

Response

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WHEN I SAW THE TITLE DAVID ALLRED chose for his remarks, I wondered if he would directly address the issues I'd raised in my essay. I'm afraid I don't think he did, and I will outline those that I believe need response. But first let me take up some points of disagreement and some matters of clarification.

My observations about fundamentalism were not aimed at religion only but at authoritarianism in general, whether in religion or politics or in any other social entity. I agree that religion, as it is expressed as principles of morality, is a necessary part of society. But most religious groups are not content with dispensing ethical principles; they seek to exploit the power given to them by their followers. The problem is authoritarian institutions (which may include religions) that use their influence to create divisions and hatreds and to spawn persecution and war. I do not believe that, as David seems to assert, Laplace's comment was interpreted by Napoleon as empowering or justifying his wars of conquest, nor do I believe that the power of religion could or would have checked him. I also do not believe that the fear of meeting God at the judgment bar would have deterred any of the 20th Century dictators David lists.

The related arguments about whether greater numbers of people have been slaughtered in the name of religion or in the name of secular politics miss the point, which I will try to frame in a different way. It is finally immaterial what the labels of the ideology are or to which authoritarian hierarchy blame may be ascribed. Science teaches respect for all organisms and denies the basis for ethnic cleansing or racial superiority. Having said that, I must concede that there remain many very bad reasons—including very bad science—for one group to oppress another. I may be naïve in thinking good science can overcome this circumstance, but it certainly offers more hope than other ideologies. In some ways, science continues to offer insights that can either benefit us or give us grounds for discrimination (genetic abnormalities, mental illness, etc.). Our society must use the information wisely and must try to find humanistic ethical guidance. But I am not persuaded that religions or political movements can or will bring about these improvements without the clarifying analysis of scientific methodology.

David Allred is critical of Weinberg's account of slavery, and the fault is probably mine because I greatly shortened the quotation. Weinberg used Eng-

land in his example, rather than America, because it was much earlier, and the earliest British criticism of slavery rose from rationalism and humanitarianism with Adam Smith, Jeremy Bentham, and Richard Brinsley Sheridan. The Somerset Case, which ended slavery in England, was written without mention of religious arguments at a time when the polemic surrounding the issue in America had not yet reached a fever pitch. In my mind, the foundation of slavery in theological principles would have remained strong in religious communities (as it has in Islam) without the exposure to rationalistic and scientific pressures from outside. Stephen J. Gould's *The Mismeasure of Man* (1981) offers an extended examination of the social attitudes and bad science concocted in support of racial policies.

In the matter of science itself, David questions the reductionist enterprise—is there a Theory of Everything (TOE) or Grand Unification Theory (GUT) and should we be looking for it? He may be right that to achieve this is a futile hope, but huge numbers of scientists have been working toward it for a very long time. He is right that many prematurely say that the TOE is here, and they claim more than the evidence supports. But I don't understand how he concludes that the TOE is somehow more directly related to the question of God's existence than the collected scientific work leading up to it.

With regard to aspects of that scientific work, I was disappointed by David's use of Alma 36:7 as a kind of proof text for Chaos Theory. Of course, proof-texting is typically Mormon—one makes an assertion, even a scientific one, and then supports it with a quotation from scripture—but it is not helpful in illuminating any scientific point. He uses this technique again when he challenges Grand Unification Theory by quoting D&C 93:30, but this too is off the point. Use of such methodology, in fact, illustrates the improper overlap of one area of thought into the other. The concept of "sphere of influence" is well known in science and is a useful tool in understanding the limitations of research conclusions. Rules of nuclear and subatomic behavior can usually be ignored in working on problems in chemistry, but that doesn't invalidate their existence or importance in their proper sphere of influence. Likewise, moving from small to large systems involves the same considerations of new and different effects. Indeed one of the most uncomfortable interfaces in science is the inability to integrate the very small and the very large. Similarly, sociological systems and the rules for analysis change as the subject matter goes from individuals to families, to cities and nations. Adding history to the research scope further expands the number of operative factors. But none of this is new and none of it challenges the reductionist enterprise. It is, in fact, an expression of reductionism. The addition of each factor is a clear reductionist tactic. Keeping the spheres of influence clearly defined is successful reductionism.

Meanwhile, David's chief support for God's existence is his testimony. I do not minimize this as evidence. It is clearly important to him and to many like him, including other religious scientists. But that is the issue. God is widely invoked in this "testimony" mode, but the content of God is different for different

persons. I think a real analysis of the problem (using belief assertions as a founding epistemology) has to account for those differences—different holy texts and traditions and so on. At least in the first pass, all stories and claims have to be given equal weight. This is the issue of moving from personal experience of God to a community of believers and from there to an organized political and social movement based on that religion. If God is out there, He's not managing his followers very well. If, on the other hand, one or more of those gods are creations of the followers, we would expect to see varieties and differences of the results reflecting their origins.

Of course, David feels that I am throwing out the baby with the bathwater. "Human experience is larger than the physical sciences," he argues. But replacing everything religious with laws of physics is not my practice and was never my intention. I remain a moral person. My life is full of culture and joy. Rejection of anti-science, relinquishing a nebulous God from my belief system, and distrust of organized religious bureaucracies don't eliminate any of that; I do, however, ask us all to be cognizant of careless thinking, thinking across "spheres of influence," and I wish to be especially wary of assertions made by people speaking outside their areas of knowledge.

David Allred's connecting Jupiter to Kolob is fanciful physics, though no less interesting for that. My response, however, is that it does not change my scientific or spiritual life to have that connection made. It does not affirm a belief in God nor demonstrate the truth of scripture. For me it only raises much larger, much deeper questions. If God is seated at Kolob, how can he create, rule, or regulate the universe from such a tiny spot? With what we know of the universe, how can one being control it? What does it mean to create a universe full of immense, violent objects like black holes, supernovae, quasars, and gamma bursts? Biological systems, molecules, atoms, even subatomic particles are ripped to shreds in such environments. No thing or being can govern them. If God the creator means only God as a distant observer, having set out the blueprints for the creation and adjusted all the critical parameters, how has he earned the title? A lab technician could read out the values. And if God's role was to "flip the switch," given the age of the universe, why would he hang around to watch the blinking lights? Modern theories of deep space, on the other hand, claim that the events between then and now are orderly processes naturally consequent to the laws and conditions at any given point.

Consideration of deep time leads to the same negative conclusions. If Man was God's objective in Creation, why wasn't creation more efficient? Assembling the necessary components (heavy elements) for life needed three or four cycles of stellar evolution (stars being formed, burning themselves out, and exploding in supernovae) taking perhaps 10 billion years before the universe was even ready to form the earth. The process of moving from atoms to molecules to primitive biological systems to more complex structures is a lengthy one. We cannot overlook the large number of false starts in the evolutionary process. There were huge numbers of failed biological forms, which is understandable if

your model for species is random generation, but is not as easily explained with a purposeful, directed model of evolution making a path to mankind. And that last phrase, "path to mankind" betrays a completely non-scientific impetus of teleology. These considerations, taken with all of the detailed supporting information, simply excise God from the discussion. Of course one could say that God performed every one of the individual steps, the few efficacious ones and also the countless that failed, but what is the point? David claims that my affirmation of moral values in the face of much negative evidence is a statement of faith. I'm afraid I think that the evidence for God's existence offered in his comments is, at base, merely a statement of faith, his affirmation of his place in family, community, and church. I'm familiar with that experience.

The principle issues that to me still invite response and ongoing discussion are these:

1. *The Rise of Anti-science in the Church.* While many point, quite properly, to the persecution of intellectuals or the pressures to create "faithful history," I believe that anti-science needs to be added to that list. Indeed, it may be the easiest to recognize and confront. I had hoped that David, who is a working physicist on the faculty at BYU, would have insights and comments on that bias. I am especially concerned about Creationism and responses to it at the grass-roots and at the higher levels of the church.

2. *The Consequences of Anti-science Attitudes on Scientists in the Church.* The Encyclopedia of Mormonism indicated a strong representation of scientists among church members and, while my story and actions are probably not typical, the conflicting pressures I felt from the church and from science are surely not unique.

3. *Hierarchy vs. Democracy.* There are institutional differences between an authoritarian organization like the church and a democratic (even anarchic) one like science. In the computer world (my other life), the difference and struggle are portrayed as "the Cathedral and the Bazaar," and this metaphor tries to make sense out of the processes of developing complex technology, on the one hand by the directed, orderly authority of a large corporation (the cathedral, such as a Microsoft or IBM) versus the random, voluntary non-authoritarian mechanisms of the Internet community (the bazaar, represented by various open-software groups). While this would seem to be a no-contest competition, in fact the Internet is based on the creations of the bazaar and the incredibly successful core software of the global community was produced there, not in the cathedral. How does the church's increasing centralization of authority in the cathedral effect the bazaar, the grass roots of its membership, and what are the implications for the future? To what extent can or should the model of the organization change?

4. *Bryan Appleyard.* I expected the major criticism of my essay to be the use of Appleyard as the contrasting viewpoint to Weinberg. Is it appropriate to restrict one side of the conflict to religion as it is expressed in anti-science? For the sake of argument, it seemed useful, but in the larger sense, it may be an over-

simplification with other consequences. Appleyard would not, I suspect, represent the views of most Mormon scientists themselves.

5. *Deep Space and Time.* The astrophysics of my student days was interesting but not challenging. The universe was very big, but stars and galaxies floated placidly like Christmas lights on the dome of the sky. The new astrophysics is exploding with new information and theories. The universe has expanded enormously in size and is now populated with violent objects of staggering size and power. These changes seem to me to require a new view, one that is different in kind, not just in scale. While ideas about God could live in the old universe, I'm not sure about this new one. I would like to have other viewpoints on these new discoveries.

Deep time is also new, based on vast new amounts of information about the earth. We knew about the huge stretches of time in our past since Charles Lyell published his new geological theories in the 1830's, but the explosion of new information from geology and geophysics has created a need for a different view of life's origins and development. This new view is full of geochemistry, plate tectonics, paleomicrobiology, genomics, and so on. Evolutionary theory has also undergone considerable enrichment and the older naïve view of "evolution's ladder" has clearly been discredited. Man, as a species, is seen now, not as the crown of creation, but as a plague animal, that is, a species that dominates its environment and allows its population to explode leading to a destruction of the species. The behavior of lemmings is another well-known example. The views of informed scientists would be interesting and beneficial here.

David Allred laments the conclusion I have come to about God, and so do I. I would like to have a loving Father who is in charge of everything. He would relieve us, finally, of all the burdens of humanity and stewardship. The god-centered religious model is a far simpler model than the scientific one and has the advantage of warm reassurance. But I don't see the evidence for it. I could simply choose to believe in an amorphous power informing the universe, but I would know that such belief only functions to put a label on a hope. I understand that temptation. I long stood in its sway, but on the evidence I am finally persuaded—though clearly I have failed to persuade my old friend—that there is life outside his religious community, and that it is intelligent, moral, principled, and satisfying life.