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IS SCIENCE BEING PICKED ON?

a book review of
Fool Me Twice:
Fighting the Assault on Science in America
by Shawn Lawrence Otto

(Rodale, 2011)

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Is science under attack in America? The writer of *Fool Me Twice* says yes. As we draw nearer to the 2012 presidential elections, he sees a political spin being put on the issue. The message: conservatives hate science.

The author of *Fool Me Twice* is an award-winning screenwriter who attended the University of Minnesota at age sixteen and later graduated from Macalester College. His credentials list no formal scientific training, although he and his wife Rebecca (who taught environmental science in the public schools for several years) have developed an environmentally friendly home on their small farm in Minnesota. Otto organized a major science debate during the 2008 presidential elections designed to stimulate discussion of science issues among the candidates. He is also a well-known filmmaker.

The basic theme of Otto's book is that there is an all-out assault on science and scientists by the American public. He develops his argument in five stages. Otto first surveys political debate during the 2008 campaign. He faults everyone involved, both Republicans and Democrats, for their lack of concern over global warming. The mainstream media also take hits for failing to be truly investigative. Otto feels science was ignored, with politically motivated decisions restricting the "morning-after" pill, abortion, and alternatives to abstinence-based sex education.

The second section of the book focuses on the development of science in the United States. Otto traces the study of science from the gentleman-scientists of the 1700s to the establishment of the National Academy of Sciences by Abraham Lincoln in 1863 to the massive federally funded support system for research that exists today. Here Otto does a credible job of painting the history of both private and government support of the sciences. He also describes the shifting support for the sciences on the part of the two major political parties over the course of the late 1800s and into the present twenty-first century.

Although the two topics of evolution and climate change crop up throughout the book, Otto devotes a separate chapter to each. He rightly recognizes one of the major concerns in the evolution debate when he titles this chapter "Teaching Evolution: The Values Debate." The next chapter, "Climate Change: The Money Battle," he couches in economic terms. We will see later that both of these approaches are simplistic and do not realistically explore the complex issues involved.

The remainder of the book becomes a little more disconnected. Otto is trying to develop some solutions to this impasse between rational science and a public that appears to hate and fear science. He even explores briefly the role of churches in this debate. Unfortunately, the churches he seems to feel would be most effective are those that are in decline today in terms of membership, resources, and moral influence.

Otto's arguments fall into five different categories:

1. Scientists are unbiased and antiauthoritarian—they simply deal with the data and do not try to inflict their views on others.
2. Science education and science communication in the United States need significant changes in order to be effective.
3. Questioning the theory of evolution is anti-science.
4. Those who doubt the reality of climate change are all politically motivated and have no scientific basis for their opposition.
5. Failure to fully support the sciences will hinder our progress as a nation.

Otto paints a very idealistic picture of scientists. In his world of scientists, the search for truth is preeminent. Scientists are unbiased, open to new ideas, and (above all) anti-authoritarian. When a new idea comes along, scientists dispassionately evaluate it and then incorporate it into their way of looking at nature.

While the author does point out some instances where science and the church have been at odds (as in the often-misunderstood Galileo controversy), he fails to recognize the long history of conflict and disagreement among scientists as to the truth or validity of a given scientific finding. Every major scientific discipline has its stories of fierce debates between supporters and opponents of some scientific theory.

There is no doubt that science education in the United States is in sad shape. American students rank very low in science knowledge when compared to students from other countries. Part of the problem is with resources—we simply do not have enough qualified teachers for our high schools. Otto also criticizes our higher education system, with too many science faculty being driven by tenure demands to focus on "publish or perish" instead of developing strong science education approaches for all students. He is correct in his assessment of the situation.

Otto reserves an entire chapter for exploring the issue of evolution. He limits the discussion to issues around whether or not humans evolved from other creatures and ignores one issue that he raises early in the chapter: the origin and nature of life and reproduction. Part of the chapter is spent attempting to make the case that Russian-American biologist Theodosius Dobzhansky made in the 1960s: "Nothing in biology

makes sense except in the light of evolution." He looks at various developments in medicine and agriculture, arguing that they are due to our understanding of evolution. The reality is that "evolution" did not shed any great insights into selective breeding for better crop yields or our understanding of drug resistance at the molecular level, although it did allow these ideas to be placed in a specific intellectual framework.

Blame is placed on the Republican Party for this antiscience attitude toward evolution. Otto extensively quotes various Republican political leaders (some of whom admittedly do not know much about science), but fails to ask why most of the questions about evolution come from the news media during debates. Are reporters trying to create controversy? Evolution is not a Republican Party platform issue.

Otto displays a disappointing lack of knowledge regarding the players in the origins debate. He equates intelligent design with creationism, labeling Michael Behe (for example) as a creationist. He appears unaware of the basic arguments offered for Intelligent Design and infers that those who support these ideas are not "doing science." These "nonscience" individuals include many tenured faculty (as Behe is) at well-known universities and one past member of the National Academy of Sciences. By focusing his gaze on the political campaign, he misses a major issue in the public acceptance of science that must be addressed.

The chapter on climate change is an interesting example of argument by ignoring the data. Yes, the question of climate change is complex and loaded with economic and political issues. But there is also a strong undercurrent of distrust running through the debate. Otto tries to minimize some of the key events in the history of this debate.

All along there were claims by those who did not accept the global warming hypothesis that reporting on the topic was selective, that some scientists and their data were being ignored. In 2009, a series of e-mails were released documenting some of the abuses of the University of East Anglia (Great Britain) Climatic Research Unit. These e-mails described an internal discussion that had occurred regarding some of the published data. Otto tries to discount the information, explaining it as a mere internal disagreement that did not have any impact on the final conclusions. However, many of the e-mails told a rather sordid story of scientists being denied publication in key journals because they doubted the reality of global warming. Eventually, a few key research papers began to appear in the scientific literature questioning both the methodologies used to gather global warming data and the reliability of that data. In addition, work done by the Intergovernmental Panel on Climate Change, the international body charged with studying global warming, has been challenged. Some members of that panel have resigned in protest over what the group has reported.

The fundamental problem with Otto's belief that science is under assault is that he has the wrong party being attacked. To get a better handle on the underlying reasons for people being suspicious of science, we have to look at basic philosophical assumptions, not specific scientific accomplishments. We do not see many conservatives (religious or political) rejecting the applications of science. These members of society embrace and employ the goods and services brought to us by scientific advances. The problem lies in the worldview that scientists want others to accept.

The basis of scientific study is called methodological naturalism—the restriction of scientific investigation to natural causes. If I study the properties of an enzyme, I explain my findings in terms of molecules interacting and affecting a chemical reaction. I do not need to invoke a supernatural explanation. For the Christian doing science, this generally does not create a problem and does not eliminate from my mind the understanding that God created all this and set life into motion. For much of science, the believer and nonbeliever can work together harmoniously in exploring the natural world.

However, the prevailing scientific paradigm takes things one step further to philosophical naturalism, the idea that there is nothing beyond the physical—that only natural causes exist. This position is essentially an atheistic view of the world. It is one that several scientists such as Richard Dawkins and Sam Harris are aggressively pushing and it is one that is increasingly being accepted in the world today.

The evolutionary idea that we are created solely by physical and chemical processes has profound implications for the value of human life. Otto wants us to have dialogue between scientists and religious groups, but he gets very upset when the religious groups don't accept the conclusions of science—embryonic stem cell research being a case in point. One can make rational arguments for the use of embryonic stem cells in treatment of diseases if one's worldview sees us only as collections of cells that came about through accidental combinations of chemicals. However, if our view of life is more complex than this, how can we allow scientists to help us develop our ethical system? Otto calls for constructive conversation between the sciences and church leaders, as long as it is science that we listen to. However, Americans are not ready to surrender their religion and ethics and bow down to philosophical materialism in the guise of science.

The book is well documented, with both chapter notes and an extensive bibliography. Many of the quotes are from 2011 speeches or other public talks given by politicians, so the book is very current in its coverage. *—Donald F. Calbreath*

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