would call a weight-of-evidence story. It shares with readers views of scientists on both sides of the issue—some who think a failed Atlantic Ocean conveyor belt needs to remain a major scientific and public concern and those who think that it is less likely than other possibly catastrophic outcomes—but then makes it clear to readers that the bulk of experts

who know the science fall into the latter category. What’s true might change as time goes on, of course, but stories such as this can go a long way toward helping us, as recipients of news, make sense of the world.

This is a service that news audiences deserve and one that journalists can deliver without compromising the long-standing norms of their business. ■

Sharon Dunwoody is the Evjue-Bascom Professor of Journalism and Mass Communication at the University of Wisconsin-Madison. She teaches courses on science and environmental journalism, and as a scholar she studies public understanding of science topics, including the newsgathering behaviors of science and environmental journalists, the nature of messages, and their effect on audiences.

✉ dunwoody@wisc.edu

Global Warming: What’s Known vs. What’s Told

‘Americans could be forgiven for not knowing how uncontroversial this issue is among the vast majority of scientists.’

By Sandy Tolan and Alexandra Berzon

In science, hypotheses become accepted truths one experiment, one study at a time. Initial doubts become so small, and the doubters so few, that a new scientific “truth” emerges. Even though these “truths” are never fully proven—be it about evolution, relativity, or even gravity—the gradual whittling away of doubt eventually compels scientists to call in the jury and declare the matter settled. Such is the case for global warming and its link to human activity.

In 1988 James Hansen, a respected NASA scientist, testified before the Senate Committee on Energy & Natural Resources, saying he was “99 percent certain” that global warming was real and that it was linked to human activity. Two years later the Intergovernmental

Panel on Climate Change (IPCC), a United Nations’ body initially backed by 175 scientists in 25 countries, convened to address global warming and declared that human activity was contributing to a warming planet. In the 17 years since the IPCC was formed, the group has grown to include more than 2,000 scientists in 100 nations, and global temperatures have continued to rise, leading to the hottest years ever recorded.

Increased temperatures coincide with the rising levels of carbon dioxide from the burning of fossil fuels and from worldwide deforestation. In 2003 the American Geophysical Union, an international scientific research group with more than 41,000 members, declared that “Human activities are increasingly

altering the earth’s climate. These effects add to natural influences that have been present over earth’s history. Scientific evidence strongly indicates that natural influences cannot explain the rapid increase in global near-surface temperatures observed during the second half of the 20th century.” Similar declarations came from the American Meteorological Society, the American Association for the Advancement of Science, and the National Academy of Sciences.

The conclusions underscore the research of Naomi Oreskes, a science historian at the University of California at San Diego, who reviewed 928 abstracts of articles on global climate change published in scientific journals between 1993 and 2003 and could not find a single one that challenged the

'Early Signs': A Journalism Class Project at Berkeley

One Sunday in August 2004, as I set down *The New York Times Book Review*, it suddenly occurred to me that there was sufficient evidence to explore one of the biggest stories of our time in a new way. I'd just read Al Gore's review of Ross Gelbspan's "Boiling Point," and that review, coupled with other readings I'd done on climate change, suggested that the signs of global warming were now sufficient to consider the story in human terms. Yet most of the reporting in the U.S. press remained focused on the debate over whether the planet is warming and, if it is, whether human activity could be partly to blame. With scientists largely in agreement on these questions (resoundingly in the affirmative), and early signs of warming coming in from the Arctic and elsewhere, it seemed possible that a team of reporters could begin documenting the social, cultural, political and economic impact of climate change around the world.

I approached colleagues at the Graduate School of Journalism at the University of California-Berkeley, where I teach international reporting and, after several encouraging

conversations, including with Dean Orville Schell and the environmental and science writer Michael Pollan, I began to investigate whether these early signs were sufficient for a full-scale investigation by a team of the school's reporters.

On September 1, 2005, 12 journalists gathered for our first class, charged with finding stories in which global warming would be explored not only through the lens of science and environment but also in human terms. How is a warming planet starting to affect people and the lives they lead? I designed "Early Signs: How Global Warming Affects Commerce, Culture and Community," as a two-semester seminar and reporting workshop. Our task was to combine intensive study of the science, politics, economics and social impacts with active story development in regions as far flung as the sub-Arctic, South America, Africa, the Indian subcontinent, and the South Pacific.

A central premise of the class was based on the scientific consensus that human activity is contributing to global warming. We intended to avoid the pitfall of creating a false bal-

ance of "dueling experts" that gives equal weight to unequal sides. This did not mean that we wouldn't learn all sides of an argument but that in our pursuit of knowledge and story ideas (which would involve several hundred pages of reading each week in the first two months), we'd place such skepticism in scientific and political context.

Accepting that global warming exists and that humans are part of the engine driving it did not, of course, mean that we'd abandon the rigor or skepticism that reporters always apply. Indeed, as my reporters began to research stories in Australia, the Azores, Bangladesh, Canada, Cuba, Ecuador, India, Mali, Peru, Portugal, New Zealand, Tanzania, Tibet, Zambia and the Pacific Islands, they were required to vet the science through a formal review process overseen by my colleague John Harte, a global warming expert at the University of California's Energy and Resources Group, who serves as my co-instructor and the science advisor to our team.

Through Harte's review and re-
Continued on next page ▶▶

scientific consensus that human-caused global warming is real. "There have been arguments to the contrary," she wrote in a 2004 editorial in *The Washington Post*, "but they are not to be found in scientific literature, which is where scientific debates are properly adjudicated." The overwhelming agreement echoed the 1997 conclusions of D. James Baker, the former administrator of the National Oceanic and Atmospheric Administration, who declared, "There is better scientific consensus on this than on any other issue I know—except maybe Newton's second law of dynamics."

"The time to call the jury in for a clear verdict has long passed" proclaimed Sir David King, science adviser to Tony Blair, in a 2002 speech.

Controversy Feeds Disbelief

Americans could be forgiven for not knowing how uncontroversial this issue is among the vast majority of scientists. Even as Arctic ice and permafrost begin to melt, resulting in slumping houses and new global shipping lanes, and the world's leading scientists agree these phenomena are linked to human activity, American readers, viewers and listeners continue to get the impression that the jury will be deliberating well into the future.

"In the case of global warming, the media have more often than not overplayed the level of uncertainty about global climate change," wrote Julia Corbett and Jessica Durfee in a 2004 article

in *Science Communication*. The reason, the authors write, is largely because of traditional journalistic balance. "The result of the routine media practice of quoting conflicting 'sides,'" wrote Corbett and Durfee, is "giving equal weight to fringe and nonscientists as much as scientists ... even though the majority of evidence or opinion may fall clearly to one side." [See article by Corbett and Durfee on page 19.]

Another factor, writes Dominique Brossard and colleagues in a 2004 study published in *Mass Communication and Society*, is the American media's inclination to generate stories with drama and conflict. "American media actively constructed narratives about global warming to maintain public interest,"

◀ *Continued*

porters' conversations with other experts in the field, we decided not to move ahead with stories on agriculture in Argentina, potential threats to the Azores, farming in Zambia, and drought in Australia. We also decided not to focus on Hurricanes Katrina and Rita for a number of reasons. These included the timing of our work, the heavy news coverage from other outlets and, as Harte pointed out, even though the science strongly suggests that warming oceans will generate more powerful hurricanes, it is difficult to point to any specific storm and connect it with global warming.

Harte explained to students that each successful story proposal would likely fall into one of three categories. One type would document the result of changes due to melting ice, rising sea levels, or elevated sea surface temperatures, which science has clearly linked to global warming. Another kind would focus on political or economic impacts, such as a South Pacific refugee program for displaced islanders or planning for sea level rise in vulnerable delta areas

like Bangladesh. A third category was more challenging. In situations in which changes from a warming planet were more subtle or indirect, the story proposal would need to show scientific evidence that the situation was "clearly not the result of a long sequence of fluctuations that are part

... the reporters worked up extensive story memos to show us their ability to transform their ideas into compelling narratives, populated with real people and a sense of place.

of natural variability." Thus, stories about powerful storms or droughts carried a higher burden of proof, and reporters had to cite peer-reviewed science explicitly linking such stories to global warming. Ultimately, each story had to be stamped with Harte's approval.

As Harte and I signed off on the students' proposals, the reporters worked up extensive story memos to show us their ability to transform their ideas into compelling narratives, populated with real people

and a sense of place. Simultaneously, I contacted former colleagues at National Public Radio's environmental newsmagazine show, "Living on Earth," and at U.S. daily newspapers, in an effort to place our large body of work. (We are still looking for a newspaper home for our series.)

In late October, with funds from the Graduate School of Journalism, our Arctic team of Jon Mooallem and Nick Miroff flew to the upper Hudson Bay to document how a small Canadian town is being transformed by melting ice and the changed terrain for polar bears. Many of the other reporters would do their travel

during the university's holiday break: Jori Lewis and Kate Cheney Davidson will go to the snows and inland lakes of Tanzania; Aaron Selverston to the Pacific Island nation of Kiribati; Pauline Bartolone and Felicia Mello to South America's glacial highlands and its Amazon; Durrell Dawson and Alexandra Berzon to New Zealand, and Sandhya Somashekhar and Emilee Raguso to Bangladesh.

During the spring semester, they will transform their reporting into stories. ■ —*Sandy Tolan*

they wrote. "In developing their narratives, they may choose to frame stories in a particular way ... ignoring others or simply reporting facts or perspectives more interesting or challenging than others The journalistic tendency to draw in discordant opinions in a story can lend strength to a viewpoint that may have very little credence in the scientific community at large."

Remaining skeptics do include a few especially cautious scientists who point out, for example, that the earth might be in a natural warming trend so it is therefore impossible to determine how much of the problem is human-caused. Many of the skeptics, however, are supported by industry-backed groups such as the Greening Earth Society and the

Global Climate Coalition. Ross Gelbspan, a former Boston Globe editor and reporter who has written two books about climate change, argues that these groups are part of a "carbon lobby" whose central purpose is to raise doubts on the issue through public relations campaigns. Gelbspan quoted industry documents aiming to "reposition global warming as theory rather than fact." [See Gelbspan's article on page 8.]

"The handful of carbon, natural gas, and oil interests have been handed a megaphone that carry their voice farther and louder than it does in strictly scientific circles," says Bud Ward, a longtime reporter on the environment who remembers similar debates over the ozone hole starting in 1976. "Public

perceptions are being torqued toward a greater uncertainty than actually exists in a responsible scientific community."

Equally influential, in some cases, are nonscientists, including the novelist Michael Crichton, whose "State of Fear" decries environmental extremism and who writes in an author's note, "We know astonishingly little about every aspect of the environment, from its past history, to its present state, to how to conserve and protect it. In every debate, all sides overstate the extent of existing knowledge and its degree of certainty." Crichton, who declares that "everyone has an agenda, except me," has nevertheless seen fit to testify before the U.S. House and Senate at the invitation of conservative legislators who continue

to sow doubt on the issue among the general public.

The Dangers of Balance

The weight many journalists give to such views, in insisting on balance but not on putting it within a broader scientific and political context, appears to be at the heart of the confusion among Americans, who may understandably determine from the “dueling experts” that nothing can be concluded and thus that action is not yet warranted. “The message of the traditional balanced account may be, ‘Well, who knows what’s really true?’” wrote Corbett and Durfee.

Ward agrees that “the old journalism 101 thing about balance” is creating a problem in the coverage of climate change. “Balance in some cases can be the enemy of accuracy,” he says. “I’m all for balance in a gubernatorial campaign, a presidential campaign, policy stories. But science isn’t determined by a popularity contest. We went through this for how long with tobacco? Certainly this is not the first time we’ve seen the mistaken application of balance.”

But the U.S. media may be inching closer to its own verdict, one more aligned with scientists. Seth Borenstein, who covers science and the environment for Knight Ridder’s 32 daily papers, said he’s noticed that in the past few years environmental reporters have reached a consensus for how to cover global warming that still adheres to the American journalistic ethic of including disputing views, but puts those views into a clear context: “Most of the people you talk to are legitimate, mainstream scientists,” explained Borenstein. “You put a paragraph in saying ‘There are a minority of scientists skeptical, they say this, but the vast, overwhelming majority of scientists disregard them.’”

In April and May 2005, The New Yorker published Elizabeth Kolbert’s three-part series, “The Climate of Man,” which documents changes to the planet

and concludes by asking, “As the effects of global warming become more and more apparent, will we react by finally fashioning a global response? Or will we retreat into ever narrower and more destructive forms of self-interest? It may seem impossible to imagine that a technologically advanced society could choose, in essence, to destroy itself, but

The weight many journalists give to such views, in insisting on balance but not on putting it within a broader scientific and political context, appears to be at the heart of the confusion among Americans, who may understandably determine from the ‘dueling experts’ that nothing can be concluded and thus that action is not yet warranted.

that is what we are now in the process of doing.”

In the months following Kolbert’s series, The Washington Post and The New York Times published major takeouts on global warming in the Arctic, with the Times’s Andrew Revkin writing in “The Big Melt” series on October 25th, “many ... scientists have concluded that the momentum behind human-caused warming, combined with the region’s tendency to amplify change, has put the familiar Arctic past the point of no return.” An informal survey of articles published in 2004 and 2005 in American newspapers also suggests less uncertainty on the issue than in previous years. One representative headline from The Seattle Times declared, “Scientists overwhelmingly agree: The earth is getting warmer at an alarming pace, and humans are the cause no matter what the skeptics say.”

Reports continue, however, of a reluctance to tackle the issue in all its gravity, both in the press and in popular culture. The summer documentary hit “March of the Penguins,” which intimately documents the migration and mating habits of penguins in Antarctica, does not once mention that the creatures’ habitat may melt away. Luc Jacquet, the French biologist and direc-

tor of the film, told National Geographic News, “It’s obvious that global warming has an impact on the reproduction of the penguins. But much of public opinion appears insensitive to the dangers of global warming. We have to find other ways to communicate to people about it, not just lecture them.”

In cases of Americans’ reluctance to confront this situation, the issue goes deeper than efforts by the “carbon lobby,” or journalistic models of balance, to something far deeper. Valerie Brown, a freelance journalist who has written about global warming, said she worries that as they find out more about the issue, “people will just get more anxious and cocoon even more while the world is going to hell in a handbasket.”

“There’s not a clear-cut view in society’s mind about what can be done about it,” says Ward. “Is it bigger than both of us? Is this something that we human beings just can’t affect? It’s not like CFC’s [chlorofluorocarbons, released in aerosol sprays], where you can just take them off the market. It’s not clear that there’s a counterpart solution. There’s the difficulty of not finding a silver bullet.

“And that,” Ward says, “basically invites denial.” ■

Sandy Tolan, a 1993 Nieman Fellow, directs the Project on International Reporting at the Graduate School of Journalism at the University of California, Berkeley. He is cofounder of Homelands Productions, a contributor to National Public Radio, and author of “The Lemon Tree: An Arab, A Jew, and the Heart of the Middle East,” to be published by Bloomsbury in May 2006. Alexandra Berzon is a freelance journalist and a graduate student of journalism at the University of California, Berkeley.

✉ sandytolan@yahoo.com

✉ aliberzon@yahoo.com

How Do We Cover Penguins and Politics of Denial?

Bill Moyers suggests a new approach to conveying reporting about global warming.

As part of the message television journalist Bill Moyers delivered in October to members of the Society of Environmental Journalists at their annual convention, he spoke about an opportunity the mainstream press has to reach a segment of the country's population—evangelical Christians—with coverage of issues revolving around climate change and sustainability. To connect their reporting with this audience, he argued, would require that journalists find ways to speak about such issues using more metaphorical language rather than “the language of environmental science.” In excerpts we are publishing from his remarks, Moyers elaborates on the methods and potential of this new approach. The entire text can be obtained online at the SEJ Web site, www.sej.org/confer/past_conferences.htm.

There is a market here for journalists who are hungry for new readers. The conservative Christian audience is some 50 million readers strong. But to reach them, we have to understand something of their belief systems.

Reverend Jim Ball of the Evangelical Environmental Network, for example, tells us that “creation-care is starting to resonate not just with evangelical progressives but with conservatives who are at the center of the evangelical spectrum.” Last year, in a document entitled “For the Health of the Nation: An Evangelical Call to Civic Responsibility,” the National Association of Evangelicals declared that our Bible “implies the principle of sustainability: our uses of the earth must be designed to conserve and renew the earth rather than to deplete or destroy it.” In what might have come from the Sierra Club itself, the declaration urged “government to encourage fuel efficiency, reduce pollution, encourage sustainable use of natural resources, and provide for the proper care of wildlife and their natural habitats.” Ball and a few evangelical leaders have also pushed for a climate change plank to their program, standing up to demagogues like James Dobson, Jerry Falwell, and Pat Robertson who are in the service of the corporate-funded radical wing of the Republican Party.

But we can't expect to engage this vast conservative Christian audience with our standard style of reporting. Environmental journalism has always

spoken in the language of environmental science. But fundamentalists and Pentecostals typically speak and think in a different language. Theirs is a poetic and metaphorical language: a speech that is anchored in the truth of the Bible as they read it. Their moral actions are guided not by the newest IPCC report but by the books of Matthew, Mark, Luke and John.

Here's an important statistic to ponder: Forty-five percent of Americans hold a creationist view of the world, discounting Darwin's theory of evolution. I don't think it is a coincidence then that in a nation where nearly half our people believe in creationism, much of the populace also doubts the certainty of climate-change science. Contrast that to other industrial nations where climate-change science is overwhelmingly accepted as truth—in Britain, for example, where 81 percent of the populace wants the government to implement the Kyoto treaty. What's going on here? Simply that millions of American Christians accept the literal story of Genesis, and they either dismiss or distrust a lot of science—not only evolution, but paleontology, archeology, geology, genetics, even biology and botany. To those Christians who believe that our history began with Adam and Eve in the Garden of Eden and that it will end soon on the plains of Armageddon, environmental science, with its urgent warnings of planetary peril, must look at the best irrelevant. At worst the environmental woes we report may be stoically viewed as the inevitable playing out of

the end of time as presented in the book of Revelation. For Christian dominionists who believe the Lord will provide for all human needs and never leave us short of oil or other resources, no matter how we overpopulate the earth, our reporting may be viewed as a direct attack on biblical teachings that urge humans “to be fruitful and multiply.” It's even possible that among many Christian conservatives, our environmental reporting—if they see it at all—could seem arrogant in its assumptions, mechanistic, cold and godless in its worldview. That's a tough indictment, but one that must be faced if we want to understand how these people get their news.

So if I were a freelance journalist looking to offer a major piece on global warming to these people, how would I go about it? I wouldn't give up fact-based analysis, of course—the ethical obligation of journalists is to ground what we report in evidence. But I would tell some of my stories with an ear for spiritual language, the language of parable, for that is the language of faith.

Let's say I wanted to write a piece about the millions of species that might be put on the road to extinction by global warming. Reporting that story to a scientific audience, I would talk science: tell how a species decimated by climate change could reach a point of no return when its gene pool becomes too depleted to maintain its evolutionary adaptability. That genetic impoverishment can eventually lead to extinction.

But how to reach fundamentalist Christians who doubt evolution? How would I get them to hear me? I might interview a scientist who is also a person of faith and ask how he or she might frame the subject in a way to catch the attention of other believers. I might interview a minister who would couch the work of today's climate and biodiversity scientists in a biblical metaphor: the story of Noah and the flood, for example. The parallels of this parable are wonderful to behold. Both scientists and Noah possess knowledge of a potentially impending global catastrophe. They try to spread the word, to warn the world, but are laughed at, ridiculed. You can almost hear some philistine telling old Noah he is nothing but a "gloom and doom environmentalist," spreading his tale of abrupt climate change, of a great flood that will drown the world, of the impending extinction of humanity and animals, if no one acts.

But no one does act, and Noah continues hearing the word of God: "You are to bring into the ark two of all living creatures, male and female, to keep them alive with you." Noah does as God commands. He agrees to save not only his own family but to take on the daunting task of rescuing all the biodiversity of the earth. He builds the ark and is ridiculed as mad. He gathers two of every species, the climate does change, the deluge comes as predicted. Everyone not safely aboard drowns. But Noah and the complete complement of earth's animals live on. You've seen depictions of them disembarking the ark beneath a rainbow, two by two, the giraffes and hippos, horses and zebras. Noah, then, can be seen as the first great preservationist, preventing the first great extinction. He did exactly what wildlife biologists and climatologists are trying to do today: to act on their moral convictions to conserve diversity, to protect God's creation in the face of a flood of consumerism and indifference by a materialistic world.

Some of you are probably uncomfortable with my parable. You may be ready to scoff or laugh. And now you know exactly how a fundamentalist Christian who believes devoutly in creationism

feels when we journalists write about the genetics born of Darwin. If we don't understand how they see the world, if we can't empathize with each person's need to grasp a human problem in language of his or her worldview, then we will likely fail to reach many Christian conservatives who have a sense of morality and justice as strong as our own. And we will have done little to head off the sixth great extinction.

That's not all we should be doing, of course. We are journalists first, and trying to reach one important audience doesn't mean we abandon other audiences or our challenge to get as close as possible to the verifiable truth. Let's go back for a moment to America's first Gilded Age just over 100 years ago. That was a time like now. Gross materialism and blatant political corruption engulfed the country. Big business bought the government right out from under the people. Outraged at the abuse of power, the publisher of McClure's magazine cried out to his fellow journalists: "Capitalists ... politicians ... all breaking the law, or letting it be broken? There is no one left [to uphold it]: none but all of us."

Then something remarkable happened. The Gilded Age became the golden age of muckraking journalism.

Lincoln Steffens plunged into the shame of the cities—into a putrid urban cauldron of bribery, intimidation and fraud, including voting roles padded with the names of dead dogs and dead people—and his reporting sparked an era of electoral reform.

Nellie Bly infiltrated a mental hospital, pretending to be insane, and wrote of the horrors she found there, arousing the public conscience.

John Spargo disappeared into the black bowels of coal mines and came back to crusade against child labor. For he had found there little children "alone in a dark mine passage hour after hour, with no human soul near; to see no living creature except ... a rat or two seeking to share one's meal; to stand in water or mud that covers the ankles, chilled to the marrow ... to work for 14 hours ... for 60 cents; to reach the surface when all is wrapped in the

mantle of night, and to fall to the earth exhausted and have to be carried away to the nearest 'shack' to be revived before it is possible to walk to the farther shack called 'home.'"

Upton Sinclair waded through hell and with "tears and anguish" wrote what he found on that arm of the Chicago River known as "Bubbly Creek" on the southern boundary of the [stock] yards [where]: "All the drainage of the square mile of packing houses empties into it, so that it is really a great open sewer ... and the filth stays there forever and a day. The grease and chemicals that are poured into it undergo all sorts of strange transformations ... bubbles of carbonic acid gas will rise to the surface and burst, and make rings two or three feet wide. Here and there the grease and filth have caked solid, and the creek looks like a bed of lava ... the packers used to leave the creek that way, till every now and then the surface would catch on fire and burn furiously, and the fire department would have to come and put it out."

The Gilded Age has returned with a vengeance. Washington again is a spectacle of corruption. The promise of America has been subverted to crony capitalism, sleazy lobbyists, and an arrogance of power matched only by an arrogance of the present that acts as if there is no tomorrow. But there is a tomorrow. I see the future every time I work at my desk. There, beside my computer, are photographs of Henry, Thomas, Nancy, Jassie and Sara Jane—my grandchildren, ages 13 down. They have no vote, and they have no voice. They have no party. They have no lobbyists in Washington. They have only you and me—our pens and our keyboards and our microphones—to seek and to speak and to publish what we can of how power works, how the world wags and who wags it. The powers-that-be would have us merely cover the news; our challenge is to uncover the news that they would keep hidden.

A lot is riding on what you do. You may be the last group of journalists who make the effort to try to inform the rest of us about the most complex of issues involving the survival of life on earth. ■

Accepting Global Warming as Fact

‘It helps that the German media is less strict about the division between editorials and news than the news media in the United States.’

By Markus Becker

When Ross Gelbspan spoke about the aftermath of his recent op-ed in *The Boston Globe*, his comments provoked deep astonishment. As he put it, his article exploded onto the scene at the end of August, sending shock waves through the U.S. media. Angry letters to the editor poured in to the *Globe*, while Gelbspan himself went on the talk show circuit.

When Gelbspan told this story to a group of visiting German journalists, I among them, we were perplexed. What on earth had this man written to cause such an uproar? The answer was this: In his op-ed, entitled “Katrina’s Real Name,” Gelbspan, author of “Boiling Point,” had claimed that 1. global warming exists and 2. not only does it exist, it even has definite, tangible effects, such as more powerful hurricanes. [See article by Gelbspan on page 8.] When we heard this, confusion gave way to utter bewilderment. For the average German media consumer, this would have been about as shocking as declaring that the world is round.

Cultural differences might well be at play here. After all, Germans are known for obsessively sorting their household waste into plastics, metals, glass, paper and compost and placing it all in separate, different colored plastic bins. The glass—and most Americans think this is a joke—is further sorted by color and tossed into neighborhood containers—but no later than 7 p.m. please, to keep the noise down. Anyone who accidentally tosses regular garbage in with the recycling is asking for serious trouble with the neighbors. And when a hurricane drowns a city like New Orleans, the German environment minister blames the U.S. government for

contributing to the catastrophe with its misguided environmental policies.

Anecdotes like these are not the only examples of the depth of concern in Germany about global climate issues. For almost 50 years, conservatives, social democrats, and liberals had shared power in democratic, post-war Germany. The first party to establish itself as a fourth political power in Germany since 1949 was the Green Party, which formed a governing coalition

The U.S. media pay far more attention to the domestic and foreign policy implications of climate change than its environmental consequences.

with the social democrats from 1998 to 2005 and pursues an environmental agenda mixed with left-wing and pacifist ideas.

The environmental threat posed by global warming rouses the German public’s emotions far more than the political aspects of climate change. Domestic environmental protection regulations and the Kyoto Protocol have generally bored German readers and will probably continue to do so—that is, unless President George W. Bush tries to use the climate agreement to boost his popularity in Europe.

By contrast, the U.S. media pay far more attention to the domestic and foreign policy implications of climate change than its environmental consequences. This could also have to do with public sentiment. When Roland Emmerich released his disaster blockbuster “The Day After Tomorrow,” conservative commentator Steven Milloy labeled him an eco-extremist. “The movie’s

unmistakable purpose is to scare us into submitting to the Greens’ agenda,” Milloy wrote on the Web site for Fox News. And this agenda has but one purpose, “domination of society through control of energy resources.”

Incidentally, Milloy’s primary employer is the neoconservative Cato Institute, which receives much of its funding through corporate contributions. That he is even allowed to write a column on climate policy for mass media distribution under the circumstances—even for Fox News—is interesting in and of itself, but Milloy is not the only vocal skeptic of climate issues that the lobby/institute has managed to slip into the mainstream media. More on that later.

The sheer number and nature of letters to the editor that are sent to mass media publications such as *Spiegel Online* demonstrates how passionate the discussion of environmental conservation and climate protection is in Germany. This makes it all the more important that we use the most reliable and credible sources for our articles and that we pay attention to the majority opinion in the scientific community.

This is perhaps the key difference between the media in the United States and Germany. This emphasis—not only at *Spiegel Online*, but in most of the German news media—has led both commentators and the public at large to the conclusion that human-caused climate change is a fact confirmed primarily, but not solely, by an overwhelming majority of scientists. Of course the proponents of the scientific minority have their say, too, but seldom does a German newspaper fail to mention the fact that these scientists do belong to a small minority.

It helps that the German media are less strict about the division between editorials and news than the news media in the United States. In Europe, the various media outlets traditionally hold a position at some specific point along the political spectrum, with conservative and left-wing newspapers publishing true to their political orientations and sharpening their images against the competition. Therefore, when the existence of global warming is largely accepted as fact, it is not just a matter of expressing the majority opinion of the scientific community. Conservative publications like *Die Welt* and *Die Zeit*, which are generally more business-friendly, tend to represent climate change as a topic of scientific debate, while liberal papers like the *Süddeutsche Zeitung* and the very left-leaning *Tageszeitung* take the side of researchers warning about the dangers of global warming.

In the United States, journalists want to be objective and take the political middle road—or so it seems from the European perspective. There are exceptions like Fox News. But it is interesting that, in this case, a TV broadcasting station that often violates political balance claims to do just the opposite, that is, to provide “fair and balanced” reporting. Another consequence of the “objectivity principle” is that news media in the United States are so intent on hearing both sides in a debate that they often are virtually incapable of showing where the majority opinion lies. In the climate debate, this means the same old skeptics can take up their position and receive equal time against an overwhelming majority of scientists.

This sometimes leads to interesting combinations. For example, on October 18th *The Washington Post* published an article by Juliet Eilperin on a study conducted at Purdue University that claims the number of extreme weather incidents will rise due to global warming. In this article, Patrick J. Michaels was quoted with an opposing view. Incidentally, Michaels also works for the Cato Institute. *The Washington Post* noted this and the fact that Michaels had

received financial contributions from representatives of the coal, gas and mining industries. Nevertheless, they gave him a soap box from which to claim that the Purdue team’s assumptions that carbon dioxide concentrations would double was wrong and “not borne out by reality.” It is hardly surprising that readers emerge from this “he said, she said” conflict not knowing any more about how or whether the Purdue researchers made any mistakes in their assumptions. All Michaels’ words do is cast doubt, and that is what is left in

**[U.S.] journalists want to be objective
and take the political middle road—or so
it seems from the European perspective.**

the readers’ minds.

For most German media, *Spiegel Online* included, something like this would be unthinkable. Michaels’ obvious conflict of interest would have disqualified him from the debate. To cite this conflict openly and then quote Michaels anyway would be viewed as a contradiction in terms or as kowtowing to industry. German reporters tend to call upon independent scientists as much as possible when seeking authorities to classify scientific studies and critically analyze the authors’ methods and findings. In the end, whether these scientists agree with the study findings or dispute them is not as important as the fact that a number of independent voices are heard. In other words, German media seek to hear numerous qualified opinions rather than doggedly searching for an opposing voice regardless of that voice’s qualifications.

One salient example of how the German journalists let climate experts be heard is an article published in the February 16, 2005, issue of the *Süddeutsche Zeitung*, one of Germany’s largest and most highly respected newspapers. Hartmut Grassl, a climate researcher who is recognized throughout the world, rebutted the common arguments of climate change skeptics. The newspaper did not invite a researcher to

debate with Grassl. Instead they had an anonymous party present 13 arguments commonly brought by climate-change skeptics. Those arguments comprised a total of 209 words of the article, while Grassl’s responses totaled 903 words. The title of the article was “Why climate-change skeptics are wrong.”

If a similar article had appeared in *The New York Times*, which holds a similar position in the daily newspaper market to that of the *Süddeutsche Zeitung* in Germany, it likely would have elicited a fierce reaction. But in

Germany this approach can easily be reconciled with journalistic ethics. The newspaper presented the views of climate-change skeptics, but gave them a relatively small amount of space to account for the fact that theirs is a minority position. At the same time, the paper avoided offering a personal forum to an individual who might be compromised by a conflict of interest. In the United States, this approach would probably have been considered a flagrant violation of the fairness principle.

However, there are clear indications that this and the resulting flood of “he said, she said” articles is coming to an end. At the beginning of October, *Time* magazine stressed that time is running out for political head games. *Time* writer Jeffrey Kluger wrote: “In Washington, successive administrations have ignored greenhouse warnings, piling up environmental debt the way we have been piling up fiscal debt. The problem is, when it comes to the atmosphere, there’s no such thing as creative accounting. If we don’t bring our climate ledgers back into balance, the climate will surely do it for us.” ■

Markus Becker heads the science department at Spiegel Online, the news Web site of Der Spiegel magazine. Becker participated in the Bertelsmann Stiftung’s Summer U.S. Academy for Science Journalism, which brought 15 young journalists from Germany to New York and Boston/Cambridge in September 2005.

✉ markus_becker@spiegel.de

Culture Contributes to Perceptions of Climate Change

A comparison between the United States and Germany reveals insights about why journalists in each country report about this issue in different ways.

By Hans von Storch and Werner Krauss

When we talk about the weather, we also establish our social relations and construct the world we live in. Today such discussions are commonplace, especially when we have many extreme weather events and climate change to talk about. A cultural dimension is inherent in these conversations, and this is evidenced in how people perceive and connect these phenomena differently in the United States and in Germany.

With the Kyoto treaty, differing responses became evident. Now, as the role of climate change is being hotly debated in the aftermath of the recent catastrophic hurricanes in the United States, differences in perception are surfacing again. These moments teach those of us who study public responses to the issue of climate change that cultural history and media representations are often neglected factors and that a firm understanding of aspects of culture is indispensable in sorting through these differences in national perspectives and in adequately planning for management for a catastrophe.

Many Americans have come to view the last few hurricane seasons as particularly extreme. This year the devastation was especially severe when New Orleans was almost directly hit by Hurricane Katrina. In comparing the 2005 hurricane season to previous ones, the greatest surprise was not so much the severity and frequency of the storms that made landfall but the

degree to which civil defense was obviously overwhelmed at a site historically known for its extreme vulnerability.

The basic events of the Katrina disaster unfolded in much the same way as did disastrous European storm surges in 1953 in the Netherlands and 1962 in northern Germany. These storms came as surprises after a long lull; underestimating the danger, thousands of people in the Netherlands and hundreds in

become part of the country's national identity.

What happened in New Orleans? As in Hamburg in 1962, people underrated the known vulnerability of the place and its potential damage. But then in New Orleans, little aid on the ground and insufficient catastrophe management led to four days of agony with close TV coverage of the human devastation in the wake of the storm.

It becomes clear that specific social conditions made this meteorological extreme event a social catastrophe: The link between race, poverty and vulnerability was suddenly rendered transparent. Rumors of massive looting and crime spread before the armed

forces arrived. President Bush took the initiative too late, only after widespread protests were heard in the news media and the emergence of social unrest could be witnessed on TV.

There is another crucial difference to be considered: During the last 50 years, the perception and interpretation of such extreme weather events have changed dramatically. "Global warming" and "Klimakatastrophe" (the English translation is climate catastrophe) are concepts that have captured public attention at the same time that extreme weather events are more likely—in some parts of the world—to be interpreted as man-made rather than natural. Moreover, even though there are significant differences in the public understanding of climate change in the United States and Ger-

... even though there are significant differences in the public understanding of climate change in the United States and Germany, the media in both societies use a similar framework of vulnerability, even if it is constructed in culturally different ways.

Hamburg drowned.

The difference among these situations is evident, however, in the societal response. In Hamburg, then-unknown state minister Helmut Schmidt took the initiative. In spite of uncertain legality for the orders he issued, he called for the military, which turned out to be a key factor in managing the catastrophe. It was the mythical beginning of Schmidt's political career, who later became chancellor of Germany. Shortly after the event, a new large-scale coastal defense program was instituted. When, 14 years later, a much more severe storm surge formed, Hamburg's coastal defense proved sufficient, and no serious damage occurred. The Netherlands became famous for its coastal defense politics in the aftermath of the disastrous 1953 flooding, an event that has

many, the media in both societies use a similar framework of vulnerability, even if it is constructed in culturally different ways.

Among mainstream climate scientists, there is little doubt that climate is changing significantly faster today than in the historical past. As a consequence of this “detection,” they conclude that there must be non-natural factors at work. When different external factors are considered as possible causes, the most consistent explanation attributes two-thirds of 20th-century’s warming to the accumulation of greenhouse gases in the atmosphere, while the other third is ascribed to the sun’s changing output. While broad scientific consensus asserts that rising temperatures are a result of human emissions, a similar conclusion has not been drawn about anthropogenic changes in other weather phenomena such as windstorms in the tropics or at mid latitudes. Recently, a number of claims about worsening hurricane intensity have been made. However, the hurricane statistics vary on time scales of a few decades; the data describing the significant upward trend cover just the last 30 to 40 years, with a lull commencing in the 1970’s after an active period in the 1940’s and 50’s. Thus the conclusion of an anthropogenic signal is methodologically premature.

Climate change is not only a topic in the inner circles of climate researchers but also in the public domain. The interplay between climate research and the public sphere—the public demand for explanation and advice about how to cope with climate change—is one of the key constraints on current climate research. Given prevailing uncertainty about the scientific facts on the one side and the high stakes for the public on the other, climate science is now a contested field. And it emerges as exemplary of what some social scientists call postnormal science.

The German Perspective

While in the United States, the words global warming refer to a tendency towards warmer conditions, climate change in Germany is framed more broadly, equated foremost with Klimak-



In 1986, *Der Spiegel*'s cover of the Cologne Cathedral half submerged in a flood became an iconic image for the German attitude towards climate change.

atstrophe. In Germany, all disastrous weather events are interpreted as consequences of climate change. The severe Elbe River flooding in August 2002 exemplifies this. While media reports on flood mitigation and repair work dominated the first days after the events, the search for underlying explanations soon attracted even greater attention. Aside from such presumably minor sins such as manipulating river beds and flood plains, the main culprit was quickly identified—climate change, brought upon us by ourselves. This explanation, while not explicitly supported by scientists, was assumed by

many commentators and could be read between the lines of many reports. The commentary in *Sächsische Zeitung*, a regional newspaper in the flooded area, illustrates this: “Now the flood finally reached our backyard. This flood confronts us with the ‘why,’ with the sins we have committed, with the search for its origins. Even without scientific certainty we know that the flood is a consequence not only of cosmic changes, but of our own way of living.”

This is only one impressive example of an explanatory strategy that Germany’s legendary weekly, *Der Spiegel*, had already dubbed *Klimakatastrophe* in 1986. Its cover image became an icon for the German attitude towards climate change, with the Cologne Cathedral half submerged in a flood. The argument in the cover article was based on plausible scientific claims: Rising temperatures increase the volume of the ocean, melt ice sheets and fuel an accelerated atmospheric energy cycle, which together lead to higher water levels and more water vapor and thus to more intense rainfall.

A tendency in the 1980’s towards more violent North Atlantic and North Sea storms helped to support these claims empirically. Reference to such exceptionally vigorous and erratic weather events helped to implant the concept of *Klimakatastrophe* firmly in the public’s mind. Further, the theory was consistent with older, culturally constructed views that the weather is getting worse and less predictable—due to nature’s response to human misconduct.

Yet since the mid-1990’s, the wind storms in Northern Europe again returned to a less severe state, a trend scarcely noticed by the media or the public. Research further revealed that the number and violence of storms started increasing around 1960, after a long period of weakening storm activity—and many analyses began in just about 1960, when good meteorological

data became available for the region. Both in terms of the actual data available and public perception of it, this situation parallels contemporary discussions on the increasing intensity of hurricanes in the Atlantic. While there has been an increase in storm intensity in the past 30 or so years, the data are too limited and cover so short of a time span to afford any clear or final conclusion.

During the past two decades in Germany, the concept of Klimakatastrophe has become a valuable asset in the public shift towards a more environmentally “conscious” political attitude. And this attitude is often expressed with moral undertones: Humanity, in general, is blamed for destroying the fundamental balance between nature and humans. Following in the tradition of Romantic and Protestant ethics, many actions, symbols and stereotypes became associated with German Klima-Angst: the rise of the Green Party, the fall of nuclear industry, the societal task of household waste separation and recycling, and the moralizing call to bike instead of drive. Closely connected with this shift in the public’s perception was the rise of German climate research, as scientists became public figures and drew on these symbolic resources to communicate with the public via the media.

Interestingly, German climate scientists form a rather uniform phalanx of supporters of the concept of anthropogenic climate change. Only a few dissenters exist. They are not climate scientists and are hardly noticed by the public. Rather, a handful of publicly identifiable individuals have emerged to dominate media discourse on climate change. They do not explicitly claim causal relationships between increased greenhouse gas levels and extreme events, but rather allude to the cautionary principle and point out that the extreme events are “consistent” with future expectations. The public understands such weak causal claims as overly cautious assertions about what they see as an established “fact”: Specifi-

cally, recent violent climate events such as the Elbe or the New Orleans flooding are not natural but human-made and thus, by implication, they are avoidable. Consistently, then, the federal minister for the environment from Germany’s Green Party alluded to the “fact” that the New Orleans disaster was self-inflicted by a stubborn U.S. administration.

The American Mindset

In the United States, the household term referring to anthropogenic climate change is not “climate catastrophe,”

tic” in this context is a respectable label for the opposition in the United States and not considered a dirty word, as it is in Germany.

Politicians, members of the public, and scientists engage in fierce debates about how to interpret scientific data and models. The media, following the U.S. norm of “balance,” typically present the problem of anthropogenic climate change as a conflict between two opposing schools of thought—and give both schools similar space in advocating their views. Within the scientific community, in contrast, one finds the skeptics isolated and accused of doing poor science; nonetheless, their arguments are eagerly fostered by political and religiously motivated groups who can command significant media attention.

Despite such differences in U.S. and German media coverage of the science, a recent survey among European and North American climate scientists revealed that these two scientific communities actually hold very similar views on the assessment and projections of future climate change. But

differences in coverage remain. In the past, for example, U.S. articles about global warming—and this contrasts with German ones—rarely were pegged explicitly to extreme weather events. Given this, it is perhaps not surprising that in the early days of the Katrina disaster, a New Orleans Times-Picayune cartoonist showcased local attitudes towards the hurricane without making any broader connection.

However, the new media’s focus in its coverage of Katrina soon changed to the “national shame” that this storm had fostered. President Bush picked up on this public perception when he tried to repair American self-understanding and confidence in his almost biblical address to the nation: “In the life of this nation, we have often been reminded that nature is an awesome force and that all life is fragile. We’re the heirs of men and women who lived through those first terrible winters at Jamestown and

Politicians, members of the public, and scientists engage in fierce debates about how to interpret scientific data and models. The media, following the U.S. norm of ‘balance,’ typically present the problem of anthropogenic climate change as a conflict between two opposing schools of thought—and give both schools similar space in advocating their views.

but “global warming.” This language leaves an impression that the future will be warmer but not more variable or extreme—a very different projection than in the German metaphor. Not surprisingly, therefore, cold spells in the United States are often associated with jokes that dispute global warming, while German scientists can use such events as further evidence for an evolving human-made disaster.

As in Germany, the interplay between science and the public has had a lot to do with the overall perception of weather events and climate change. Public opinion and the direction of research have been heavily influenced by long-standing disputes (rhetorical and real) between powerful social groups such as industry, scientists, environmentalists and religious groups (with the creationists in science serving as a symbol for the blurring of boundaries among these parties). The term “skep-

Plymouth, who rebuilt Chicago after a great fire, and San Francisco after a great earthquake, who reclaimed the prairie from the Dust Bowl of the 1930's. Every time, the people of this land have come back from fire, flood and storm to build anew—and to build better than what we had before. Americans have never left our destiny to the whims of nature—and we will not start now.”

Contrary to the German attitude sketched above, the American construction of identity in relation to nature is optimistic and far from self-critical. President Bush never mentioned climate change or the possibility of human action in causing it. He spoke about saving energy, but that reference was related to the potential damage to Texan oil refineries, not to a global ethical imperative. Whereas in Germany, climate change became a media issue from the first day of the Elbe River flood (and the German media immediately covered New Orleans's catastrophe in headlines), it was not until three weeks after Katrina that any widespread discussion of climate change appeared in the leading journals in the United States. It will be interesting to see how long interest in the issue persists, given that infrastructure and social welfare concerns predominate in the public discussion.

Yet climate change has not been absent from U.S. public discourse. In fact, in the late 1980's and early 1990's, some powerful voices used extreme weather events to argue for the need to reduce greenhouse gas emissions. After the 1988 heat wave and drought, for example, a famous claim was made during a U.S. Senate hearing that the heat conditions in that summer were due to global warming. That argument was also used regularly to appeal for support for environmental policy, with then-Vice President Al Gore as its most prominent public proponent. However, that campaign could not be sustained over the long term, and the link between extreme events and human

actions lost its persuasiveness among the U.S. media and public. It had been oversold, and the political climate had changed to what we've seen happen during the Katrina disaster.

What the Future Holds

Media symbols and representations of extreme weather events and their embedding in overarching cultural frameworks fluctuate over time. And the story of differing perceptions and resulting actions has not, and will not, come to an end.

If most Germans understand weather extremes as scripture written on the wall of impending, self-inflicted disaster, and if most Americans are willing to chance climate extremes as existential risks, these different attitudes have little to do with superior morality or rationality, but with deeply held—but very different—cultural values and orientations.

The boundaries between science, politics and the public sphere are blurring, and climate research is one of the most prominent examples for this ongoing “postnormal science” process. By bringing social science into this debate, in particular with respect to different time horizons and media discourses, does not just add a further element to the end of an analysis, but it is indispensable for understanding public dynamics and for designing appropriate catastrophe management in a world, which was, is and will remain, vulnerable.

People react not really according to abstract concepts and scientific data, but to traditions, experience and shared values. Indeed, we have shown that the scientific construction of facts is cultural as well. If most Germans understand weather extremes as scripture written on the wall of impending, self-inflicted disaster, and if most Americans are willing to chance climate extremes

as existential risks, these different attitudes have little to do with superior morality or rationality, but with deeply held—but very different—cultural values and orientations.

The German approach might have the advantage that it helps to institute a meaningful policy of sustainability with respect to environment and resources. The advantage of the U.S. approach might be that it helps individuals adapt better to crises, doing so with less fear. The disadvantage of the U.S. approach is that people are also shielded from thinking about sustainable energy and resource usage, while Germans are led to assume a missionary attitude, telling the world what is environmentally right and what is wrong. Some Germans seem to even believe that improved protection against extreme events will not really be needed as soon as appropriate Klimaschutz (which translated means climate protection) measures are implemented.

In either case, it becomes critical to examine how the rhetoric of the public discourse and that of the scientific community intersect to create climate politics and guide the direction of research. This societal rhetoric is not ancillary to “real science” but serves as a critical determinant of scientific attitudes and explanations. ■

Hans von Storch is the director of the Institute for Coastal Research at the GKSS Research Center in Geesthacht, Germany and professor at the Meteorological Institute at the University of Hamburg. Werner Krauss is an adjunct associate professor with the department of Germanic studies at the University of Texas at Austin. Katherine Arens and Sheldon Ungar assisted in the preparation of this article.

✉ Hans.von.Storch@gkss.de

✉ werner.krauss@mail.utexas.edu

Trying to Achieve Balance Against Great Odds

With the United States's opposition to Kyoto so strong, a Canadian journalist finds little pressure from editors to include that perspective in his stories.

By Jacques A. Rivard

For more than 20 years, I've covered the environment for Société Radio-Canada, the French arm of the Canadian Broadcasting Corporation's national TV news. As journalists do, I've tried to apply the "balanced coverage" rule to my reporting, just as I have taught my students in journalism at the Université de Montréal for two decades. But my attempts to do this don't always work.

Sometimes daily news coverage with limited time to tell a story has not allowed for multiple points of view to be presented, and follow-up stories I might propose, to provide such balance, were often hard to persuade my editors to do. But when it has come to reporting on topics such as global warming or climate change, I think being in Canada has made it easier for me to do this than for reporters in the United States, since there are fewer pressure groups in Canada working against ecological actions.

In 1992, I was in Rio de Janeiro, Brazil, when countries from throughout the world pledged to spend billions of dollars and facilitate transfers of clean technology to developing countries to help reduce global warming emissions. Those promises were not kept but, in Kyoto, Japan, when these countries met again to address this issue, the call out of that meeting was for nothing less than a new economic order, as industrial nations committed themselves to very substantial reductions of polluting gases emitted by the burning of fossil fuels.

In Canada, public opinion so

strongly favored such actions that the government decided it had enough support to ratify the Kyoto Protocol. Canada was one of few major economic powers outside of Europe to do so. As a reporter covering this issue, I did many stories about climate

when powerful opposition is found next door in the words and actions of the American President. In Canada, the consequence of this has been that pressure groups against Kyoto have become almost irrelevant; the only contrary views tend to come from the energy sector.

As a reporter covering this issue, I did many stories about climate changes being measured in the Arctic, as well as about pressure Canadian provincial and federal governments were putting on the United States to ratify Kyoto. As I did these stories, few of my editors ever suggested that I try to find opposing views about global warming.

changes being measured in the Arctic, as well as about pressure Canadian provincial and federal governments were putting on the United States to ratify Kyoto. As I did these stories, few of my editors ever suggested that I try to find opposing views about global warming.

Why this lack of interest in balance from my editors with these stories? In some respects the situation can be easily explained. As it became quite clear that the U.S. government—our close and powerful neighbor to the south—was set against ratifying the Kyoto Protocol, this meant that ecologists in Canada were not facing a lot of pressure from within their own country about this issue. The perspective of my editors—and of many columnists in this country—is that the obligation to look to opposing pressure groups in Canada isn't as great

when the debate about global warming still open, how can a journalist provide the best available information and strive to produce balanced reporting? From my experience of 20 years covering the environment, the only way to do this is to become a specialist in reporting on these issues and work to do follow-up stories to bring in information that might be missing in the daily stories that tend to be done. ■

Jacques A. Rivard, a 1996 Nieman Fellow, has covered the environment from the early 1980's for the French arm of the Canadian Broadcasting Corporation (CBC). As a national TV correspondent from 1998-2004, based in Vancouver, he did many stories about the impact of global warming in the Arctic. He retired from the CBC in 2004. As a Nieman, Rivard held the V. Kann Rasmussen Environmental Fellowship.

✉ jacquesrivard@canada.com