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Climate Change as News: Challenges in Communicating Environmental Science

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A few decades ago, anyone with a notepad or camera could have looked almost anywhere and chronicled a vivid trail of environmental despoliation and disregard. Only a few journalists and authors, to their credit, were able to recognize a looming disaster hiding in plain sight. But at least it was in plain sight. Now, the nature of environmental news is often profoundly different. Biologists these days are more apt to talk about ecosystem integrity than the problems facing eagles or some other individual charismatic species. The subject of sprawl is as diffuse and diverse as the landscapes it encompasses. Concerns about air pollution have migrated—from the choking plumes of old to the smallest of particles that penetrate deep in the lungs and to the invisible heat-trapping greenhouse gases linked to global warming, led by innocuous carbon dioxide, the bubbles in beer. Even though scientists say the main cause of recent warming is smokestack and tailpipe emissions, projections of the pace and ramifications of future climate changes remain as murky as the mix of clouds, particles, and gases that determine how much sunlight reaches the earth and how much heat radiates back into space—the balance that sets the global thermostat.

The challenges encountered in meaningfully translating such issues for the public today are enormous for a host of reasons. Some relate to the subtlety or complexity of the pollution and ecological issues that remain after glaring problems have been addressed. Others relate to effective, well-financed efforts by some industries and groups that oppose pollution restrictions to amplify the uncertainties in environmental science and exploit the tendency of journalists to seek two sides to any issue. This approach can effectively perpetuate confusion, contention, and ultimately public disengagement and inaction.

On the other side of the debate, environmental groups are not innocent in this regard. In some cases, they have focused media attention on their favored issues by going beyond the data and magnifying the risks of, say, cancer or abrupt climate change. Some scientists, expressing frustration with the public's indifference to long-term threats, have stepped outside their areas of expertise and portrayed warming as a real-time catastrophe.

The rhetoric swelled in the spring of 2006 as documentary films, books, and magazine cover stories endeavored to directly link the outbreak of hurricanes, and particularly the ferocity of Hurricane Katrina, to the slow buildup of heat in the world's oceans from human activities. *Time* magazine proclaimed on April 3 "Be worried. Be very worried" (Kluger et al. 2006). A trailer for *An Inconvenient Truth*, the film that documents former Vice President Al Gore's peripatetic multimedia climate campaign, called it "the most terrifying film you will ever see."

Many climate experts said that while there was a growing likelihood that humans were helping shape storm patterns and the like, the inherent variability and complexity of the climate system guaranteed that drawing any straight lines was impossi-

ble. On hurricanes, for example, even some of the scientists who claim to have found a relationship between rising hurricane intensity and human-caused warming said that no one could point (with any credibility) to this relationship affecting a particular storm or season.

Critics of those who proclaimed the dawn of a real-time man-made climate catastrophe lashed out. In an opinion piece in the *Wall Street Journal*, Richard S. Lindzen (2006), a climatologist at the Massachusetts Institute of Technology who has long disputed the dominant view that humans could dangerously warm the climate, labeled some calamitous claims “lies” and derided what he called an “alarmist gale.”

Between the depictions of global warming as an unfolding catastrophe and as a nonevent lies what appears to be the dominant and still troubling view: that the buildup of carbon dioxide and other long-lived greenhouse gases poses a sufficient risk of profound and largely irreversible transformations of climate and coastlines to warrant prompt action to limit future harms. That view was clearly articulated by eleven national academies of science, including the U.S. National Academy, in a letter to world leaders in 2005.

Many experts explain that it is urgent to act promptly to curb emissions and limit future risks. In fact, because of population growth and increased energy use in developing countries, even the most optimistic scenarios project that concentrations of greenhouse gases will continue to climb throughout the first half of the twenty-first century.

The problem is that the processes that winnow and shape the news have a hard time handling the global-warming issue in an effective way. The media seem either to overplay a sense of imminent calamity or to ignore the issue altogether because

it is not black and white or on a time scale that feels like news. This approach leaves society like a ship at anchor swinging cyclically with the tide and not going anywhere.

What is lost in the swings of media coverage is a century of study and evidence that supports the keystone findings: human-generated heat-trapping gases are holding in heat, and the ongoing buildup of this greenhouse-gas blanket adds to warming, shrinks the world's frozen zones, raises seas, and shifts climate patterns.

Certainly, the disinformation generated both sides of the issue can trip up even earnest, skilled journalists. And the complexity of climate science and policy questions poses a huge challenge in media that are constrained by deadlines and a limited supply of column inches or newscast minutes. Another hurdle is the persistent lack of basic scientific literacy on the part of the public. Nonetheless, some of the biggest impediments to effective climate coverage seem to lie not out in the examined world but back in the newsroom and in the nature of news itself. Overcoming these impediments is a persistent and daunting task. No one should expect to pick up a daily paper anytime soon and read a headline that takes climate science across some threshold of definitiveness that will suddenly trigger public agitation and policy action—and if such a story does appear, it should be looked at skeptically.

A Legacy of Calamity

A little reflection is useful. Most journalists of my generation were raised in an age of imminent calamity. Cold-war “duck-and-cover” exercises regularly sent us to school basements. The prospect of silent springs hung in the wind. We grew up in a landscape where environmental problems were easy to

identify. The shores of the Hudson River, for example, were coated with adhesives, dyes, and paint, depending on which riverfront factory was nearest, and the entire river was a repository for human waste, making most sections unswimmable. Across the United States, smokestacks were unfiltered. Gasoline was leaded. Los Angeles air was beige.

Then things began to change. New words crept into the popular lexicon—*smog*, *acid rain*, *toxic waste*. At the same time, citizens gained a sense of empowerment as popular protests shortened a war. A new target was pollution. Earth Day was something new and vital, not an anachronistic notion. Republican administrations and bipartisan Congresses created laws and agencies aimed at restoring air and water quality and protecting wildlife. And remarkably, those laws began to work.

Still, through the 1980s the prime environmental issues of the day—and thus in the news—continued to revolve around iconic incidents that were catastrophic in nature. First came Love Canal, quickly followed by Superfund cleanup laws. Then came Bhopal, which generated the first right-to-know laws granting communities information about the chemicals stored and emitted by nearby businesses. Chernobyl illustrated the perils that were only hinted at by Three Mile Island. The grounding of the *Exxon Valdez* powerfully illustrated the ecological risks of extracting and shipping oil in pristine places. Debates about wildlife conservation generally focused on high-profile species like the spotted owl or whales, and gripping stories in which a charismatic creature was a target of developers or insatiable industries presented simplistic views of reality.

In the late 1980s, the world began to focus on the harm caused by burning in the Amazon and other tropical forests. Forest destruction was made personal and relevant to citizens of the industrialized world when the forests were portrayed as

the “lungs of the world” or our “medicine chest”—not because scientists suddenly found a way to describe the extraordinary biological diversity of rain forests and the role they play in the global climate system.

Indeed, the first sustained media coverage of global warming was spawned not by a growing recognition that long-lived emissions from industrial smokestacks and tailpipes could alter the climate. Instead, it began when the American public experienced a record hot summer in 1988 just as satellites and the space shuttle were transmitting images of the thousands of fires burning across the Amazon basin. The burning season in the rain forests was unleashing torrents of carbon dioxide that were perceived as directly perilous to us, so we paid attention. These days, deforestation in the tropics is once again a distant regional issue and has faded to near obscurity in the press—resurging only briefly when someone prominent is gunned down there, like the American nun Sister Dorothy Stang in 2005.

Nuclear Winter, Nuclear Autumn

My first stories about the atmosphere and climate came a few years before the scorching greenhouse summer of 1988 and focused on the inverse of global warming—nuclear winter. Here was a ready-made news story. Prominent scientist-communicators, most notably Carl Sagan and Paul Ehrlich, calculated that anyone surviving a nuclear war might perish in the months of cold and dark that followed as the smoke-veiled sky chilled the earth and devastated agriculture and ecosystems. As the scientists met with Pope John Paul II and the theory made the covers of major magazines, the scenario

brought new pressure on leaders to find a way to end the cold war. Within a couple of years, however, fresh scientific analysis showed that the aftermath of nuclear war might be more like a nuclear autumn (to use a phrase coined by Stephen Schneider and Starley Thompson, climate scientists who independently assessed the question). A prediction of nuclear winter was dramatic, dangerous, and novel news. Nuclear autumn was not news, and the double-doomsday scenario quickly faded.

In the meantime, global warming began to build and ebb as a story, always building a bit more with each cycle. If there is one barometer that can help a society gauge whether a problem is real, it is longevity. Unlike concerns about nuclear winter and despite challenges by antiregulatory lobbyists and skeptical scientists, human contributions to climate change have not diminished. Instead, evidence of the link and its potential dangers has built relentlessly, as is deftly charted in *The Discovery of Global Warming* by Spencer R. Weart (2003), a historian at the American Institute of Physics.

An Ozone Hole over Antarctica

In the late 1980s, there was a sense of the new about the greenhouse effect, even though scientists had been positing since the 1890s that heat-trapping gases, particularly carbon dioxide released by burning coal and other fossil fuels could raise global temperatures. A combination of observations and computer simulations seemed finally to be giving a face to theory, which made it easy to sell as a cover story in *Time* magazine or to *Science Digest*, *Discover*, the *Washington Post*, or the *New York Times*. At that time, there was also a newly perceived global atmospheric threat—the damage to the ozone

layer from chlorofluorocarbons (CFCs) and other synthetic compounds—and an international solution in a treaty that banned the chemicals.

But eliminating a handful of chemicals produced by a handful of companies is a very different challenge than eliminating emissions from almost every activity of modern life—from turning on a lamp to driving a car. Another difference between global warming and ozone damage was the iconic nature of the ozone problem. It was an issue with an emblem—the stark, seasonal “hole” that was discovered in the protective atmospheric veil over Antarctica. If a picture is worth a thousand words, a satellite image of a giant purple bruise-like gap in the planet’s radiation shield must be worth 10,000. Indeed, according to many surveys, the ozone hole still resonates in the popular imagination—incorrectly—as a cause of global warming simply because it is so memorable and has something to do with the changing atmosphere. The ozone hole also resonated with the public because it was directly linked with an issue that concerns everyone—their health—through the possible risk of increased rates of skin cancer. There, too, global warming is different. Some of the least understood impacts of warming are the possible connections to health problems, like patterns of tropical disease and the frequency of smoggy days, as the National Academies of Science concluded in 2001.

Still, human contributions to the greenhouse effect have remained a perennial issue. Specialized reporters have tracked the developments in climate science and the policy debates over the implications of that science. Tracking scientific progress has become somewhat akin to the old art of Kremlinology—sifting for subtle shifts of language showing that vexing questions are being resolved. Every five years or so, fresh hints emerge from the Intergovernmental Panel on Climate Change (IPCC), the

United Nations scientific body charged with assessing the state of understanding of the problem. The group has sought to be as concrete as possible in its findings, giving quantitative weight to words and phrases such as “likely” and “very likely.” That metric has helped the media meaningfully explain the incremental improvements in scientific understanding of the causes and consequences of warming.

The other vital component of the assessment process has been the use of scenarios to depict how certain societal behaviors, particularly energy use, might affect the pace and extent of climate shifts over the course of the century. For the public, this practice provides boundaries for outcomes and a means of judging what kind of response is the most reasonable.

But the incremental nature of climate research and its uncertain scenarios will continue to make the issue of global warming incompatible with the news process. Indeed, global warming remains the antithesis of what is traditionally defined as news. Its intricacies, which often involve overlapping disciplines, confuse scientists, citizens, and reporters—even though its effects will be widespread, both in geography and across time. Journalism craves the concrete, the known, the here and now and is repelled by conditionality, distance, and the future.

If ever there was a moment for a page-one story on climate, for example, it came in October 2000, when a scientist sent me a final draft of the summary for policymakers from the IPCC’s third climate assessment, due out early in 2001 (Revkin 2000). For the first time, nearly all of the caveats were gone, and there was a firm statement that “most” (meaning more than half) of the warming trend since 1950 was probably due to the human-caused buildup of greenhouse gases. To me, that was a profound turning point, and I wrote my story that way:

Greenhouse gases produced mainly by the burning of fossil fuels are altering the atmosphere in ways that affect earth's climate, and it is likely that they have "contributed substantially to the observed warming over the last 50 years," an international panel of climate scientists has concluded. The panel said temperatures could go higher than previously predicted if emissions are not curtailed.

This represents a significant shift in tone—from couched to relatively confident—for the panel of hundreds of scientists, the Intergovernmental Panel on Climate Change, which issued two previous assessments of the research into global warming theory, in 1995 and 1990. (Revkin 2000)

To the *New York Times*, this was just another news story, and it was outcompeted for the front page by presidential politics, the breakup of AT&T, the overthrow of a junta in Ivory Coast, a study on the value of defibrillators in public places, and a decision by Hillary Clinton to return some campaign contributions from a Muslim group. Reporters, scientists, and the public can take steps to improve this situation. The first one is simply to anticipate the hurdles that can create trouble when the news media and climate science mix.

The Tyranny of News

A fundamental impediment to coverage of today's top environmental issues is the nature of news. News is almost always something that happens that makes the world different today. A war starts. A tsunami strikes. In contrast, most of the big environmental themes of this century concern phenomena that are complicated, diffuse, and poorly understood, with harms spread over time and space. Runoff from parking lots, gas stations, and driveways invisibly puts the equivalent of one and a half *Exxon Valdez* loads of petroleum into coastal ecosystems each year, the National Research Council (2003) recently found. But try getting a photo of that or finding a way to

make an editor understand its implications. A journalism professor of mine once spoke of the “MEGO” factor: “my eyes glaze over.” I’ve seen that look come over more than a few editors in my years of pitching stories on climate.

Climate change is the poster child of twenty-first-century environmental issues. Many experts say that it will be a defining ecological and socioeconomic problem in a generation or two and actions must be taken now to avert a huge increase in emissions linked to warming as economies in developing countries expand. But you will never see a headline in a major paper reading “Global Warming Strikes: Crops Wither, Coasts Flood, Species Vanish.” All of those things may happen in plain sight in coming decades, but they will occur so dispersed in time and geography that they will not constitute news as we know it.

Most changes in the landscape and developments in climate science are by nature incremental. Even as science clarifies, it also remains laden with statistical analyses, including broad *error bars*. In the newsrooms I know, the adjective *incremental* in a story is certain death for any front-page prospects, yet it is the defining characteristic of most environmental research. Editors crave certainty: hedging and caveats are red flags that immediately diminish the newsworthiness of a story.

In fact, reporters and editors are sometimes tempted to play up the juiciest—and often least certain—facet of some environmental development, particularly in the late afternoon as everyone in the newsroom sifts for the “front-page thought.” They do so at their peril and at the risk of engendering even more cynicism and uncertainty in the minds of readers about the value of the media—especially when one month later the news shifts in a new direction. As a reporter, it can be hard to turn off one’s news instinct and insist that a story is not “frontable” or that it deserves three hundred words and not eight

hundred, but it is possible—kind of like training yourself to reach for an apple when you crave a cookie.

Scientists have gotten into trouble for doing the same kind of thing. Over and over, I meet scientists who despair that issues they see as vital, like climate change or diminishing biological diversity, are not receiving adequate attention. They feel that they “get it” and the rest of the world does not. When talking to the media, some have been tempted to push beyond what the science supports—focusing on the high end of projections of global temperatures in 2100 or highlighting the scarier scenarios for emissions of greenhouse gases. Recently, a few scientists and environmental groups linked Florida’s devastating 2004 and 2005 hurricane seasons to warming, even though the inherent variability in hurricane frequency and targets precludes any such link without a host of caveats and scientific projections call only for slight intensification of tropical storms late in the century, not greater numbers.

The coverage linking these storms to warming oceans resulted in a backlash when some hurricane experts disputed the assertions made to the media. Some statements made to the press about climate and hurricanes were made by climatologists who lacked expertise in the conditions generating these great storms. As a result, in late 2004 one federal hurricane expert, Christopher Landsea, withdrew in protest from the climate-review process at the Intergovernmental Panel on Climate Change, leading to stories on a dispute over climate science. The result was probably more public confusion and cynicism about what is going on.

This tendency of everyone, from scientists to reporters, to focus on the most provocative element when climate becomes news backfired in a very big way in August 2000. A science reporter for the *New York Times* wrote that a couple of scientists on a tourist icebreaker cruise in the Arctic had seen a

large patch of open water at the North Pole, possibly the first such occurrence in thousands of years. Better yet, there were pictures. In an interview, one of the scientists ascribed the open water to global warming, and on a quiet summer weekend, the story popped to the top of the front page (Wilford 2006). Finally, the climate-change issue seemed to be behaving like a news story. It was vivid and dramatic, implying that profound changes were afoot. Television reports and political cartoonists quickly followed up with items on the loss of Santa's summer residence.

Unfortunately, the story was incorrect. Calling a few independent experts might have helped the reporter to avoid trouble. Although vast regions in the Arctic may soon be open water in summer and sometime late this century perhaps a blue ocean will exist at that end of the Earth, the sighting in 2000 was unremarkable. Floating sea ice is always a maze of puzzle pieces and open areas. Society would have to wait for its global warming wakeup call. Since 2000, the science has steadily pointed to the ever-growing summertime retreat of Arctic sea ice as an early indicator of human-driven warming. But it remains a subtle process, laden with uncertainty.

After covering climate for over twenty years, my sense is that there will be no single new finding that will generate headlines that galvanize public action and political pressure. Even extreme climate anomalies, such as a decade-long superdrought in the West, could never be shown to be definitively caused by human-driven warming.

The Tyranny of Balance

Journalism has long relied on the age-old method of finding a yea-sayer and a nay-sayer to frame any issue from abortion to zoning. It is an easy way for reporters to show they have no

bias. But when dealing with a complicated environmental issue, this method is also an easy way to perpetuate confusion in readers' minds about issues and about the media's purpose. When this format is overused, it tends to highlight the opinions of people at the polarized edges of a debate instead of in the much grayer middle where consensus generally lies. The following maxim illustrates the weakness of this technique: "For every PhD, there is an equal and opposite PhD." The practice also tends to focus attention on a handful of telegenic or quotable people working in the field who are not necessarily the greatest authorities. There are exceptions, but over the years I have learned to be skeptical of scientists who are adept at speaking in sound bites.

One solution to the tyranny of balance is for writers to cultivate scientists in various realms—chemistry, climatology, oceanography—whose expertise and lack of investment in a particular bias are well established. These people can operate as guides more than as sources to quote in a story. Another way to avoid the pitfall of false balance is to focus on research published in peer-reviewed journals rather than that announced in press releases. Peer review, as scientists know all too well, is a highly imperfect process. But it provides an initial quality-control test for new findings that advance understanding of an issue.

The norm of journalistic balance has been exploited by opponents of emissions curbs. Starting in the late 1990s, big companies whose profits were tied to fossil fuels recognized they could use this journalistic practice to amplify the inherent uncertainties in climate projections and thus potentially delay cuts in emissions from burning those fuels. Perhaps the most glaring evidence of this strategy was a long memo written by Joe Walker, who worked in public relations at the American

Petroleum Industry, that surfaced in 1998. According to this “Global Climate Science Communications Action Plan,” first revealed by my colleague John Cushman at the *New York Times*, “Victory will be achieved when uncertainties in climate science become part of the conventional wisdom” for “average citizens” and “the media” (Cushman 1998). The action plan called for scientists to be recruited, be given media training, highlight the questions about climate, and downplay evidence pointing to dangers. Since then, industry-funded groups have used the media’s tradition of quoting people with competing views to convey a state of confusion even as consensus on warming has built.

A recent analysis of twenty years of newspaper coverage of global warming, including articles in the *New York Times*, showed how the norm of journalistic balance actually introduced a bias into coverage of climate change. Researchers from the University of California at Santa Cruz and American University tracked stories that portrayed science as being deadlocked over human-caused warming, being skeptical of it, or agreeing it was occurring. While the shift toward consensus was clearly seen in periodic assessments by the Intergovernmental Panel on Climate Change, the coverage lagged significantly and tended to portray the science as not settled (Boykoff and Boykoff 2004).

One practice that can improve coverage of climate and similar issues is what I call “truth in labeling.” Reporters should discern and describe the motivations of the people cited in a story. If a meteorologist is also a senior fellow at the Marshall Institute, an industry-funded think tank that opposes many environmental regulations, then the journalist’s responsibility is to know that connection and to mention it. Such a voice can have a place in a story focused on the policy debate,

for example, but not in a story where the only questions are about science. The same would go for a biologist working for the World Wildlife Fund.

Another effective approach is to listen carefully to the facts embedded in what someone is saying, regardless of that person's affiliations. For a 2003 story on the politicization of climate science, for example, I interviewed Patrick J. Michaels, a University of Virginia climatologist and outspoken critic of the mainstream view that human-caused warming is dangerous. While laying out his argument against that view, he said he had recently calculated that the most likely warming in the twenty-first century would be just 1.5°C (2.7°F). Later, I realized that Michaels—a prime skeptic who received income through his affiliation with the Cato Institute, an antiregulatory group that was supported substantially by energy companies—had essentially entered the mainstream. His predicted warming was more than two and a half times the twentieth-century warming and within the range projected by the IPCC.

None of this comes easily, in part because of two more hurdles that constrain a reporter's ability to characterize what is being said in a story.

The Twin Tyrannies of Time and Space

I came to newspapers after writing magazine stories and books and at first was petrified about filing on a daily deadline. One of my editors, hovering over my shoulder and alluding to the stately pace of other forms of publication, while daylight ebbed, gently put it this way: "Revkin, this ain't no seed catalog." Through the ensuing years, I adapted to the rhythm of the daily deadline but also to the reality of its limitations. On

an issue like the environment, I understood why the crutch of “on the one hand” was so popular: there is often simply no time to canvass experts. I grew to understand why stories tend sometimes to read like a cartoon version of the world: there is just no time to do better.

And then there is the question of space. Science is one of the few realms where reporters essentially have to presume the reader has no familiarity at all with the basics, particularly something as complicated as climate science. Just about anyone in America knows the rules of politics, business, baseball, and other subjects in the news. But studies of scientific literacy show that most people know little about atoms, viruses, or the atmosphere. So a lot of extra explication somehow has to fit into the same amount of space devoted to a story on a stock split, a primary vote, or a ball game—and it doesn’t. Stories about global warming are not granted a few hundred extra words because it is harder than other subjects.

The shrinking of a climate story that is competing on a page with national or foreign developments is as predictable as the retreat of mountain glaciers in this century. But the material that is cut matters to researchers and to those who want to convey the real state of understanding: the caveats, the couching, the words like *may* and *could*, the new questions that emerge with every answer. Labeling ideally should be there to characterize the various voices in a story.

The only solution is to educate editors as much as possible about the importance of context and precision in such stories. That fight is getting more difficult as the media feel more pressure to generate profits and attract readers. More and more, the limited “news hole” reserved for science in newspapers is being filled with stories on subjects most likely to boost circulation, like fitness, autism, diet, and cancer. That leaves ever

fewer columns for basic science or research on looming risks like climate change.

Heat versus Light

One of the most difficult challenges in covering the environment is finding the appropriate way to ensure a different kind of balance—between the potent “heat” generated by emotional content and the “light” of science and statistics. Consider a cancer cluster. A reporter constructing a story has various puzzle pieces to connect. Some paragraphs or images brim with the emotional power of the grief of a mother who lost a child to leukemia in a suburb where industrial effluent once tainted the water. A dry section lays out the cold statistical reality of epidemiology, which might never be able to determine if contamination caused the cancer. No matter how one builds such a story, it may be impossible for the reader to come away with anything other than the conviction that contamination killed.

In the climate arena, substitute drowning polar bears or displaced Arctic cultures for cancer-stricken children, and you have the same dynamic at work. It is vital to explore how a warming climate affects ecosystems and people. But this tactic can backfire if a story downplays the uncertainties surrounding unusual climate events or if it portrays everything unusual in the world today as driven by human-caused warming.

It is my impression that the European press, which gives more attention than American media do to climate, has also been more apt to play up hot content and minimize the cooler elements that might deflate a story’s sense of drama. This approach caught hold in the United States after Hurricane Katrina, to the extent that Al Gore’s film poster showed a plume from a smokestack merging with a swirling satellite image of a hurricane.

This tactic makes for powerful headlines and gripping TV and magazine images, but are media that adopt this approach doing their job? By the metric of the newsroom, the answer is probably yes. Pushing the limits is a reporter's duty. Finding the one element that's new and implies malfeasance or peril is the key to getting on the front page.

I hope that my own work and that of others will try to refine purely news-driven instincts, to understand and convey the tentative nature of new scientific knowledge, and to retain at least some shades of gray in all that black and white. We also need to drive home that once a core body of understanding has accumulated over decades on an issue—as is the case with human-forced climate change—society can use it as a foundation for policies and choices.

The Great Divide

Journalists dealing with global warming and similar issues would do well to focus on the points of deep consensus, generate stories containing voices that illuminate instead of confuse, convey the complex without putting readers (or editors) to sleep, and cast science in its role as a signpost pointing toward possible futures, not as a font of crystalline answers.

The only way to accomplish this is for reporters to become more familiar with scientists and the ways of science. This requires using those rare quiet moments between breaking-news days to talk to climate modelers, ecologists, or oceanographers who are not on the spot because their university has just issued a press release. By getting a better feel for the breakthrough and setback rhythms of research, a reporter is less likely to forget that on any particular day the state of knowledge about endocrine disruptors, PCBs, or climate is temporary. Readers will gain the resolve to act in the face of

uncertainty once they absorb that some uncertainty is the norm, not a temporary state that will give way to magical clarity sometime in the future.

There is another reason to do this. Just as the public has become cynical about the value of news, many scientists have become cynical and fearful about journalism. Some of this is their own fault. When I was at a meeting in Irvine, California, on building better bridges between science and the public, one researcher stood up to recount her personal “horror story” about how a reporter misrepresented her statements and got everything wrong. I asked her if she had called the reporter or newspaper to fix the errors and begin a dialogue about preventing future ones. She had not even considered doing so.

Cynical unconcern for the presumed failings of journalism in part prolonged the career of the disgraced former *New York Times* reporter Jayson Blair. Few of the people who identified falsehoods in his stories called the paper to correct them. The interactions between sources, journalists, and readers ideally should take on more of the characteristics of a conversation. The communication of news cannot remain effective if it is a monologue.

The more scientists and journalists talk, the more likely it is that the public—through the media—will appreciate what science can (and cannot) offer as society grapples with difficult questions about how to invest scarce resources. An intensified dialogue of this sort is becoming ever more important as science and technology increasingly underpin daily life and the progress of modern civilization.

Given the enormous consequences and irreversible losses from global warming should the worst projections play out, the time for improving the flow of information on this subject is clearly now.

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