Chapter 6

Working With Scientists and Scientific Sources on Climate Change

One of the first things a reporter should understand before talking to scientists about climate change or anything else is this: a good scientist likely is more interested in talking with other scientists than in talking with reporters.

Scientists do not automatically assume that media attention to their work is going to illuminate the truth. An inquiring reporter is going to boil down to two or three paragraphs a subject about which the scientist may have written entire books.

All too often a reporter is assigned cold to a story on a 24-hour news cycle and asked to enlighten several hundred thousand readers or viewers. This even happens with climate change, a story which requires a lot of background to do well. Should this keep journalists from doing their job? Hardly. It is a tough and honorable job. Reporters need to keep a certain sense of professionalism and humility about what they do, and avoid thinking that their kind of truth is better than the scientist's kind of truth.

"On a daily story you do what you can," says veteran Ben Patrusky, "but you don't overdo what you can." Patrusky is a freelance science writer who has served as executive director of the Council for the Advancement of Science Writing.

Scientific Culture and the Need for Precise, Qualified, and Complex Explanations

Scientific knowledge is generated when scientists talk to scientists — and the talk is endless. One researcher proposes a hypothesis, another devises an experiment to test it, a third tries to duplicate that experiment and sometimes gets different results. Science advances because ideas are constantly being tested, discussed, and revised. Some very highly specialized "languages" and "media" have evolved for conducting the dialogue of science.

Scientists have discovered that one key to getting reliable answers lies in asking the right questions — questions which can be answered experimentally, quantitatively, or statistically. Reporters need to understand that the kind of questions they and their audience want answers to may be quite different from the ones scientists are able to answer reliably.

Journalism thrives on "facts," and requires the facts to be true and

accurate. In practice, this means withstanding the skepticism of editors and fact-checkers, whose test is whether a fact can be attributed to a source few would dispute, like the Census or the encyclopedia.

"Editors hate to deal with what journalists have to deal with," says Patrusky. "There is no simple, easy, quick answer. It's not yes or no. Journalism thrives on answers, not questions."

In this era of tabloid TV, the headline-writers and hypesters even in the print media are often posing questions which may be very interesting, controversial, or provocative — but may also be very hard to answer. Things like: "Global Warming: Threat or Hype?" ... "Air Pollution: Who's to Blame?" .... "Climate Change: Who Are the Winners and Losers?" ... or "Energy Conservation: Success or Failure?" Often, there are no either-or answers for either-or questions.

Such questions may involve politics, social values, undeclared motives, or government policies. And they may be the kind of questions that scientists are neither able to answer nor willing to answer — speaking as scientists. When they refuse or duck these questions, many journalists get very frustrated, and start pressing too hard, which can be counterproductive.

Scientific culture needs precise, qualified, and complex explanations for things. Journalists more likely can win the confidence of their scientist-sources by demonstrating an understanding and appreciation of this state of affairs.

Scientists talk to each other in certain formal channels. They publish articles in scientific journals. They deliver papers at professional meetings. They sit on committees which put together reports. These are the ways in which most of the scientifically important things they have to say actually get said. For full-time science reporters, the professional meetings and committee reports are often good sources of story ideas. Because these channels involve groups of scientists involved in a dialogue and reflect different opinions, the journalist covering them is less likely to be a victim of bad information.

A reporter covering a source or event outside these channels should — in two words — use caution. A scientist, or group of scientists, holding a press conference to announce results before they have been published in journals or discussed at professional meetings may have good reasons for doing so. But they may also be handing the reporter another "cold fusion" story, which evaporates under scrutiny. The reporter who simply takes the handout may get on page one. But the reporter who seasons it with skepticism also may get on page one — and do the audience the service of better informing them and clarifying the subject.

Similar caution is called for in other "media events" involving science,

particularly given the politicization of science surrounding important public policy issues. Scientists testify at congressional hearings. They appear on talk shows and news-interview shows. Scientists may be employed by a lobbying or interest group, and these groups may issue their own "reports." Some even take to the lecture circuit talking on topics outside their area of training. Just because a "scientist" says something, the reporter cannot assume it is true.

A reporter should remember that scientists are also people. Some are unused to speaking with reporters. Others are reluctant to talk because they are experienced and have been burned by the media. Such scientists' main fear may be that a reporter will misquote, simplify, or distort their work in a way that misrepresents it before their professional colleagues, causing damage the scientist then will have to try to undo.

On the other hand, there are plenty of scientists who like publicity and are glad to talk to reporters. They may simply want recognition for their work, like everybody else. Research funding is scarce and highly competitive, and many scientists hope media attention will help them win funds.

At least since the dawn of the atomic era, there have been scientists who believe it their ethical duty to get actively involved in public policy decisions. They point to the bomb as illustrating that detached and amoral science can be terribly misused. Some of those scientists (e.g., Barry Commoner) helped found the modern environmental movement, and some still pursue policy agendas with a sense of moral mission. They feel they can maintain the needed objectivity in their special field while still participating as informed citizens in responsible policy debate. Nonetheless, a reporter should always be cautious — especially when the science and the policy agenda support one another.

Scientists' opinions about public policy issues pertinent to their fields may be quite valuable. For even if they are personal and non-scientific judgments, scientists are often better informed than the average person. When you want policy opinions, David Perlman, science editor of the *San Francisco Chronicle*, suggests that it may be fruitful to phrase questions that specifically require policy opinions, and to push the scientist a little if you don't get an answer. He says many reporters have problems with scientists' giving them narrow detail, when the reporter wants a more generalized answer. Sometimes, reporters may get the gist of a scientist's policy views better by paraphrasing than by direct quotes, he says.

But Perlman worries more about scientists who are uninhibited with reporters than about those who are restrained: "The worst scientists are the ones who give you a lot of policy decisions that they're not qualified to give."

Patrusky says: "The reporter should be saying, 'Wait a minute.' There are a lot of people in this global warming business. The thing about global warming is that it is politicized. There's a lot at stake. There are axes to be ground."

"I think the thing to do is keep a very, very open mind and ask a lot of people the same questions," says Patrusky. "The more points of view you have ... the more you know the truth is not in yet. You've got to cover multiple sources."

Except on non-controversial items, says Perlman, "You almost never try to do a one-scientist story, because you always try to solicit some comment." But the reporter has to use some ingenuity to find people who are working in the same field or related fields. It is perfectly legitimate, he says, to ask a scientist you have called: "Who else is working in your field who may agree or disagree."

Ultimately, reporters should be bringing the same skeptical intelligence to their inquiry as scientists are supposed to bring to theirs. One of the most important questions to ask is simply, "How do you know that?"

Scientific Publications: How to Use Them, How to Understand Them

Scientific publications can be excellent sources of information. They can even spark story ideas. Most reporters live within driving distance of a university or public library which carries a range of scientific journals. The biggest hurdle to their use may be the intimidating effect of pages of equations they sometimes contain.

Journalists who are not going to spend more than 24 hours thinking about global change probably are wasting their time looking into scientific journals. But those looking for a little more depth and controversy can discover a lot in journals, especially if they have a little math and science background.

Not all science journals are created equal. One veteran science editor says the first thing you want to know about a journal is whether it is peer-reviewed. Peer review is a process whereby an article submitted to a journal is read by a panel of scientists working in the field it pertains to, then defended and revised in light of their comments. Often they are published by university-affiliated research institutes and professional associations. Some science periodicals are published as commercial ventures in "trade" or "industry" publishing. Naturally, peer-reviewed journals tend to be more disinterested and reliable.

Daily journalists looking for breaking news will find little in most scientific journals. Academic, peer-reviewed journals often take a year or more to review and publish an article.

Perhaps more immediately useful are certain less specialized "fast-track" journals that tend to move important discoveries to the top of the heap quickly. Some good examples are *Science*, published by the American Association for the Advancement of Science; the British journal *Nature*; and the *Journal of the American Medical Association*. All are peer-reviewed but accessible. Other newsy publications include *Science Week*, *Scientific American*, *Science News*, *New Scientist*, *and Chemical & Engineering News*. Such journals often interpret important findings for the non-specialist. Some include columns written as "science news."

What makes a science story news? Often, it seems merely to be the fact that it got play in the science columns of the *New York Times*, the *Washington Post*, or some other bellwether print daily. Such papers, in turn, pick up a lot of their material from journals like *Science* or *Nature*. So the enterprising reporter might want to look at such journals regularly — just in case something was missed.

A reporter interested in global change could explore particular specialized journals (see Appendix B).

Does a reporter have to understand every word of a scientific article, or every equation? Hardly. What concerns reporters most are the general "findings and conclusions" of the article, often written in plain English under a separate subhead, or in an abstract. A reporter needs to know how firmly based a particular finding is, and how it fits into the overall debate on global change.

Reporters often get obscure articles "translated." An author who writes in equations for his professional colleagues may be glad to explain the article in layman's terms over the phone. The journal editor who published it may also be a good resource here. A credible scientist at a local university may also help.

Articles in science journals tend to focus on very specific questions, defining their boundaries tightly. The article often states the results of a particular study or experiment. Scientists confine these articles mostly to what they have studied directly. An oceanographer who has measured sea-surface temperatures in the equatorial Pacific Ocean may write about their implications for the "El Niño" cycle, but not for larger climate change trends.

The hardest part of understanding a journal article may be reading between (or beyond) the lines. While an article may confine itself to a specific question, its real importance may lie in what it responds to — what other findings it seems to contradict, or what theory or hypothesis it confirms or undermines. This is a story often found by tracking down the footnotes and citations at the end of the article. In a lot of cases, reporters can get this kind of context only by doing a lot of homework, and strengthening their background understanding of climate change.

Disciplinary Blinders

"This is one planet which has been subdivided by us into departments," Ben Patrusky says.

This guidebook has tried to give reporters a sense of how complex and far-reaching are the changes humans have caused to the planet. Their multi-disciplinary nature presents particular problems to reporters, especially those who want to see the whole situation clearly.

Oceanographers, biologists, geochemists, climatologists, meteorologists, atmospheric and cloud physicists — to mention only a few — all have different factors shaping their thinking. What each scientist sees may be limited by his or her discipline. It is like the old story about the blind persons feeling the elephant (one, feeling the tail, said it was like a vine; another feeling the leg, said it was like a tree, and so forth). Scientists have ways of putting together the mosaic of what each discipline sees.

But a reporter talking to an individual scientist needs to allow for that scientists' possible disciplinary blinders.

For example, a reporter talking to an atmospheric physicist may well be told that the global warming problem is fairly straightforward and well understood. There is little disagreement about the radiative properties of greenhouse gases. The circulation of the atmosphere is a matter of heat, moisture, and momentum that can be reduced to half a dozen equations that do quite well, in computer models, at predicting how the atmosphere will behave.

All that may be true. But it may not be enough to justify the "certainty" the physicist may feel on matters of climate change. The climate system involves more than atmospheric physics. Oceanographers, geochemists, and biologists often do not have the crisp certainty of physicists when talking about climate change. The rate of increase in atmospheric CO_2 which the physicist dismisses as a "given," or merely as an input to his model, may actually be under considerable debate by geochemists or energy economists.

How does a reporter find the overview? Fortunately, there are some scientists who specialize in overviews. They may be heads of interdisciplinary committees, or interdisciplinary research institutes, departments, agencies, or programs. Entities like the National Academy of Sciences and the National Science Foundation are not particularly partial to any one point of view.

Eventually, however, the reporter's job entails putting together his or her own overview. Any given scientific paper may well cite references to relevant work in parallel fields. And a reporter can legitimately ask a scientist-source in one field to suggest names of workers in other disciplines who could further illuminate a subject.

What Scientists Want — and Expect — From Reporters

"I worry about general assignment reporters a lot," says Patrusky.

Scientists want and expect reporters to have some basic understanding of the subject they are covering before they call a scientist and start asking questions.

"You've got to know something about the subject before you go chase it," Patrusky says of global climate change. "Without some basic knowledge, you shouldn't be covering this at all." This does not mean the field is restricted to reporter-specialists. It does mean doing "a little homework."

"Know what the scientist's field is, and a little about that field," advises David Perlman, who has been practicing science journalism for more than three decades. "Know what the scientist's focus is. No reporter should attempt to interview a scientist without some familiarity with the field in which a scientist is working."

"Never come naked to the scientist's table," Perlman says. "Bring with you as much as you can, so that your questions can be as precise as possible. Questions should not be so broad that they become difficult for the scientist to answer."

Beyond that, what the reporter owes the scientist is much the same as what a reporter owes any source — honesty, accuracy, and fairness ranking high on most lists.

"Scientists should be able to trust that the reporter's going to at least capture the essence of what they're saying," Patrusky says.

Specifically, most scientists don't want reporters to present their work as more final, or certain, or conclusive than it really is. (Of course, editors want the opposite.) Shades of meaning become important here. An epidemiologist may plead with a reporter not to write that he "suspects" a certain virus as the cause of an epidemic, or that he is working on the "hypothesis" that it is the cause. The right way to say it, the epidemiologist will insist, is that it "has yet to be ruled out."

Reporters should not be surprised to find scientists asking to see a copy of their article before publication. This is a common courtesy between scientists in the culture of science. Some scientists, however, may not be aware that in the culture of journalism it presents a threat to the journalist's independence. Patrusky says there is nothing wrong with calling a scientist back to read particular passages in a story, check particular facts, or verify particular direct quotes. But he says a journalist is not obligated to show a scientist-source the whole story. Certainly, he says, the journalist is not obligated to let scientists judge the emphasis and interpretation of the story. "They're just as biased as the journalist in their way," Patrusky says.

Many science writers see no absolute ethical bar to showing a scientist a story ahead of publication. It may be a matter to be negotiated, and it may depend on circumstance. But veterans emphasize that the best time to do the negotiating is before the interview takes place.

Interpretation of Results

Good scientists rarely reach startling conclusions in the lab and rush to call a press conference, however much reporters wish they would.

Instead, they go through a process of replication of results, publication, review, discussion, and revision, bringing other workers in their field into the process of interpreting results. This happens in obscure journals and conferences and committee meetings. One term for it is "peer review." Without it, the public tends to get more stories like the miraculous "cold fusion" breakthrough, which turned out to be less miraculous than early press accounts suggested.

Eventually, if a conclusion holds up in the face of peer review, after enough meetings and articles, it may win a consensus within the scientific community, or a near-consensus, since nothing in science is ever quite settled.

In the field of climate change, the problem is compounded by the number of scientific disciplines and nations involved.

Scientific meetings and conferences on climate change issues began before the 1960s. But during the years after the oil price shock of 1973, attention to these questions intensified. Much of it came in early-1980s conferences sponsored by the U.S. Department of Energy, and mid-1980s conferences sponsored by the World Meteorological Organization (WMO) and the International Council of Scientific Unions (ICSU).

Today, the center of gravity of scientific opinion can be found in organizations like the Intergovernmental Panel on Climate Change (IPCC) (see sidebar, p.viii).

What Reporters Might Expect from Scientists

One thing reporters should expect from scientists is openness, at least openness of a certain kind. The free flow of information and the right to inquire are vital interests shared by both science and journalism.

That means a reporter can expect the scientist to be open about what he or she is studying, and the questions the study seeks to answer, and even about the raw data ... and about who is funding it. It doesn't mean that the scientist is obligated to share conclusions before they are really reached.

What reporters shouldn't expect from responsible scientists is certainty. "Everything in science is uncertain," says Patrusky. "Consensus is a good word; certainty is a bad word."

Reporters can ask scientists for "the measure of knowledge that's available to them," says Patrusky: "`What do you know, what does it mean, and how far can you take this?'"

One thing reporters want from almost any story is the local angle. This is a legitimate thing for them to want, given the interests of readers, viewers, and listeners.

"It's very hard to localize a global change story," says Patrusky. The problem, scientists will tell you, is that "predictions" of how climate change will affect a particular region are even less reliable than predictions of climate change on a global scale. On the other hand, it is important to realize that climate change may affect some areas dramatically and some areas hardly at all. There are some pretty interesting guesses as to how this may work out. But it is important to remember that they are guesses.

Daily journalists with too little time and space have long fallen back on the device of presenting two opposing extreme viewpoints. In a pinch (and they are always in a pinch), this may be one way of achieving "balance." But reporters with time for one more phone call might do well to ask themselves whether "balance" is always a good enough substitute for accuracy and fairness, for completeness or for real understanding.

For example, a scientist might testify before a Senate committee that termites help cause global warming (not a hypothetical example). Another scientist may say: "No, they don't." The realm of most likely truth may lie in between: termites may cause some proportion of potential global warming. The problem is that readers or viewers may be left to average out the two viewpoints and grope for their own conclusions. Too often, the "point and counterpoint" average out to nothing at all. They just cancel each other. "That doesn't advance people's understanding very much," says Perlman. "It doesn't help your reader."

That's why it's sometimes more important to ask what scientists agree on rather than what they disagree on.

Reporters are on much safer ground reporting "consensus" science. Scientists reach consensus on certain topics through organizations, meetings, collective authorship, peer review, and similar mechanisms. In the climate area, groups like the Intergovernmental Panel on Climate Change, the World Meteorological Organization, or the National Academy of Science have issued reports summarizing the knowledge most scientists agree on. These are a handy way to locate mainstream thinking, although this doesn't mean sources that disagree should be ignored. They are a way of getting some perspective beyond the "point-counterpoint" approach.

As a practical matter, most general-audience journalists don't often write about pure science stories; there is usually some government action

or finding or decision that the story is pegged to. Consequently, one method that is often useful in assembling a story is the "insider-outsider" model. First, you quote the government official or government scientist. Then, you quote some person outside government, working to evaluate government policy or science. Special-interest lobbies and think tanks can add to such stories — if you quote enough of them (and identify the ax they are grinding).

"The more uncertain the issue is, the more people you have to talk to," says Patrusky. "I'm a student of: 'Check it out, check it out, check it out.' And the more uncertain it is, check it out with more people."

"The best instruments that science writers have are telephones," Patrusky says. "I just don't trust anybody. Everything has to be questioned. Even Ph.D.'s have agendas."

Other Tips

1. Cultivate experts at local universities, colleges, junior colleges, or government laboratories. Visit the department studying climate change issues, if they have one. Ask the public information office for names and leads. Attend meetings, conferences, or lectures on the subject. Listen to presenters, ask questions, and talk to the scientists involved one-on-one after the formal meeting.
2. The National Center for Atmospheric Research has a communications office that can provide materials and contacts, and assist with interviews.
3. Use library resources to get background before you interview scientists. Your newspaper, university, or public library may help you. They often can do computerized searches of both popular periodicals and scientific literature — sometimes for free. Failing that, they may have printed guides, indexes, and abstracts to use.
4. Find the professional scientific associations that deal with your particular question, and call them. Gale's *Encyclopedia of Associations* is a good place to start.
5. Scientists learn how to ask questions so that they can be answered numerically. So do reporters. Statistics is a branch of mathematics devoted to translating certainty and uncertainty into numbers. Some understanding of statistics is essential to any understanding of climate change. What does it mean when scientists say something is "statistically significant?" It is easy to learn some basic concepts in statistics without understanding the difficult math. Two books that help reporters do this are Victor Cohn's *News & Numbers* and Philip Meyer's *The New Precision Journalism*.

6. Another way to find experts is to use ProfNet (http://www.profnet.com/). You can put in a query on this system and have it reach more than 600 universities and research institutions. ProfNet, a subsidiary of PR Newswire, is a collaborative of public information officers at these universities, linked on the Internet. The simplest way to make a query is to go to the Web page (above) and fill out the interactive query form. You can send the query by e-mail to profnet@profnet.com, phone it in to (800) PROFNET (01-516-941-3736 from outside the United States), or send it by fax to (516) 689-1425. Normally, you hear back from experts within 3-5 days, although you can ask for faster response. To make a query, write a short paragraph or two summarizing:
   a) The nature of your project — your specific questions, your deadline, and so forth;
   b) the nature of the expertise you are seeking;
   c) the name of the news organization you are working for; and
   d) the manner in which you would like answers to reach you (e.g., phone number, fax number, e-mail address, etc.).

   For more information, talk to Dan Forbush, President and Sysop, or Kevin Aschenbrenner, Managing Editor.
7. For perspective or advice, leads or evaluation of sources, try asking a science writer.
8. Another way of finding experts on climate change is to pick them from the panels of experts assembled by science organizations to do consensus reports on the subject. The best current one is the Intergovernmental Panel on Climate Change, Scientific Assessment. Hundreds of scientists took part in writing or reviewing it, and they are listed in the report itself. Other panels were assembled for many previous reports by agencies like the National Academy of Sciences. They are cited in the IPCC Assessment report, and some are cited in the appendices to this guide.