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Antiscience Beliefs Jeopardize U.S. Democracy

The United States faced down authoritarian governments on the left and right. Now it may be facing an even greater challenge from within

By Shawn Lawrence Otto | Wednesday, October 17, 2012 | 308 comments

It is hard to know exactly when it became acceptable for U.S. politicians to be antiscience. For some two centuries science was a preeminent force in American politics, and scientific innovation has been the leading driver of U.S. economic growth since World War II. Kids in the 1960s gathered in school cafeterias to watch moon launches and landings on televisions wheeled in on carts. Breakthroughs in the 1970s and 1980s sparked the computer revolution and a new information economy. Advances in biology, based on evolutionary theory, created the biotech industry. New research in genetics is poised to transform the understanding of disease and the practice of medicine, agriculture and other fields.

The Founding Fathers were science enthusiasts. Thomas Jefferson, a lawyer and scientist, built the primary justification for the nation's independence on the thinking of Isaac Newton, Francis Bacon and John Locke—the creators of physics, inductive reasoning and empiricism. He called them his “trinity of three greatest men.” If *anyone* can discover the truth by using reason and science, Jefferson reasoned, then *no one* is naturally closer to the truth than anyone else.

Consequently, those in positions of authority do not have the right to impose their beliefs on other people. The people themselves retain this inalienable right. Based on this foundation of science—of knowledge gained by systematic study and testing instead of by the assertions of ideology—the argument for a new, democratic form of government was self-evident.

Yet despite its history and today's unprecedented riches from science, the U.S. has begun to slip off of its science foundation. Indeed, in this election cycle, some 236 years after Jefferson penned the Declaration of Independence, several major party contenders for political office took positions that can only be described as “antiscience”: against evolution, human-induced climate change, vaccines, stem cell research, and more. A former Republican governor even warned that his own political party was in danger of becoming “the antiscience party.”

Such positions could typically be dismissed as nothing more than election-year posturing except that they reflect an anti-intellectual conformity that is gaining strength in the U.S. at precisely the moment that most of the important opportunities for economic growth, and serious threats to the well-being of the nation, require a better grasp of scientific issues. By turning public opinion away from the antiauthoritarian principles of the nation's founders, the new science denialism is creating an existential crisis like few the country has faced before.

In late 2007 growing concern over this trend led six of us to try to do something about it. Physicist Lawrence M. Krauss, science writer and film director Matthew Chapman (who is Charles Darwin's great-great-grandson), science philosopher Austin Dacey, science writer Chris Mooney, marine biologist Sheril Kirshenbaum and I decided to push for a presidential science debate. We put up a Web site and



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began reaching out to scientists and engineers. Within weeks 38,000 had signed on, including the heads of several large corporations, a few members of Congress from both parties, dozens of Nobel laureates, many of the nation's leading universities and almost every major science organization. Although presidential hopefuls Barack Obama and John McCain both declined a debate on scientific issues, they provided written answers to the 14 questions we asked, which were read by millions of voters.

In 2012 we developed a similar list, called "The Top American Science Questions," that candidates for public office should be answering [see "Science in an Election Year" for a report card by *Scientific American's* editors measuring how President Obama and Governor Mitt Romney did]. The presidential candidates' complete answers, as well as the responses provided by key congressional leaders to a subset of those questions, can be found at www.ScientificAmerican.com/nov2012/science-debate and at www.sciencedebate.org/debate12.

These efforts try to address the problem, but a larger question remains: What has turned so many Americans against science—the very tool that has transformed the quality and quantity of their lives?

A Call to Reason

Today's denial of inconvenient science comes from partisans on both ends of the political spectrum. Science denialism among Democrats tends to be motivated by unsupported suspicions of hidden dangers to health and the environment. Common examples include the belief that cell phones cause brain cancer (high school physics shows why this is impossible) or that vaccines cause autism (science has shown no link whatsoever). Republican science denialism tends to be motivated by antiregulatory fervor and fundamentalist concerns over control of the reproductive cycle. Examples are the conviction that global warming is a hoax (billions of measurements show it is a fact) or that we should "teach the controversy" to schoolchildren over whether life on the planet was shaped by evolution over millions of years or an intelligent designer over thousands of years (scientists agree evolution is real). Of these two forms of science denialism, the Republican version is more dangerous because the party has taken to attacking the validity of science itself as a basis for public policy when science disagrees with its ideology.

It gives me no pleasure to say this. My family founded the Minnesota Republican Party. But much of the Republican Party has adopted an authoritarian approach that demands ideological conformity, even when contradicted by scientific evidence, and ostracizes those who do not conform. It may work well for uniform messaging, but in the end it drives diverse thinkers away—and thinkers are what we need to solve today's complex problems.

This process has left a large, silent body of voters who are fiscally conservative, who believe in science and evidence-based policies, and who are socially tolerant but who have left the party. In addition, Republican attacks on settled scientific issues—such as anthropogenic climate change and evolution—have too often been met with silence or, worse, appeasement by Democrats.

Governor Romney's path to endorsement exemplifies the problem. "I don't speak for the scientific community, of course, but I believe the world is getting warmer," Romney told voters in June 2011 at a town hall meeting after announcing his candidacy. "I can't prove that, but I believe based on what I read that the world is getting warmer, and number two, I believe that humans contribute to that." Four days later radio commentator Rush Limbaugh blasted Romney on his show, saying, "Bye-bye nomination. Bye-bye nomination, another one down. We're in the midst here of discovering that this is all a hoax. The last year has established that the whole premise of man-made global warming is a hoax! And we still have presidential candidates who want to buy into it.

By October 2011 Romney had done an about-face. "My view is that we don't know what's causing climate change on this planet, and the idea of spending trillions and trillions of dollars to try and reduce CO₂ emissions is not the right course for us," he told an audience in Pittsburgh, then advocated for aggressive oil drilling. And on the day after the Republican National Convention, he tacked back toward his June 2011 position when he submitted his answers to ScienceDebate.org.

Romney is not alone in appreciating the political necessity of embracing antiscience views. House Speaker John A. Boehner, who controls the flow of much legislation through Congress, once argued for teaching creationism in science classes and asserted on national television that climate scientists are suggesting that carbon dioxide is a carcinogen. They are not. Representative Michele Bachmann of Minnesota warned in 2011 during a Florida presidential primary debate that "innocent little 12-year-old girls" were being "forced to have a government injection" to prevent infection with human papillomavirus (HPV) and later said the vaccine caused "mental retardation." HPV vaccine prevents the main cause of cervical cancer. Religious conservatives believe this encourages promiscuity. There is no evidence of a link to mental retardation.

In a separate debate, Republican candidate Jon Huntsman was asked about comments he had made that the Republican Party is becoming the antiscience party. "All I'm saying," he replied, "is that for the Republican Party to win, we can't run from science." Republican primary voters apparently disagreed. Huntsman, the lone candidate to actively embrace science, finished last in the polls.

In fact, candidates who began to lag in the GOP presidential primaries would often make antiscience statements and would subsequently rise in the polls. Herman Cain, who is well respected in business circles, told voters that "global warming is poppycock." Newt Gingrich, who supported doubling the budget of the National Institutes of Health and who is also a supporter of ScienceDebate.org, began describing stem cell research as "killing children in order to get research material." Candidates Rick Perry and Ron Paul both called climate change "a hoax." In February, Rick Santorum railed that the left brands Republicans as the antiscience party. "No. No, we're not," he announced. "We're the truth party."

Antiscience reproductive politics surfaced again in August, this time in one of the most contested U.S. Senate races. Todd Akin, who is running in Missouri against Claire McCaskill, said that from what he understood from doctors, pregnancy from rape is extremely rare because "if it's a legitimate rape, the female body has ways to try to shut that whole thing down." Akin sits on the House Committee on Science, Space, and Technology, which is responsible for much of the U.S. federal science enterprise, so he should be aware of what science actually says about key policy issues. In fact, studies suggest that women are perhaps twice as likely to become pregnant from rape, and, in any event, there is no biological mechanism to stop pregnancy in the case of rape. Akin's views are by no means unusual among abortion foes, who often seek to minimize what science says to politically justify a no-exception antiabortion stance, which has since become part of the 2012 national GOP platform.

A look at down-ticket races suggests that things may get worse. The large crop of antiscience state legislators elected in 2010 are likely to bring their views into mainstream politics as they eventually run for Congress. In North Carolina this year the state legislature considered House Bill No. 819, which prohibited using estimates of future sea-level rise made by most scientists when planning to protect low-lying areas. (Increasing sea level is a predicted consequence of global warming.) The proposed law would have permitted planning only for a politically correct rise of eight inches instead of the three to four feet that scientists predict for the area by 2100.

Virginia Republicans took similar action in June, banning the use of the term "sea-level rise" from a government-commissioned study and instead requiring use of the phrase "recurrent flooding" because "sea-level rise" is considered "a left-wing term," according to one of the legislators.

The Evolution of American Science Denialism

The American Antiscience Movement did not travel from the fringe to the center of society overnight. Its roots can be traced back a century to three-time Democratic candidate for president William Jennings Bryan, who ran fundamentalist campaigns against the theory of evolution, which he argued was causing moral decay in the nation's youth by undermining the authority of the Bible.

Bryan lost to proscience Republicans William McKinley and William Howard Taft, but he continued to campaign throughout the South, working to banish the scientific theory from American classrooms. Eventually Tennessee passed a law prohibiting the teaching of "any theory that denies the Story of the Divine Creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals." The coverage of the resulting Scopes "monkey trial" in 1925 turned the American public against religious fundamentalism for a generation, and the persistent campaigns against evolution drove most scientists into the Republican Party.

When World War II broke out, science gained new luster. President Franklin D. Roosevelt turned to science as an intellectual weapon to help win the war. FDR asked Vannevar Bush, who led what is now known as the Carnegie Institution for Science, to marshal the U.S. science enterprise. Bush's efforts succeeded, leading to the development of radar, artificial rubber, the mass production of penicillin and the atomic bomb. After the war, he convinced President Harry S. Truman that continued federal investment in science could make the U.S. into a world leader.

The investment paid off, but the steady flow of federal funding had an unanticipated side effect. Scientists no longer needed to reach out to the public or participate in the civic conversation to raise money for research. They consequently began to withdraw from the national public dialogue to focus more intently on their work and private lives. University tenure systems grew up that provided strong disincentives to public outreach, and scientists came to view civics and political involvement as a professional liability.

As the voice of science fell silent, the voice of religious fundamentalism was resurging. Moral disquietude over the atomic bomb caused many to predict the world would soon end, and a new wave of fundamentalist evangelists emerged. “All across Europe, people know that time is running out,” a charismatic young preacher named Billy Graham said in 1949. “Now that Russia has the atomic bomb, the world is in an armament race driving us to destruction.”

Increasing control over the reproductive process widened the split in the following years. Religious conservatives felt that humans should not interfere in God's plan, denouncing the growing popularity of the birth-control pill in the 1960s and debating in the 1970s whether “test-tube babies,” produced by in vitro fertilization, would have souls. They redefined pregnancy to begin at fertilization, rather than implantation in the uterine wall, and argued that abortion was murder.

Science's black eye grew with the broader public as well. In the 1950s children played in the fog of DDT as trucks sprayed neighborhoods, but with the 1962 publication of Rachel Carson's *Silent Spring*, we learned it was toxic. This pattern repeated over and over again as unforeseen health and environmental consequences of quickly commercialized science came to light. Similar scandals erupted over the effects of scores of industrial applications, ranging from sulfur dioxide and acid rain, to certain aerosols and the hole in the ozone layer, to leaded gas and cognitive impairment, to the granddaddy of them all, fossil fuels and global climate change.

Industrial mishaps led to new health and environmental regulatory science. The growing restrictions drove the older industries in the chemical, petroleum and pharmaceutical fields to protect their business interests by opposing new regulations. Proponents of this view found themselves in a natural alliance with the burgeoning religious fundamentalists who opposed the teaching of evolution. Industrial money and religious foot soldiers soon formed a new basis for the Republican Party: “In this present crisis, government is not the solution to our problem,” President Ronald Reagan argued in his 1981 inaugural address. “Government is the problem.” This antiregulatory-antiscience alliance largely defines the political parties today and helps to explain why, according to a 2009 survey, nine out of 10 scientists who identified with a major political party said they were Democrats.

This marriage of industrial money with fundamentalist values gave fundamentalism renewed power in the public debate, and efforts to oppose the teaching of evolution in public schools have returned in several states. Tennessee, South Dakota and Louisiana have all recently passed legislation that encourages unwarranted criticisms of evolution to be taught in the states' public schools. Evangelical state legislators and school board members mounted similar efforts this year in Oklahoma, Missouri, Kansas, Texas and Alabama, and the Texas Republican Party platform opposes “the teaching of ... critical thinking skills and similar programs that ... have the purpose of challenging the student's fixed beliefs and undermining parental authority.”

An Antiscience Philosophy

If both Democrats and Republicans have worn the antiscience mantle, why not just wait until the pendulum swings again and denialism loses its political potency? The case for action rests on the realization that for the first time since the beginning of the Enlightenment era in the mid-17th century, the very idea of science as a way to establish a common book of knowledge about the world is being broadly called into question by heavily financed public relations campaigns.

Ironically, the intellectual tools currently being used by the political right to such harmful effect originated on the academic left. In the 1960s and 1970s a philosophical movement called postmodernism developed among humanities professors displeased at being deposed by science, which they regarded as right-leaning. Postmodernism adopted ideas from cultural anthropology and relativity theory to argue that truth is relative and subject to the assumptions and prejudices of the observer. Science is just one of many ways of knowing, they argued, neither more nor less valid than others, like those of Aborigines, Native Americans or women. Furthermore, they defined science as the way of knowing among Western white men and a tool of cultural oppression. This argument resonated with many feminists and civil-rights activists and became widely adopted, leading to the “political correctness” justifiably hated by Rush Limbaugh and the “mental masturbation” lampooned by Woody Allen.

Acceptance of this relativistic worldview undermines democracy and leads not to tolerance but to authoritarianism. John Locke, one of Jefferson's “trinity of three greatest men,” showed why almost three centuries ago. Locke watched the arguing factions of Protestantism, each claiming to be the one true religion, and asked: How do we know something to be true? What is the basis of knowledge? In 1689 he defined what knowledge is and how it is grounded in observations of the physical world in *An Essay Concerning Human Understanding*. Any claim that fails this test is “but faith, or opinion, but not knowledge.” It was this idea—that the world is knowable and that objective, empirical knowledge is the most equitable basis for public policy—that stood as Jefferson's foundational argument

for democracy.

By falsely equating knowledge with opinion, postmodernists and antiscience conservatives alike collapse our thinking back to a pre-Enlightenment era, leaving no common basis for public policy. Public discourse is reduced to endless warring opinions, none seen as more valid than another. Policy is determined by the loudest voices, reducing us to a world in which might makes right—the classic definition of authoritarianism.

Postmodernism infiltrated a generation of American education programs, as Allan Bloom first pointed out in *The Closing of the American Mind*. It also infected journalism, where the phrase “there is no such thing as objectivity” is often repeated like a mantra.

Reporters who agree with this statement will not dig to get to the truth and will tend to simply present “both sides” of contentious issues, especially if they cannot judge the validity of scientific evidence. This kind of false balance becomes a problem when one side is based on knowledge and the other is merely an opinion, as often occurs when policy problems intersect with science. If the press corps does not strive to report objective reality, for which scientific evidence is our only reliable guide, the ship of democracy is set adrift from its moorings in the well-informed voter and becomes vulnerable once again to the tyranny that Jefferson feared.


An Existential Crisis

“Facts,” John Adams argued, “are stubborn things; and whatever may be our wishes, our inclinations, or the dictates of our passion, they cannot alter the state of facts and evidence.” When facts become opinions, the collective policymaking process of democracy begins to break down. Gone is the common denominator—knowledge—that can bring opposing sides together. Government becomes reactive, expensive and late at solving problems, and the national dialogue becomes mired in warring opinions.

In an age when science influences every aspect of life—from the most private intimacies of sex and reproduction to the most public collective challenges of climate change and the economy—and in a time when democracy has become the dominant form of government on the planet, it is important that the voters push elected officials and candidates of all parties to explicitly state their views on the major science questions facing the nation. By elevating these issues in the public dialogue, U.S. citizens gain a fighting chance of learning whether those who would lead them have the education, wisdom and courage necessary to govern in a science-driven century and to preserve democracy for the next generation.

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