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‘I Can’t Just Stand on the Sidelines’: An Interview with Naomi Oreskes

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This year’s Climate Week is past. But Naomi Oreskes is extending an important part of the political debate with her new book *Why Trust Science*.

This one, her seventh, grew out of her experiences traveling the country lecturing on climate change. Who were these climate deniers she regularly encountered at her talks, she wondered? What could she, a geologist by training and a professor of the history of science at Harvard, say that they might be willing to hear?

These are questions that anyone venturing into the public square on climate change issues is likely to ponder. The way Oreskes found to answer them in her new book was by showing how the scientific enterprise functions and why that community’s verdicts should command our attention.

This wasn’t the first time Naomi Oreskes, sixty, had given herself a tough assignment. About fifteen years ago, she began to wonder why there was widely thought to be no scientific agreement on the causes of climate change. Oreskes went over the peer-reviewed literature and saw that, contrary to popular belief, the matter had long been settled by a decisive consensus: the culprit wasn’t sun-spots or natural weather cycles; it was human activity and the gases it had caused to be released into the atmosphere.

In December 2004, the result of her investigation was printed in *Science*, one of the most influential of journals in the scientific world. Her paper, titled “The Scientific Consensus on Climate Change,” was crucial in helping to expand public awareness of what climate scientists were saying.

Then, in 2010, Oreskes, together with co-author Erik M. Conway, published *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. That book showed how conservative ideology backed by business interests drove a group of elite scientists to create public skepticism about scientific findings with which they disagreed for political reasons. *Merchants of Doubt* became a bestseller and remains an essential text for the environmental movement.

Throughout her career, Naomi Oreskes has sought to understand how science knowledge develops and the scientific methods by which scientists deduce their findings. By dissecting the process of science, she has often found herself walking into the unexpected territory of politics.

“Like the scientists I study, I did not set out to be involved in a political debate,” she explained to me, during a four-hour interview at her home outside of Boston. “But climate science led me there, willingly or not. Part of the challenge has been to understand and explain why work done by scientists who did not have a political agenda became so politicized.”

An edited and condensed version of that interview, and of a subsequent telephone conversation, follows.

Claudia Dreifus: *You start your new book with a quote from Ronald Reagan: "Trust, but verify." Didn't he say this when he was speaking about an international treaty?*

Naomi Oreskes: Yes. For nuclear weapons.

Right. So how does it apply to science?

Well, obviously, the quotation's meant to be a little ironic. But it captures my basic point: all social relations rely on trust to some degree or another. That's as true of science as it is in any other area of life.

Reagan was talking about nuclear weapons, where, to make sure that treaties were being honored, all kinds of verification practices were put into place. The argument of my book is that science is really about verification practices and that they are central to what makes the work of scientists trustworthy.

Now, in science, we don't like the word "verification," but scientists do have a set of practices intended to test claims and see whether they're holding up—peer review, reproduction of experiments. And, on the whole, scientists do trust one other. The general assumption when someone puts forward a claim is that it is not fraudulent. Though there have been some very celebrated examples of fraud in science, they're pretty rare.

The point is, we don't rely on trust relationships. They are where things begin. Then we move onto verification. Science is all about verification.

What motivated you to write Why Trust Science*?*

It came out of my experience giving public lectures on climate change. After my 2004 paper on the scientific consensus on climate change research came out, I started giving a lot of public lectures.

Most involved telling a historical story about who the climate change scientists were, why they had got interested in climate change in the first place, and how they had come to the conclusion that yes, man-made climate change was underway. I tried to show how this idea didn't come out of the blue, that it isn't just some plot by Al Gore, or an environmental fad.

Often, there'd be people in the audience who'd demand, "Why should we trust scientists about climate change?" These weren't right-wing ideologues, although I certainly got those at my talks. In most instances, these were ordinary Americans who were genuinely bewildered. I felt that they deserved a serious answer.

What did you say?

That people are looking for a warrant for trust in science and that they are right to want to know about the reliability of the methods that scientists use for their claims. I'd usually add that I believe that the reliability of science is not to be found in "the scientific method," as is commonly thought, but rather in the ways scientific claims are vetted and adjudicated. There's a

collective process that is subject to constant adjustment and revision and that's what creates reliable knowledge.

It's not a perfect system: humans do it. But I believe this process is what differentiates science from hearsay, rumor, and opinion.

Why this particular book at this political moment?

This is a book that I probably would have written at some point in the future. I've been on this beat for much of my academic career.

My first book, *The Rejection of Continental Drift*, a reworking of my doctoral thesis, was about the nature of scientific inquiry. What you had there was the scientific community's rejecting an idea and, thirty years later, accepting it. My second book, *Merchants of Doubt* (co-authored with Erik M. Conway), focused on the opposite—the rejection of scientific knowledge by a group of eminent scientists because of their political beliefs.

As for *Why Trust Science*, with all that's happened these last few years, I felt an urgency to address this question. We're now living in a world where rejection of scientific claims has become a significant social, cultural, and political phenomenon.

After all, we have in Washington, D.C., a president who rejects scientific reasoning on a number of issues—notably, vaccinations and climate change. I don't know what Trump's view on evolution is, but his vice-president is a "young Earth" creationist who rejects the age of the earth as scientists have found it.

Meanwhile, at the grassroots, there are many Americans who reject the safety of vaccinations and also accept Trump's declaration that climate change is "a hoax."

Why do you think scientists sometimes have difficulty convincing the public that global warming is real? Is it that the science is too complicated?

Climate science is not that complicated!

Yes, there are problems in explaining aspects of it. One issue is that the scientific community has been asked to predict exactly when the negative effects of global warming will occur. That's something they cannot do. Science just does not permit us to say that on April 1, 2030, the West Antarctica ice sheet will collapse.

If you step back from the details, the broad picture is incredibly clear. Carbon dioxide, produced by the burning of fossil fuels, is a greenhouse gas. That means it is transparent to visible light and relatively opaque to infrared radiation. So light from the sun comes in, heats the planet and when that heat is radiated back toward space, it's trapped by CO_2. We've known this since the 1860s.

So where's the complication? In 1958, the late Charles David Keeling, a professor at the Scripps Institution of Oceanography, asked: If we keep putting these greenhouse gases into the atmosphere and it keeps heating up, will the gas stay up there—or will it be absorbed by the ocean and the biosphere? This became his life's work.

By 1965, Keeling and his colleagues had clear evidence that about half of the CO_2 remains in the atmosphere and the other half more or less equally in the oceans and the biosphere. In 1965, he

and others wrote a report as part of President Lyndon Johnson's science advisory committee, in which they said that by the year 2000, there'd be 25 percent more CO_2 in the atmosphere—and this would significantly impact climate.

They were right. The only thing they got wrong was that the amount of CO2 was actually more than 25 percent; they'd slightly underestimated the problem. The point is that this is long settled science. It's completely non-controversial.

What is left for science to answer? What's left is what I call tempo and mode. When will the calamities occur? Will it be linear? Will it be slow and steady? Or will there be tipping-points? Even today, this is still not completely resolved. But the main issues are not terribly complicated.

Let me refine that question. If the issues are uncomplicated, why has it been so difficult for scientists to explain climate change to the public?

I think there are three main reasons. The first is that scientists are very interested in details and the details of climate science are not always easy to explain, even if the overall picture is clear. The second is that scientists have faced a deliberate, organized, and often highly orchestrated disinformation campaign designed to create public distrust in science. The third is that scientists had a naïve view of politics. They thought it was sufficient to do the scientific work—to hand over the facts—and that government and business leaders would act accordingly.

I can't blame the scientists. I see them largely as the victims of the disinformation campaigns Erik Conway and I documented in *Merchants of Doubt.*

Given the lessons of history—especially the role of the tobacco industry in fighting the evidence of the harms of its product—climate scientists might have expected the fossil-fuel industry to fight them. But most scientists pay little, if any, attention to history. I'm willing to criticize them for *that!*

One of the mantras one hears among social scientists trying to understand climate change rejection, is that a high educational level is not predictive of denial. In your experience, have you found also found that?

This is one of those interesting, tricky things. Education seems to play out differently among Democrats and Republicans. For Democrats, more education is correlated with a higher level of acceptance of scientific claims. For Republicans, it's the opposite.

Some Republicans, particularly of a certain age and outlook, don't want to accept the reality of climate change. They look for reasons to reject it. The more educated you are, the more access you have to sophisticated arguments.

I've been in airports and met men reading *The Wall Street Journal* who claimed that climate change is not real. "It's not climate change, it's cloud feedbacks," they insisted.

Cloud feedbacks?

This refers to the fact that global warming leads to more moisture in the atmosphere, which can produce more clouds. We all know that clouds can have a cooling effect—it's cooler on a cloudy day than a comparable sunny day. So, in theory, cloud feedback could act as a negative feedback, and prevent warming from going too far.

That these people even know a term like "cloud feedbacks" tells me that they've made an effort. They've read websites like those of the Cato Institute or Competitive Enterprise Institute where these arguments are presented as talking-points. But it's an incomplete argument, because clouds can also have a warming effect, trapping heat, which is why clear nights are typically colder than cloudy ones.

Cloud feedback is real, but here it's being used out of context to justify climate change denial. Scientists have carefully studied cloud feedbacks for decades, and have shown that they do not stop global warming.

How did you come to write Merchants of Doubt*?*

In 2004, I became troubled by the way the media were presenting climate change as a scientific controversy. From work I had done on the history of oceanography, I knew that scientists had been concerned about the issue since the 1950s, and I was pretty sure the media presentation was misleading. So I decided to check the peer-reviewed literature, analyzing a sample of 928 peer-reviewed papers on climate change. I found that none disagreed with the consensus position that "most of the observed warming of the last fifty years is likely to have been due to the increase in greenhouse gas concentrations."

Until then the conventional wisdom had it that there was "controversy." I showed that there was actually consensus. So my paper for *Science* got a lot of attention. And that's when the attacks began—vicious letters, threats… It hit me like a truck. I was completely blindsided.

Some months later, I attended a professional conference where I ran into the NASA historian Erik Conway. He was writing a book on the history of atmospheric science. Over drinks, it came up that I was being attacked and getting hate mail. Somehow, the name of a certain physicist also came up in the discussion, someone of whom Erik knew from his own research. Erik said: "Well, Naomi, one of the people attacking you is the same person who attacked Sherry Rowland over the ozone hole."

Who was Sherry Rowland?

One of the greatest scientists of the twentieth century: his work was critical to proving that chlorofluorocarbons—the chemicals that were at one time in most air-conditioners and refrigerators—were damaging the ozone layer. Rowland's research led to international treaties banning the most harmful of them. He received a Nobel Prize for it.

I remember saying to Conway, "Did you just use my name in the same sentence as Sherry Rowland?" Erik said, "Yes. There was this huge attack on him. This physicist you mentioned was one of the main people involved. I've got a whole folder about this at home. I'll send it to you."

So Erik sent me his material. Reading it was like playing the game *Mad-Libs*: you could take out the word "ozone" and replace it with "climate change," and the arguments were the same. The line went, more or less, that "The science isn't settled. There's a lot of doubt."

Surprisingly, some of the people who went after Rowland were quite prominent. Fred Seitz had been a Rockefeller University president. Bill Nierenberg was a director of the Scripps Institute of Oceanography. I *knew* Bill Nierenberg! I had talked with him for my oceanography book.

I thought, "Wow, this is so weird! Why would a former president of Rockefeller attack an atmospheric scientist?" Then I began digging a little more and discovered evidence linking Fred Seitz to the tobacco industry.

I had a buddy at Stanford, Robert Proctor, who'd studied the history of tobacco. Robert sent me his folder on Seitz's relationship to R.J. Reynolds. Reading through it, one could see that some of the people casting doubt on climate change science had sought to discredit the research on chlorofluorocarbons and on smoking. I phoned Erik: "I think there's a book here."

What do you think motivated these scientists?

Politics. Economics. The motive—at least for Seitz—would turn out to be a hatred of government regulation and a fear that regulating cigarettes would lead to socialism or communism. From tobacco, they went onto other campaigns.

As I researched and wrote *Merchants of Doubt*, the personal attacks continued. There was a period when I took out legal insurance. I did get sick at one point. I got a stress-related illness.

Writing that book changed how I worked. There was a period in which everything I wrote was vetted by lawyers. I became a lot like a journalist, paying attention to issues that academics don't normally worry about, like the Sullivan standard [from the Supreme Court decision in *New York Times Co.* v. *Sullivan*].

The actual writing of it helped me a lot. By the time we published, in 2010, I felt more confident. And safer. I started getting fan mail. The hate-mail still came, but it was counterbalanced by love mail. And the attacks died down. My husband, Ken, says it was because these people knew that if they attacked me, they'd be in my next book!

How was the book's political message received by your sometimes apolitical colleagues?

One researcher at Columbia's Lamont-Doherty [Earth] Observatory—a leading center for climate research—said something I will always remember: "*Merchants of Doubt* made me so happy," he told me. "I thought I was being paranoid. In fact, this stuff is really going on."

What I think the book did was set people looking for more effective courses of action. If you go back ten or fifteen years, to the extent that scientists were aware that there were people out there who rejected science, the scientists—almost to a person—thought it was a matter of scientific illiteracy. They believed that their challenge was to explain science *better*.

Now, explaining science clearly is a good thing to do. But it's not going to solve this problem because this isn't about scientific illiteracy. The cause was, and still is, a deliberate misinformation campaign designed to confuse the American people and prevent action.

Do you think the scientific community, embedded as it was in the isolation of the academy, was ill-prepared to effectively respond?

Absolutely. The moment when that changed was the Climategate affair of 2009, in which the computers of four climate scientists at the Climatic Research Unit of the University of East Anglia [in the UK] were hacked, their emails stolen, and their out-of-context comments released to the press—which, for the most part, published them uncritically.

Until then, the scientists thought they'd been operating in good faith. Afterwards, they had to confront that these people were not: that they'd steal emails, deliberately take things out of context, and that the media, with a few exceptions, will pile on.

Was it difficult for the scientific community to comprehend that their opponents were highly skilled communicators?

I think it was hard to accept that the deniers were excellent at communicating. But once people recognized what they were up against, one saw more scientists willing to stand up to defend the integrity of science, to speak to journalists, to go on television. Before, most considered it a waste of time.

I heard that you grew up in a political family. True?

I did. And for a long time, I didn't want to be political. My parents were very involved in the civil rights movement. I always tell people, "When I grew up, the mall was a place you went to protest, not to shop." As a child, I was proud of my parents, but there was something about their lives that was exhausting.

Part of me just wanted the have the right to just play the piano or read poetry, and not to feel as though I was personally responsible for saving the world all the time. Do you know the novel *Burger's Daughter*, by Nadine Gordimer? It was about the doubts of the child of two activists during the apartheid era in South Africa. I really related to the central character. That book gave me permission to do what I felt I needed to do in life. I thought, "I want to be a scientist, and I feel I can contribute to the world as a scientist more than I can as an activist."

You are an activist now. What changed?

The world changed. There came a point where I felt, "There are things that need to be said and I'm in a position to say them." After my consensus paper was published in *Science*, I came to feel, "I can't just stand on the sidelines."

Yet I still don't really think of myself as an activist because my primary world is scholarly. Everything that I do comes out of my scholarship. For me, that's an important distinction.

One of your recent efforts has been to help organize the Climate Science Legal Defense Fund. What is it?

It's a way of offering some organized support to climate scientists who are attacked because of their work. We joke that we started out as the Mike Mann Legal Defense Fund. That's because when climate researcher Michael Mann—a regular target of the deniers—needed legal help. He had no money.

The meteorologist Scott Mandia quickly raised some funds for him. That's how I got involved. It soon became clear that we didn't just want to help Mike Mann, but anyone facing similar legal problems. We've since developed an amazing network of pro bono lawyers to help out.

It's been gratifying to know that there are talented lawyers willing to help embattled scientists free of charge. I've enjoyed working with them because their work is also based on evidence.

How does this relate to the ideas you put forward in your new book?

One of the points I make is that we should trust science because it is based on evidence. In this case, the jury isn't ordinary citizens, but highly trained and credentialed specialists. I further argue that we shouldn't trust scientists as individuals, no matter how famous or smart they are. Scientific knowledge isn't about the behavior or opinion of any one person—it's about a consensus based on the evidence.

Consensus is key because it's how we sort out the difference between one person's opinion versus a body of information that has been supported by evidence. Science is about marshalling evidence, evaluating evidence, generating evidence.

I think scientists should do more to talk about that. We shouldn't be saying, "Trust us—we're the experts." Instead, we ought to be explaining, "Here's how we know that vaccines don't cause autism, that climate change isn't caused by the sun." These are things that ordinary people can understand if scientists make some modicum of effort.

When you wrote that paper for Science*, you were working on a book on the history of oceanography during the cold war. Whatever happened to that project?*

It's finally done. I sent the manuscript to the University of Chicago Press this past July. It's to be called *Science on a Mission.*

How does this just completed work relate to your earlier books?

It's another piece of the puzzle. I don't want to oversimplify, but during the cold war, and even earlier, during World War II, science made a pact with the military. In doing so, the community gave up on communication as part of the job. Before that, you saw much more effort on the part of scientists to reach out. Once World War II and the cold war hit, you see a very clear change to "loose lips sink ships."

As part of this secrecy, the scientists began living in a closed world where they never had to communicate with the general public. They didn't even have to communicate with each other. In fact, they were often told not to. "Don't talk about this! Do not share this, even with colleagues in your own department who don't have clearances."

One of the consequences of those decades of military secrecy was a loss of scientists' capacity to communicate. We're seeing the consequences of that today in the climate change debate.