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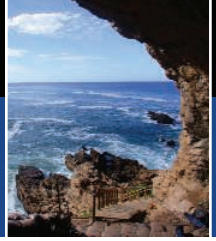

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GLOBAL WARMING

Nobel Peace Prize Won by Host Of Scientists and One Crusader

The announcement came as a shock to Robert Watson. "It would never have crossed my mind that a scientific assessment process would be named in a Nobel Peace Prize," he says. "If anyone had told me that could happen, I would have said, 'You have to be smoking something.' " But stone-cold sober the Norwegian Nobel Committee was when it awarded the prize to the United Nations–sponsored Intergovernmental Panel on Climate Change (IPCC)—which Watson chaired from 1997 to 2002—and to Al Gore for their "efforts to build up and disseminate greater knowledge about man-made climate change" because such change may increase "the danger of violent conflicts and wars, within and between states."

The odd-couple winners are a good match, most scientists believe. On the one hand, there's the organization of thousands of unpaid, nearly anonymous researchers meticulously assessing the state of climate science; on the other, a former politician using that science to underpin his media-savvy campaign to save the world from climate catastrophe. "The combination of IPCC, with its very careful examination of scientific knowledge, and Al Gore's ability to bring the message to politicians and the public" has worked well, says Bert Bolin, the first chair of IPCC. Not that their work is done. There's still the matter of steeling the public's will to meet the costs of countering the threat.

On the IPCC side, the winners are legion. "This is an honor that goes to all the scientists and authors who have contributed to the work of the IPCC," says Indian engineer and economist Rajendra Kumar Pachauri, current IPCC chair. The award recognizes a vast amount of unpaid hard work on their part, says geoscientist Michael Oppenheimer of Princeton University, who has served IPCC in various capacities since the United Nations established the body in 1988. "There's an incredible amount of time involved," he says, flying to meetings in every corner of the world, hammering out consensus, responding to thousands of reviews, and extracting government approval word by word for three different working groups for each report (*Science*, 9 February, p. 754). "There is a price," says Oppenheimer. "People burn out."

Working against burnout is "a sense of community responsibility," says Oppenheimer. "A free society provides the space so you can do science" and create knowledge. In return, he says, climate researchers serve on IPCC to distill that knowledge in a credible way for policymakers. Adds Watson: "They want informed political decisions. If they want their science to be part of informed policymaking, the IPCC is the vehicle." And then there is self-interest. "I get more out of IPCC than I put in," says Oppenheimer. "IPCC meetings are very useful." They force a critical analysis of a scientist's own specialty and provide exposure to the top people in other fields, scientists say.

The other winner of the prize is far more familiar to the public. But Gore has also been well-known to the scientific community for decades. Scientists say few politicians have relied upon or involved more researchers in their policy work than Gore. "My relationship with Al Gore was born in combat," says climate researcher Stephen Schneider of Stanford University in Palo Alto, California, who recalls a 1981 hearing then-representative Gore held in which Schneider opposed a move by the Reagan Administration to cut climate research. "We were soldiers in the same war … for 25 years."

Climate researchers have known Gore as the rare policymaker who brings scientists in—and listens. When he visited Lamont-Doherty Earth Observatory in Palisades, New York, as a senator, recalls geochemist Wallace Broecker, "he said, 'I don't want a tour. I just want to sit around a table with some of your climate people.' " While Gore was writing his 1992 book *Earth in the Balance*, recalls atmospheric chemist Michael McElroy of Harvard University, the then-senator spent 2 hours on the phone nailing down a "pretty subtle chemical point" about ocean acidification. "He came into these issues with a visceral feel that this was an important issue," says McElroy, "like the Vietnam War had been when he was a young man."

Schneider thinks the award to both Gore and IPCC recognizes their dual roles in promoting climate science. "We provide the credibility the Gores and Blairs and Schwarzeneggers need," he says of the panel. And Gore's treatment of that science? "He did a pretty good job of communicating complex scientific information to a lay audience," says McElroy of Gore's film *An Inconvenient* ▶

Winners all. IPCC chair Rajendra Kumar Pachauri (*left*), representing several thousand scientists, and Al Gore share the Nobel Peace Prize for creating and spreading knowledge of climate change.

CREDITS (LEFT TO RIGHT): TANUSHREE PUNWANI/REUTERS/LANDOV; AP

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Truth. "If it was a scientist doing it, it would be different. But I don't think there were any glaring errors." The publicity, Broecker says, accomplished far more than IPCC's scientists could have done on their own: "Gore put it in a way that people listened. We're much further along to meaningful action [to cut emissions] because of him."

IPCC led the way, Watson says. Its reports forging increasingly strong links between human activity and global warming were instrumental in moving nations toward drafting and signing the Kyoto Protocol for cutting greenhouse gas emissions, he says. But more recently, says Oppenheimer, other forces have come into play: high oil prices and a new energy crisis; events ascribable to global warming, such as the dwindling of Arctic sea ice; and weather events such as Hurricane Katrina that are at least analogs of weather in a greenhouse world.

And then "along comes Al Gore," says Oppenheimer. The end result has been an explosion of media attention and, in the United States, unprecedented political debate and even emission-cutting legislation. But it's not over, warns political communications researcher Matthew Nisbet of American University in Washington, D.C. IPCC and Gore may have raised awareness broadly and stoked concern among the already environmentally attentive, but by Nisbet's reading of the polls, the broad support for emissions cuts that will hurt is nowhere near there. Activists, he says, need a new message.

–RICHARD A. KERR AND ELI KINTISCH

With reporting by Pallava Bagla.

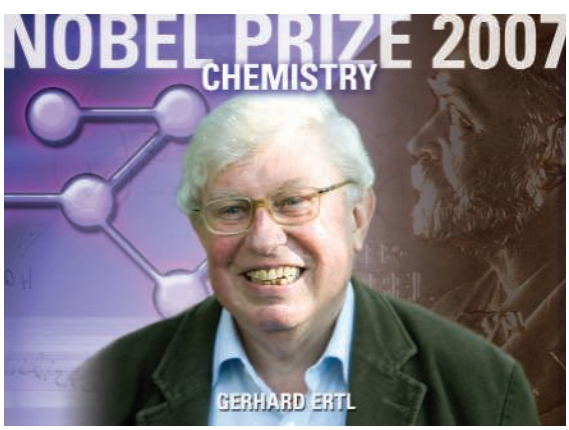
NOBEL PRIZES

Chemistry Laureate Pioneered New School of Thought

Now that's a birthday present! Instead of receiving the random necktie on his 71st birthday last week, Gerhard Ertl was awarded this year's Nobel Prize in chemistry. Ertl, a physical chemist at the Fritz Haber Institute of the Max Planck Society in Berlin, Germany, won for developing methods that reveal how chemical reactions take place on metals and other surfaces. Those techniques have led to results as diverse as new catalysts that remove poisonous carbon monoxide from car exhaust and an understanding of how stratospheric ice crystals supercharge chlorine's ability to destroy the planet's protective ozone layer.

"This is really well deserved," says Ralph Nuzzo, a surface chemist at the University of Illinois, Urbana-Champaign. "Ertl is a titan." John Vickerman, a chemist at the University of Manchester in the U.K., agrees. "The reactions occurring at surfaces are very difficult to probe because there are so few molecules involved, and they frequently occur very rapidly," he says. "Furthermore, the scientist has to distinguish what is happening in a layer one molecule thick from the rest of the solid. Ertl developed very sophisticated physical tools to identify the chemistry occurring at the surface." The Royal Swedish Academy of Sciences, which awards the Nobel Prizes, says Ertl was selected not for developing a particular tool, technique, or discovery, as is often the case, but because "he established an experimental school of thought for the entire discipline."

One early example was in figuring out how iron-based catalysts convert hydrogen and nitrogen into ammonia, a critical industrial process for making fertilizers. This conversion, known as the Haber-Bosch process, combines dinitrogen molecules from the air with dihydrogen molecules. Earlier studies had revealed that the slowest step in the process was one in which nitrogen molecules adsorb onto iron particles in a manner that primes them for combining with hydrogen. Researchers didn't know whether the tightly bonded nitrogen molecules reacted with hydrogen intact or whether they broke apart first. Using spectroscopic techniques and other tools, Ertl revealed the complete seven-step process whereby nitrogen and hydrogen molecules land on an iron surface, break apart, and react to form ammonia.



Many happy returns. After Gerhard Ertl won the Nobel on his birthday, colleagues toasted him with champagne and German pretzels.

After receiving the announcement last Wednesday, about 200 of Ertl's colleagues toasted him with champagne and German pretzels on the shaded lawn of the Fritz Haber Institute. After Ertl fielded a few questions from TV reporters, the crowd broke out in a rousing round of "Happy Birthday to You" (in English).

In an earlier phone interview with *Science*, Ertl was quick to offer credit to fellow researchers. His field, he says, was propelled by the parallel development of many surface characterization techniques. And, he adds, many scientists were adept at applying them—including Gabor Somorjai of the University of California, Berkeley, with whom he shared the 1998 Wolf Prize in Chemistry for their work in surface science. "I was a little bit disappointed he didn't share [the Nobel Prize] with me," Ertl says. Last week, several chemistry bloggers went further, arguing that Somorjai deserved recognition for his vital role in laying the foundations of surface science.

For his part, Somorjai says simply that he does not understand how award decisions are made. But he notes that in the 1980s, he began steering away from ultrahigh-vacuum surface science to study reactions at solid-liquid interfaces, among other things. By contrast, Somorjai says, "Ertl stayed in there all through his life."

–ROBERT F. SERVICE

With reporting by Gretchen Vogel in Berlin, Germany.

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