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Clouding the Truth: A Critique of *Merchants of Doubt*

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"In questions of science, the authority of a thousand is not worth the humble reasoning of a single individual."

Galileo Galilei

The book *Merchants of Doubt*, written by Naomi Oreskes and Erik Conway, ostensibly provides insight and understanding about the challenge to the climate science orthodoxy. Although cloaked in the appearance of scholarly work, the book constitutes an effort to discredit and undermine the reputations of three deceased scientists who contributed greatly to our nation. These men were accomplished scientists, leaders of universities and major research organizations, advisers to government, and the founders of the George C. Marshall Institute. This book questions their integrity, impugns their character, and questions their judgment on the basis of little more than faulty logic and preconceived opinion.

One is left to wonder why such a book was written. Two lines in the introduction offer a clue — "… on every issue, they were on the wrong side of the scientific consensus" and "it is a story about a group of scientists who fought the scientific evidence and spread confusion on many of the most important issues of our time." These statements presume certain truths without justifying them. First, Oreskes-Conway assert the importance of consensus — these scientists "were on the wrong side" of the scientific consensus, they state. Science is not a popularity contest and scientific history is replete with examples of consensus views that were flat-out wrong. Second, Oreskes-Conway say these scientists "fought the scientific evidence." That should surprise no one. In fact, if the opposite were true, we all should be very concerned. Challenging the theory, hypothesis, and evidence is after all, the basis of modern science. "Whenever a theory appears to you as the only possible one, take this as a sign that you have neither understood the theory nor the problem which it was intended to solve, the philosopher Karl Popper reminds us. Finally, Oreskes-Conway say these men "spread confusion." Their actions spread confusion only in the sense that their views differ from the prevailing orthodoxy. The authors discount entirely the possibility that the questions of science were (and are) not as clear cut as is claimed.

Clearly, Oreskes-Conway believe these scientists were on the wrong side of the issues examined. But, this book isn't about the facts of the scientific and technical issues, it is about questioning the motives and intentions of the men involved.

The approach taken is to first construct a strawman positing an illicit relationship between a scientist and the tobacco industry. Then these scientists are accused of providing "phony facts" about missile defense. Finally, they are criticized for challenging the so-called consensus on global warming. Throughout facts are mixed with pre-

judice to construct an opaque view of these events and the role of these men and the Institute they founded.

Alleged Tobacco Conspiracies

Oreskes-Conway capture the imagination with a grand conspiracy with a central player – Dr. Frederick Seitz. In their interpretation, Dr. Seitz is either a pawn or a critical cog in the tobacco industry's plans to shield itself from criticism.

Who was Dr. Seitz? Dr. Frederick Seitz, the founding chairman of the Marshall Institute, was one of the nation's leading scientists. As a practicing scientist, Dr. Seitz literally advanced the state of the art; as an administrator, he led the nation's most prestigious research institutions; and as an adviser to government, he served presidents of both political parties on a range of topics of critical importance to the nation.

He was a recipient of the National Medal of Science, the nation's highest award in science, and the Vannevar Bush Award presented by the National Science Board of the National Science Foundation.

Oreskes-Conway allege that Seitz was asked by R.J. Reynolds to lead a research program whose purpose was to help the tobacco industry defend itself. Seitz did lead a research program funded by R.J. Reynolds upon his retirement as president of Rockefeller University, a leading biomedical research institution. Reynolds had long supported the university and there were strong ties between Reynolds and the Rockefeller families; both facts are referenced in Seitz's autobiography as explanations for why he agreed to assist the effort. Seitz helped assemble an advisory committee of extremely capable and distinguished scientists to help guide a multi-year, multi-million investment by Reynolds in human health research and

Dr. Frederick Seitz

Born in 1911 in San Francisco, California was educated at Stanford University and completed a PhD in physics at Princeton University in 1934. He was an instructor in physics at the University of Rochester, the University of Pennsylvania, the Carnegie Institute of Technology, and the University of Illinois. While at Princeton, Seitz and his teacher, Prof. Eugene Wigner, developed the Wigner-Seitz method for calculating the cohesive energy of metal, the first such calculation. At Illinois, he authored The Modern Theory of Solids from which generations of students learned their solid state physics and which served to define the field.

In 1959, Seitz, with the cooperation of Robert Sproull of Cornell, Harvey Brooks of Harvard, Charles Yost of the Office of Naval Research, and Donald Stevens of the Atomic Energy Commission, conceived of and worked to establish the Materials Research Laboratories. It is no exaggeration to state that the concept of Materials Science as a discipline arose from the efforts of these individuals.

His career in public service began during World War II as a civilian member of the National Defense Research Committee and consultant to the Secretary of War. He was also the director of the training program in atomic energy at the Oak Ridge National Laboratories from 1946 to 1947.

Elected to the National Academy of Sciences in 1951, he served as president on a part-time basis for three years before assuming full-time responsibilities in 1965.

He served as President of the Rockefeller University from 1968-1978.

He was science advisor to the North Atlantic Treaty Organization and a member of the President's Science Advisory Committee from 1962-1969. He has been an advisor to numerous federal government department and agencies, including terms as the chairman of the Defense Science Board, the Strategic Defense Initiative Organization Advisory Committee, and the Space Program Advisory Council.

Among his numerous honors and awards, Seitz received the Department of Defense Distinguished Service Award, the NASA Distinguished Service Award, the Compton Award, which is the highest award of the American Institute of Physics. In 1979, he received his second NASA Distinguished Public Service Medal for his "dedicated service as chairman of the NASA Space Program Advisory Committee."

development. Assisting Seitz with the review of those investments were Jim Shannon, MD, PhD, former Director of the National Institutes of Health, and Maclyn McCarty, MD, the junior author of the famous paper in 1944 that showed the importance of DNA. Were they tacit supporters of this conspiracy?

Was Reynolds interested in discrediting the links between tobacco and human health effects? Certainly, but that is irrelevant to the question of whether Seitz and his colleagues believed that or saw the research they were supporting as contributing to that goal. What Reynolds hoped the research would produce is not the same as proving that Reynolds forced Seitz and his colleagues to do anything untoward. In fact, the documents cited by Oreskes-Conway suggest the opposite — that Seitz and his colleagues operated independently and supported worthy research. And there is little question of the worth of the research. It supported work which eventually produced a Nobel Prize by Dr. Stanley Prusiner for his work on prions.

Oreskes-Conway assert that the purpose of the Reynolds' research was to emphasize uncertainty and complexity. From that assertion, they imply that Seitz must have actively contributed to that goal because the emphasis on uncertainty and complexity would characterize subsequent efforts to challenge the scientific evidence of anthropogenic global warming. The truth is much simpler — Seitz targeted the R.J. Reynolds research money to first-class researchers who did creative work on the causes of degenerative conditions affecting human health that was published in rigorously peer reviewed journals.

It should be noted that corporations have a legal obligation to conduct such research to meet the "duty of an expert" standard. If Reynolds had not sponsored such independent research, the authors would have also indicted them. So, no matter how they funded research, they were guilty of wrong-doing.

The tobacco strawman is a designed to enrage the reader and colors their perceptions of what follows. The message sent is clear — industry's self-interest will always run counter to the public interest. The implication is worrisome. Is all privately-funded research tainted? Is public funding the only "clean" source of support for scientists? Seitz saw a critical role for private funding (through companies and foundations) and saw dangers in science becoming too dependent on either private or public support.

Missile Defense and Mutually Assured Destruction

Next Oreskes-Conway accuse Seitz of having "hawkish politics," of being opposed to Communism, and of embracing ballistic missile defense. Seitz, and his colleague, Dr. Robert Jastrow, are said to have exaggerated the Soviet threat and pushed "phony facts" about missile defense.

Who was Bob Jastrow? Dr. Jastrow was one of the pioneers of the nation's space program, having headed the new agency's theoretical division whose task was to define the scientific missions that would be carried out in space. Jastrow helped convince senior NASA leaders that lunar exploration was necessary and worthwhile. He founded the Goddard Institute for Space Studies, which conceived and managed some of the U.S.'s most famous space and earth observation programs. Jastrow helped popularize space science through regular appearances on television throughout the Apollo era and authored a series of widely read books on the universe, stars, and space systems.

Jastrow believed it was immoral and illogical for the U.S. government to intentionally place the lives of its citizens at risk of nuclear destruction by relying on the strategy of mutual destruction. Jastrow wrote that mutually assured destruction is "a cruel policy because it leaves the American people open to incineration by Soviet nuclear weapons and only offers the incineration of the Soviet people as a deterrent to that dreadful act."[1] Instead, like President

Dr. Robert Jastrow

Born in 1925, Robert Jastrow earned degrees in theoretical physics at Columbia University. Following post-doctoral studies at Leiden University in the Netherlands, Princeton University's Institute for Advanced Studies, and the University of California at Berkeley, he became an assistant professor at Yale in 1953-1954. He then served on the staff at the Naval Research Laboratory from 1954-1958.

Jastrow joined the National Aeronautics and Space Administration (NASA) at the time of its formation in 1958. Jastrow's contributions to the American presence in space were felt almost immediately.

Homer Newell, NASA's first Assistant Director for Space Sciences, established a "theoretical division" to devote attention to basic research in cosmology, astronomy, and planetary sciences. To head this new division, Newell selected Robert Jastrow, who had come to NASA with the Naval Research Laboratory upper air group.

According to Newell, "When Robert Jastrow, a physicist interested in properties of the upper atmosphere, transferred from the Naval Research Laboratory on 10 November 1958, he immediately set to work helping to plan the future space science program. An attractive, able scientist, Jastrow quickly earned the support of the administrator's office. He took the lead in developing for NASA a theoretical space sciences group, from which eventually came both the Theoretical Division and the Institute for Space Studies of the Goddard Center. Through both of these activities Jastrow was instrumental in drawing a high level of scientific talent into the agency, either onto NASA rolls or as visiting scientists."

Jastrow met Harold Urey, the Nobel Laureate chemist, shortly thereafter who explained the "unique importance" of the moon for understanding the origin of the earth and the other planets. Jastrow and Urey convinced Newell that such a program should be undertaken and from that the resolve that NASA should have a serious program of lunar exploration directed toward the goals espoused by planetary scientists emerged.

Even more important, perhaps, was the subsequent introduction of planetary scientists into the planning structure of NASA. In January 1959, Newell formed an ad hoc Working Group on Lunar Exploration. Its members included Harold Urey, James Arnold, Frank Press, and Harrison Brown. Chaired by Jastrow, the new lunar working group was to operate as a forum for the exchange of views between scientists at NASA and in the academic world-an important function intended by Newell-and it had charge of evaluating and recommending to NASA the experiments to be placed in orbit about the moon or landed on its surface.

He became director of the Goddard Institute of Space Studies in 1961. As a U.S. government laboratory charged with carrying out research in astronomy, atmospheric science, and weather and climate prediction, Goddard Institute scientists played a key role in the Pioneer, Voyager, and Galileo planetary missions, under Jastrow's guidance. Jastrow stayed at the helm of the Goddard Institute for 20 years before becoming professor of earth sciences at Dartmouth.

In recognition of his work at NASA, Jastrow received the NASA Medal for Exceptional Scientific Achievement and the Arthur Fleming Award for Outstanding Service to the U.S. Government.

For the next 30 years, Jastrow was a prolific author and public commentator on the space program, astronomy, earth science, and national security.

Reagan, Jastrow argued the construction of a defense against ballistic missiles would not only defend the American public in the event of a nuclear attack, but also serve as a deterrent to such an attack by limiting the prospect of a successful strike. Also, like Reagan and our current President, Jastrow desired a world free from nuclear weapons.

Oreskes-Conway correctly note the controversial nature of these beliefs and the "backlash" of the much of the scientific community against them. Scientific and foreign policy elites alike rejected the concept theoretically and claimed such a defense was technically impossible. Jastrow disagreed and willingly engaged the public debate. He pointed out flaws that he saw in the analyses of critics. Oreskes-Conway do not weigh the details of the technical debate that went on at that time, nor do they care to evaluate the merits of the

strategic debate surrounding it. Instead, they criticize Jastrow for being persuasive.

Were Seitz and Jastrow opposed to communism? We suspect most Americans were opposed to communism and fail to see how that can be construed as a mark against their characters. Did they believe the Soviet Union posed a threat to the United States? Yes, again hardly a unique belief. Both saw the dangers of totalitarianism and were acutely concerned about the threats the Soviet regime posed to freedom.

The irony is that elements of missile defense have been proven to work and Reagan's advocacy of missile defense contributed to the fall of the Soviet Union. Looking back, it is hard to understand why someone today would still support the strategy of Mutual Assured Destruction over a system which protects lives from nuclear devastation. Furthermore, in today's world, a robust missile defense system is an important option in the U.S. strategy against rogue nations and terrorists.

Climate Change and Global Warming

Oreskes-Conway claim that Seitz, Jastrow, and Dr. William Nierenberg intentionally obfuscated the truth about man's impact on temperature by misrepresenting scientific information, playing up doubt where certainty existed. Far from it, these scientists were intrigued by the claims being advanced in the late 1980s and began looking at the evidence supporting and assumptions behind the notion that human activities are most responsible for warming over the past century and will lead to a climate catastrophe later this century.

Who was William Nierenberg? Nierenberg was an accomplished scholar and leading administrator. He served at leading universities before assuming the directorship of the Scripps Institution of Oceanography. There he helped launch research programs and projects supporting investigations of climate change and the human effect on climate. Nierenberg served on numerous advisory boards for the U.S. government and chaired panels investigating major environmental questions.

Oreskes-Conway allege Seitz, Jastrow, and Nierenberg sought to deny the human impact on climate by "blaming the Sun." They spend considerable time examining the Institute's first publication on the climate issue. Oreskes-Conway write: "The central claim of the Marshall Institute report was that the warming

Dr. William Nierenberg

William Nierenberg was an outstanding physicist, oceanographer, government adviser, and administrator. Born in New York City in 1919 to Jewish immigrants from Poland, Nierenberg worked his way from poverty to renown with creativity, energy, and enthusiasm. After a physics instructorship at Columbia University (1946-48) and a stay at the University of Michigan as an assistant professor of physics (1948-50), Nierenberg was an associate professor of physics and then a professor of physics at the University of California, Berkeley (UCB), from 1950 to 1965.

In 1965, his career took a sharp turn when he accepted the directorship of the Scripps Institution of Oceanography in La Jolla, a position in which he served for 21 years.

Scripps had begun a program of measuring carbon dioxide and other greenhouse gases under Roger Revelle's directorship from 1951 to 1964. Nierenberg supported Revelle's work with enthusiasm, and intervened personally when research funds for the program were threatened. In concurrent positions as a science adviser for the President's Scientific Advisory Committee and for the White House Office of Science and Technology Policy (1969-78), he directed a study on acid rain and climate change and served on a White House panel that examined the Santa Barbara, California, oil spill of 1969.

Nierenberg, who remained closely associated with Scripps until his death, served on many governmental advisory committees; he also was a member of the Department of Defense's noted JASON group of scientific advisors.

… didn't track the historical increase in CO_2 … [and] since the warming didn't parallel the increase in CO_2, it must have been caused, they claim, by the Sun."[2]

Yes, the report, *Global Warming: What Does the Science Tell Us*, points out that temperature trends were not acting in a manner consistent with greenhouse theory. And, yes, the report discusses solar effects. Nowhere does it assign causation for temperature trends solely to the Sun. In fact, they observe a *correlation* between the pattern of solar activity and the pattern of temperature change and conclude: "These parallel patterns of change could be a coincidence, but they seem a more promising explanation for the post-1880 global temperature rise than the greenhouse effect, whose predictions disagree with the observed properties of the recent warming in almost every respect."[3]

In fact, their work is remarkably prescient. Writing 20 years ago, Seitz, Jastrow and Nierenberg identified the critical variables affecting estimates of temperature and man's impact of climate that remain the central focus of the scientific debate today.[4] They were: adjustments for uncertainty in the temperature observations (the quality of the surface temperature record has been shown to be in question); the effect of the ocean thermal lag (the role of the oceans and the movement of heat and carbon dioxide in the oceans remains an area of active study); adjustments for natural variability (our understanding of the natural patterns of Earth's climate is still under development); and the accuracy and reliability of procedures for estimating 21st century warming (processes based entirely on computer models and forecasts which have known limitations).

Their writings make clear the obvious points — the earth's climate is complex, science presently understands some but not all of that complexity, obtaining accurate current and historical climate data is challenging, and replicating the complexity of climatic processes with limited observational evidence in computer models has known limitations. If so little is known about a complex system like climate, it is not possible to make conclusionary statements with great certitude.

Nevertheless, Oreskes-Conway criticized Seitz, Jastrow, and Nierenberg for rejecting the scientific consensus that anthropogenic factors will cause dramatic climate change. To bolster their support for an alleged consensus, Oreskes-Conway offer a strong defense for the Intergovernmental Panel on Climate Change (IPCC). The recent Climategate revelations should be sufficient to give anyone pause when examining the openness and credibility of the IPCC process.

The most recent IPCC assessment included three reports on science, impacts, and mitigation and a Summary for Policy Makers, which is what gets the most attention. Each major report is made up of 10-20 chapters written by a team of 10-12 Lead Authors chosen for their knowledge as well as geographic balance. United Nations politics limits the expertise of each team. Independent of scientists who are sought to contribute to a chapter, final decisions are made by the Lead Authors. Because being an IPCC author is time consuming, many experts will not volunteer to participate in the process. In addition, the fact that the Summary for Policy Makers are approved after a word by word review by more than 100 governments has an impact on how authors present their work. In reality, the only consensus is among those on a writing team.

Daniel Boorstin, in his seminal work, *The Image: A Guide to Pseudo Events in America*, goes to great lengths to explore and explain the growing tendency to measure reality against the image instead of measuring the image by reality. Boorstin points out that "American citizen-consumers are daily less interested in whether something is a fact than whether it is convenient that it should be believed. Today the master of truth is not the master of facts but the practitioner of the arts of self-fulfilling

Key Uncertainties in Climate Science

The conclusion that most recent warming is due to human activities cannot withstand close scrutiny. Figure 2 in the most recent IPCC Summary for Policy Makers shows nine radiative forcing components and the level of scientific understanding of each. Of the nine, the IPCC says that there is only high level of understanding for two. In addition, the IPCC admits there is not a high level of understanding of ocean effects, climate feedbacks, or natural variability. Understanding the nature of the relationships, representing correctly those relationships in climate models, and being able to measure the variables are critical to understanding changes in the climate.

Climate models are the modern tools for creating the image of human activity being the primary cause of an impending, but not too impending, climate catastrophe. Most of what we are told about climate change and human influence comes not from scientific facts, but from models that were designed to be research tools, not a sorcerer's crystal ball. If Oreskes-Conway had looked into the current state of climate models, they would have discovered considerable variability in the output of the group of models used by the IPCC. In other words, running any scenario of greenhouse gas emissions through the IPCC ensemble of models produces as much variability in results as running all of the scenarios through a single model. The fact that these models produce widely varying results is clear evidence that too little is understood about the climate system to make them policy drivers.

It is well understood that none of these models has ever been scientifically validated and their ability to back cast past temperature requires adjustments to inputs. If you know the result that you need, it is just a matter of fiddling with data or equations to get the right output. That is hardly science.

A National Academy of Sciences (NAS) report released in 2001 offers "clarity" to the state of the consensus. The NAS report does state "The changes observed over the last several decades are likely mostly due to human activities…" It also says, "but we cannot rule out that some significant part of these changes is also a reflection of natural variability."

On the same Summary page, the NAS report states, "Because there is considerable uncertainty in current understanding of how the climate system varies naturally and reacts to emissions of greenhouse gases and aerosols, current estimate of the magnitude of future warming should be regarded as tentative and subject to future adjustments(either upward or downward)." The committee report goes on to point out that "reducing the wide range of uncertainty inherent in current model predictions of global climate change will require major advances in understanding."

prophecy…In this new world where almost anything can be true, the socially rewarded art is that of making things seem true." Much of the global warming advocacy is built upon making citizens feel guilty for their use of energy and personal consumption and fear that their behavior will result in a climate catastrophe later this century. The solution is penance through sacrifice and increased government control over the lives of the citizenry.

The Marshall Institute and the Global Warming Debate

In describing the Institute and its positions on global warming, Oreskes-Conway never talked with the Chairman of its Board, its CEO, its current President, Board members, past Executive Directors, nor apparently anyone who could shed first-hand light on the personalities and motivations of Seitz, Jastrow, or Nierenberg. And yet they write as if they are intimately familiar with the institutional and individual motivations. The fact that the Institute raises questions about the so-called consensus is hardly an indictment of distortion because its views accurately reflect both the underlying work of the IPCC and the National Academies of Science. Our major disagreement with those who speak with great certitude about human influence on the climate system is that the Institute is not willing to dismiss uncertainties as being trivial or accept that all is known that needs to be known. These uncertainties are not trivial and their implications

are not well understood. The debate over climate science is not simply a disagreement about aspects of climate and physical science, but over how interpretations of science are being used to drive policy in ways which will make the nation poorer while enriching those who can exploit legislative and regulatory actions to limit greenhouse gas emissions.

But science is not just about science. Scientific results change lives, impact policy choices, and affect relationships between nations — science has consequences. Seitz, Jastrow, and Nierenberg created the Marshall Institute to help explain science and its implications to the public (a role no different than other scientifically-oriented think tanks and associations have established for themselves). The role of such an organization is to engage the public, the media, and policymakers, to provide them with information and to encourage them to ask the important questions.

The Institute has never claimed that humans do not influence the climate system. It does continue pressing the evidence and examining the assumptions in the prevailing theory. For example, the prevailing global warming theory holds that increases in carbon dioxide lead to increases in surface temperatures. That has clearly not been the case over the past century and especially this decade. Further, for that theory to be correct, temperatures and water vapor in the lower atmosphere must increase. They haven't. But, more important, the Marshall Institute has not denied that global warming is real or that human activities contribute to it. Oreskes-Conway attribute positions to the Institute that it does not hold and then uses those allegations to denigrate the reputations of its founders. The Institute has never claimed that no action should be taken to address the climate risk. It has consistently stated that actions should be related to our state of knowledge and adjusted as new knowledge is gained.

One way to distinguish between the approach favored by Oreskes-Conway and that favored by the Marshall Institute is an example made famous by former Secretary of Defense and Energy James Schlesinger. In a chapter of a book on research and development and uncertainty, he distinguished between Cook's Tour Planning and Lewis and Clark Planning. When there is little uncertainty, R&D can be planned the way a long vacation is planned. When there is great uncertainty the approach used by the explorers Lewis and Clark is preferred — act on the knowledge at hand, gain new knowledge and adjust actions accordingly.

Oreskes-Conway advance the notion that adherence to a radical free market ideology and belief that environmentalists were essentially communists in disguise explain the motivations of Seitz, Jastrow, and Nierenberg and the subsequent positions of the Institute. Seitz writes at length in his autobiography about the dangers of extremism in modern society. Careful reading reveals that his concern is not with partisan or ideological extremes, rather it is with those who see scientific and technical developments as harmful to mankind, and he feared their challenge would reverse the gains which advances in both have offered to humanity.

Yes, the past and current leaders of the Institute have deep concerns about the federal government's increasing control of economic activity in the name of environmental protection. Is that reflective of the amorphous concept of free market fundamentalism advanced in the book? Hardly; our long-held position on climate change is simple — government should take action on climate change commensurate with the state of knowledge and have that action be flexible so it can adjust as our understanding of man's impact on the climate changes. That view was plainly articulated in 2001.[5] Do we oppose cap-and-trade or Kyoto Protocol-like policies? Yes. They are expensive and will yield little environmental return. Do we propose actions to take? Yes. Did Oreskes-Conway bother to inquire about them? No.

Conclusion

The techniques employed are not new. Al Gore in the early 1990s tried to get Ted Koppel to use *Nightline* to discredit climate skeptics. At the end of the program, Koppel made a very insightful observation:

> *"The issues of global warming and ozone depletion are undeniably important. The future of mankind may depend on how this generation deals with them. But the issues have to be debated and settled on scientific grounds, not politics. There is nothing new about major institutions seeking to influence science to their own ends. The church did it, ruling families have done it, the communists did it, and so have others, in the name of anti-communism. But it has always been a corrupting influence, and it always will be. The measure of good science is neither the politics of the scientist nor the people with whom the scientist associates. It is the immersion of hypotheses into the acid of truth. That's the hard way to do it, but it's the only way that works."*

Nothing in the work of the Institute's founders or indeed its work has been shown to be contrived or inconsistent with scientific fact. That should be the only standard that is relevant.

Indeed, many have observed the dangers of imagined fears and its effect on society. Robert Samuelson observed: "Good judgment requires good information. Every imagined danger or adverse social trend is not as ghastly as it seems. Consciousness-raising can be truth-lowering. We fall prey to our fears and fantasies. We create synthetic truths from a blend of genuine evidence, popular prejudice and mass anxiety."[6]

Although this observation was written years before the Oreskes-Conway polemic, it describes well their contribution to the public discourse on global warming. Truth is now a victim to the promotion of a political agenda and those who oppose that agenda will be dealt with harshly.

Merchants of Doubt is long on innuendo and short on evidence or compelling logic. It fits well with Mark Twain's classic observation of about the gathering facts and then distorting them as the gatherer desires. If it were not for the attack on the Institute's founders who cannot now defend themselves, the book could be dismissed for the partisan history it is, but they cannot defend themselves and so the work cannot be left unchallenged.

Notes

1. Robert Jastrow, *How to Make Nuclear Weapons Obsolete*, (Boston, MA: Little, Brown, 1983): 14-15.
2. Naomi Oreskes and Erik Conway, *Merchants of Doubt*, (New York: Bloomsbury Press, 2010): 186-187.
3. Robert Jastrow et al, *Global Warming: What Does the Science Tell Us?*, (Washington, DC: Marshall Institute, 1990): 53.
4. Jastrow et al (1990): 60-65.
5. James Schlesinger et al, *Climate Science and Policy: Making the Connection*, (Washington, DC: Marshall Institute, 2001).
6. Robert Samuelson, "The Triumph of the Psycho-Fact," *Newsweek*, (May 9, 1994), ***http://www.newsweek.com/1994/05/08/the-triumph-of-the-psycho-fact.print.html***.