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# FORUM p. 382

## Teaching Evolution, the Kansas Board of Education, and the Democratization of Science

In the August 1st Republican primaries for the Kansas State Board of Education, three board members were defeated who voted for the 1999 decision to remove most references regarding evolution from state education standards. This makes it likely that the board will in some way overturn or modify the 1999 decision.

When the 1999 decision came out, many inside and outside the scientific community expressed disappointment and frustration. The Kansas decision seemed to confirm the sense of many scientists that general scientific literacy is dangerously low. One positive result from this frustration has been a call for greater involvement by scientists in public education and in education policy-making, [e.g., *Geissman*, 1999; *Kingston and Lanzerotti*, 1999].

With the recent primary results, some may conclude that last year's decision was an anomaly. Others may feel that the electoral process has bought some breathing room for redoubled educational efforts to bear fruit. In this article, I describe an alternative view of the significance of the Kansas decision. It may be new to most members of our Union, but if valid, suggests an important shift in the way we practice our disciplines and interact with the public. This article is meant less as a polemic than as a conversation starter.

### Scientific Populism

The misunderstanding and even distrust sometimes expressed by the public towards science perplexes and confuses many scientists. These scientists see their work as a sincere and intellectually honest attempt to understand the workings of nature, and are puzzled by the widespread skepticism (as measured by public opinion polls) of some of the central findings of modern science. Many have concluded that the problem lies chiefly in an inadequate public education system, and have accordingly stressed proposals to

**Evolution (cont. on page 387)**

## A Name for D"

tal to his great work on the Earth's density distribution.

**Evolution (cont. from page 382)**

improve general science education and media reporting on science.

Certainly, part of the public mistrust of science stems from a lack of understanding of the way science works and of how scientific claims are tested. From a broader historical perspective, however, the increasing reluctance of the general public to trust the judgment of the scientific community may stem not from the failure of education, but from one of the most powerful cultural forces in American history, populism.

Examples of the economic and political forms of populism include the Granger and "free silver" movements of the late 19th century, and the student protest movements of the 1960s.

Populism, however, has not been restricted to economics and politics. The notion that the judgment of everyday men and women is better than that of the cultural and intellectual elites, had a major effect on American religious life (particularly Protestant Christianity), by moving ecclesiastical authority from the elites to the individual [e.g., *Hatch*, 1989; *Noll*, 1994]. The practice and discussion of Biblical interpretation, theology, and church discipline have increasingly shifted from traditional standards handed down through the centuries, to individual decisions.

But how relevant is 18th- and 19th-century religious populism to science at the beginning of the 21st century? In an article titled "The Democratization of Science," ~~Brian~~ Barry Harvey [2000], a theologian at Baylor University, argues that the growing tendency of various public groups to decide for themselves what constitutes "good science" is merely the extension of populism into the realm of science. The same cultural force that democratized American commerce, politics, and religion, the same unbridled skepticism of authority that helped individualize American religious life and undermine traditional authority structures, is now aimed at science. Harvey sees the result of this trend as a society "with every young farmer, tradesman, and professional choosing for himself which beliefs to accord the exalted title of 'science.'"

### Implications for General Science Literacy

Harvey's historical analysis, even if overly pessimistic, has important ramifications for the Enlightenment attacked not only "all claims to knowledge with skepticism," but also the "accepted *means* (emphasis mine) for adjudicating the value of those claims" [*Harvey*, 2000]. If society has abandoned the very standards used to decide whether something is true or false, who is to say what is correct religious practice? Applied to science, who is to say what constitutes correct science?

The situation is compounded by the historical lack of awareness by most scientists of the foundations underlying their work. Thus, argues Harvey "scientists have never really been prepared to justify their disciplines in the face of radical skepticism exercised by ordinary people, particularly in connection with questions that extend beyond matters of technical utility."

One reason why scientific populism has gained influence is the inability of scientists to defend the importance of their work beyond a generic appeal to the "scientific method" or the argument that "it works." Such an appeal might have worked during the 18th and 19th centuries, when Enlightenment rationalism dominated the cultural landscape and the limits inherent in the scientific method could be papered over. This is no longer the case. At a time when the public increasingly questions the authority of science, the inadequacies we scientists have regarding our knowledge of the philosophical underpinnings of our discipline stand out starkly.

Thus, we are left with cases in which society repudiates the privilege of scientists to determine "what is science" by replacing standards and rules of judgment with skepticism, and where scientists have not been able to answer in a convincing manner. As scientists, we can present our graphs, publication lists, and consensus statements, and argue that science says this-or-that, but if society refuses to admit such criteria are compelling proof, where are we left? This situation, I emphasize, is not a result of ignorance. It is not driven by the lack of knowledge, but by the lack of accepted standards with which to adjudicate that knowledge. A key part of improving general science literacy requires that society establish, or re-establish, such standards. This lack, at its heart, is a cultural and philosophical problem.

### Expanding the Dialogue

If the challenge of scientific populism is essentially philosophical, what roles do scientists have in addressing the issue? Obviously, I do not suggest we should abdicate our responsibility to science conducted over the past several decades provides a clearer understanding of the often unconscious "auxiliary assumptions" [*Hempel*, 1966; see also *Oreskes et al.*, 1994] that make up so much of the methodology of science. We may come to better understand the limits of our work, as well as discover ways of being more precise and logical thinkers.

We might also discover ways to more accurately explain the findings of our research to an incredulous public, without the claim of privileged methods that has historically characterized our defense of science. In the end, such a dialogue may build institutions that encourage a healthy skepticism; one that avoids dismissing wisdom from tradition a priori and establishes at least some common standards for adjudicating truth.

The first steps of this dialogue have already started. For instance, the American Association for the Advancement of Science (AAAS) has sponsored an ongoing Dialogue on Science, Ethics, and Religion (http://www.aaas.org/spp/dspp/dbsr/), where theologians and scientists have interacted on difficult questions, clearly disagreeing where necessary. The Center for Theology and the Natural Sciences, with funding from the Templeton Foundation, sponsors a program to develop science and religion courses.

The American Scientific Affiliation, an organization of Christians who are scientists (and of which I am a member), has also been at the forefront of working on a dialogue, through conferences and lecture series.

I hope this article is also a part of this unfolding conversation. If the analysis presented by Harvey and others is correct and the Kansas decision is one particularly dramatic example of the impact of populism, this should affect our response as scientists. The issues at stake are in some significant sense philosophical in nature. To successfully address them, we as scientists, in all humility, must deepen our own understanding of the philosophical assumptions that underlie our research, and discuss them openly with those who have already studied these problems.

Otherwise, even with improved science education, I suspect public mistrust of science will continue to grow, and with it, the larger danger of unbridled populism. Harvey described that process "as a social solvent that gradually strips a community of the habits and practices it needs for the cultivation of civic-minded citizenship." We all have a vested interest in preventing such an evolution of society.

### Acknowledgments

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## NOMINATIONS SOUGHT

title of 'science.'

### Implications for General Science Literacy

Harvey's historical analysis, even if overly pessimistic, has important ramifications for the way scientists interact with the public at large.

First, and most obviously, it implies that the increasing reluctance of Americans to trust the judgment of the scientific community on scientific issues is not, on some basic level, a failure in science education. Although efforts to improve general science education are vital, if the Kansas decision is in some way a symptom of a broader cultural shift, it would be a mistake to assume that adding science requirements to curricula, more favorable media coverage, and more involvement by scientists in education policy will make the public think more "scientifically." Greater involvement by practicing scientists in science education will only go so far.

Instead, the historical and philosophical lessons of religious populism suggest that the challenge to science by populism stems from deep-seated metaphysical reasons. When religious populism undermined established ecclesiastical authority, it did not just shift power from the clergy to the laity. Rather, the "instrumental modes of rationality" that came from

### Expanding the Dialogue

If the challenge of scientific populism is essentially philosophical, what roles do scientists have in addressing the issue? Obviously, I do not suggest we should abdicate our responsibility to interpret the role and nature of science to philosophers and historians. But if increasing our participation in science education is not the end of the story, what else should we do?

Harvey's intriguing suggestion is that scientists might have something to learn about responding to the challenge of scientific populism from those who have been dealing with the challenge of American political and (especially) religious populism for the last century and a half. This suggestion is perhaps a bit surprising to those of us brought up thinking of science and religion as either in conflict, or, at best, irrelevant to each other. Regarding the challenge of populism, however, perhaps "religion, morality, politics, and science share a common fate with respect to questions of authority, and ... attention to one cannot be sustained at the expense of others." [*Harvey*, 2000].

In such a conversation, we scientists might find much to learn from historians, philosophers, and theologians about our own disciplines and the places they should occupy in our society. Research in history and philosophy of

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