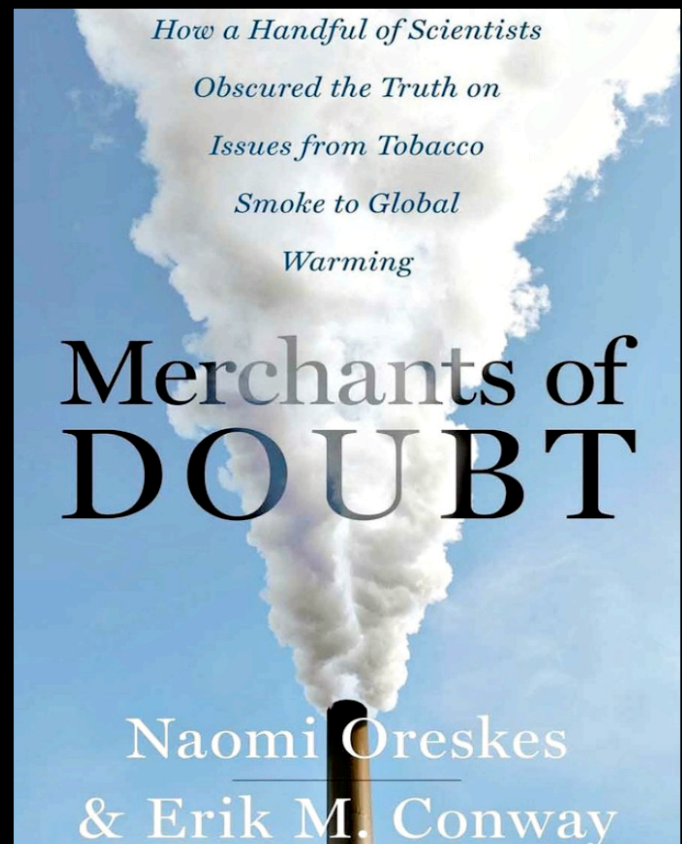


BOOK REVIEW

In *Merchants of Doubt*, historians Naomi Oreskes and Erik Conway explain how a group of high-level scientists, with extensive political connections, ran effective campaigns to mislead the public and deny well-established scientific knowledge over four decades. Oreskes and Conway roll back the rug on this dark corner of the American scientific community, showing how the ideology of free market fundamentalism skewed public understanding of some of the most pressing issues of our time.

By ANDREW KARAM



Anyone who is not a scientist might be surprised to hear that science is a fairly conservative way to make a living. Not conservative in the political sense so much as conservative in that most scientists spend their careers filling in the blanks of existing theories – doing what they can to support and extend the scientific status quo – rather than boldly striking off into novel territory. Genuinely revolutionary ideas come about perhaps once in a generation – for every Newton, Darwin, or Einstein there are hundreds or even thousands of scientists setting the stage or tidying up the loose ends of the existing theories. And when something comes up that seems poised to upset the scientific applecart (as it were), the first reaction of most scientists is to be skeptical and to question the new way of looking at things. Some new ideas crumble and fall under serious scientific scrutiny – cold fusion is one example – while others grow stronger the harder they are tested (evolution and relativity theory come to mind here). The point is that most scientists tend to be hesitant to embrace something truly new and revolutionary until it's been tested and shown to be solid.

The question is where to draw the line between healthy skepticism and denial (or even obstruction) of a new way of looking at the world. In many cases even unhealthy scientific skepticism is literally of only academic importance – refusal to accept some aspects of plate tectonics for example don't make a huge difference to society. But there are some cases in which scientific skepticism taken too far can have a significant impact on society. And when that skepticism is deliberate – when scientists use their tools to purposely befuddle and obstruct – the impact can be profound. It is this deliberate obfuscation that Naomi Oreskes and Erik Conway write about in their thoughtful book *Merchants of Doubt*.

I can understand being skeptical on these topics. Consider ozone depletion – CFCs were an accepted technology widely used around the world and replacing them was neither cheap nor easy. It makes sense that, before embarking on a decades-long multi-billion dollar international project to eliminate CFCs, there be a high degree of confidence about the entire chain of logic – that the ozone layer was really being depleted, that the reason for this was the wide use of CFCs, and that the loss of the ozone layer would really be harmful to humans and to the environment. Only after having a high degree of certainty on all of these points could outlawing CFCs be seen as a reasonable action – after all, it doesn't make sense to take a controversial action based on a guess. Similarly, scrubbing sulfur from the exhaust gas of coal-fired power plants to reduce acid rain should only be done when we are fairly certain that there is a link between burning coal and the acidification of mountain lakes and soils. But once the scientific evidence is in and consensus coalesces then taking action to avoid dreadful consequences seems reasonable. And as a corollary, deliberately prolonging the public debate by making specious arguments might not serve us well.

The authors make a compelling case that a relatively small group of politically motivated scientists set out to deliberately obscure the fact that the scientific community had reached a general consensus on a number of topics – acid rain, secondhand smoke (and first-hand smoke as well), ozone depletion, DDT, and global warming – primarily because this consensus might lead to extra expense, regulation, and inconvenience across society.

As a scientist I can understand scientific skepticism. I remember in particular that I spent some time working on calculations

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about ultraviolet radiation and its absorption by ozone. I have to confess I was deeply skeptical about the impact of ozone depletion on the Earth's organisms - my skepticism really didn't abate until I realized that the loss of Earth's ozone layer would cause UV irradiance to increase by a factor of 400 or more. When I realized that, absent an ozone layer, I would need to go outdoors wearing SPF-400 sunblock I convinced myself that ozone depletion was something to be avoided. In some areas where I lack the expertise to make an assessment myself, my options are more limited - I can try to learn the science in each of these areas well enough to make my own determination or I can learn enough to satisfy myself that the consensus among those who are competent to make these determinations seems to be well-founded. But through this I must also maintain my own scientific integrity - I can't hang onto an idea that is contrary to the consensus of qualified scientists simply because I don't want to accept their conclusions. Rejecting the conclusions of the scientific community simply because they are inconvenient or because I don't like them is intellectually dishonest. And I cannot imagine using my scientific training to obscure rather than to illuminate an issue. Yet, according to Oreskes and Conway, a number of scientists did just this in order to help avert actions that might be expensive, that might involve added governmental regulations, or that might have an impact on industry.

In their book Oreskes and Conway make a good case that a relatively small number of scientists deliberately raised objections to the scientific consensus in fields in which they had no scientific expertise because of their personal philosophical and political objections. In so doing, these scientists helped to delay necessary corrective actions, letting problems continue to build.

My only real quibble with this book is that it is obvious where the authors' sympathies lie. While I cannot say that I disagree with them, I have read other of Oreskes' books and had expected more objectivity in this one. Having said that, this does not appear to detract from the quality of the information or the analysis presented. That aside, there was nothing in the book that was troubling.

This again brings us to the question about skepticism. Personally, I dislike using the term "skeptic" as a pejorative - I firmly believe that a scientist's job is to be skeptical, and the more revolutionary or the more far-reaching the claim the more skeptical a scientist should be (thus the common comment that "extraordinary claims require extraordinary evidence"). Thus, to me a "global-warming skeptic" is simply a scientist being a scientist. But at some point we have to ask ourselves if skepticism remains a reasonable response to a scientific claim or if skepticism has turned into a refusal to accept (or a denial of) a new scientific understanding. To some extent, even this can be accommodated by the scientific process - this is captured by the comment (sorry, I can't remember who came up with this one) that a new scientific theory finally triumphs when the last adherents of the old theory have died. What upsets me is not resistance to a new

idea - even when the new theory has been widely accepted - so much as using one's scientific training and reputation to actively convince others that an accepted theory is wrong or is too poorly understood to take action. I suspect that this upsets Oreskes and Conway as well, as it should upset us all.

There is one final point to make - how do we know that scientific consensus is correct? Six centuries ago a vote among scientists would have told us that the sun and planets orbit the Earth. Three centuries ago polling scientists might have concluded that swallows spent the winter hibernating at the bottom of rivers, and just a century ago a vote among scientists would have showed that the continents are fixed in place on the face of the Earth. And these votes would all have been wrong. This makes things easy for the merchants of doubt that Oreskes and Conway castigate, but it is a very real question - and a question with very real (and expensive) implications. How do we know when it's time to accept the scientific consensus - when it's time to stop studying a question and to take action? This question - at the boundary of science and policy - may not be amenable to a formulaic solution. Oreskes and Conway don't answer this question either, but they provide a wealth of information and insights that can help the reader to better understand now this process can work - and how it has been undermined so effectively. ■

Merchants of Doubt - How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming (Bloomsbury Press, 2010. Trade paperback, 355 pages, \$18.00).

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