Science: "Forever Tentative"?

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ALTHOUGH THE EXCHANGE IN DIALOGUE (Winter 1989) between Charles Boyd and David Bailey concerning the epistemological status of contemporary science was interesting and informative, in the final analysis it was lacking.

To begin, Boyd himself falls into the trap that he has accused Bailey of stumbling into: assigning *facts* a higher epistemological status than *theories* (p. 143). Here it is actually Boyd who misunderstands the distinction between scientific *facts* and scientific *theories*. Except for the most obvious "facts" (such as "I exist!"), theories as *explanations* allow us to sift through and identify the facts. That is, without theories it is not possible to isolate the relevant "facts" from the maze of data in our conceptual environment. All *interpretive* endeavors, such as anthropology and history, encounter this same situation.

Bailey suggests that "it is high time for the LDS intellectual community to consider the theological and philosophical implications of recent scientific discoveries" (p. 155). This assertion implies that science is fundamentally in the process of making true claims—true, that is, with a capital T. This position is theologically reinforced by such oft-spoken LDS views as "the glory of God is intelligence," "knowledge and intelligence gained in this life will be to one's advantage in the next," and "God's 'science' is only more refined or advanced than ours." These views lead many Latter-day Saints to adopt a "realist" position, a belief that science (among other pursuits) can actually tell us what *reality* is. Here, if push comes to shove and if he is not very careful himself, however, Bailey's training may mitigate against the task he assigns himself. That is, Bailey the scientist will compel Bailey the Latter-day Saint to adopt the view that *science* actually reveals the very

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ground of *reality*. And Boyd's basic claim, that science must always remain "forever tentative," becomes profoundly relevant.

Still, there is a middle position somewhere between the Boyds and the Baileys. Scientific claims, however tentative initially, range from hunches to hypotheses, from empirical laws to theories and to "laws" of nature. While this "ordering" might seem to indicate that these various levels of claims range along a continuum, this is not the case. For example, empirical laws are regularities that appear in (empirically obtained) data, such as Kepler's three laws of planetary motion or Mendel's laws of inheritance. Laws of nature are intellectual constructs describing the way nature ought to operate. The principle of inertia, described by Galileo and Descartes, or the first law of thermodynamics, explained in Mayer's and Helmholtz's conservation of energy law, belong to this category.

In order to assert the truthfulness of any scientific claim, however, one must look to the idea of a theory. Suppose that a particular scientific claim has achieved the status of theory. This means that (1) there is substantial empirical, experimental, and/or mathematical support (evidence) for the theory; (2) there are no serious anomalies remaining that the theory cannot explain; and (3) the scientific community at large has achieved consensus on this theory. It also means that (4) the theory is part of a much larger conceptual structure and fits coherently into that larger frame. Thus, for example, the theory for hominid evolution is part of the much larger theory of evolution. Thomas S. Kuhn calls these larger superstructures "paradigms" (Kuhn 1970); a less ambiguous phrase is Larry Laudan's idea of a "research tradition," which captures the reconstruction of the historical past far better than Kuhn's idea of "paradigm" (Laudan 1977, 1984).

Whether paradigm or research tradition, however, *all* superstructures also make fundamental methodological and ontological assumptions. For example, in the process of totally rejecting creationism, modern evolutionary theory assumes an ontological world that rejects the following: essentialism (the idea that a specie has ontological status), nominalism (that the specie idea has no status), anthropocentrism (that the world, at the *biological* level, is human-oriented), and creationism (that God created all species at the beginning without any possibility of phylogenetic change) (Mayr 1972; Jeffery 1973).

The point is that, by definition, for a theory to have any scientific status it must be subsumed in a research tradition, which is a "set of ontological and methodological do's and don'ts" (Laudan 1977, 80). The purpose of theories in research traditions then becomes to reduce the empirical problems to the ontological and methodological requirements of the research tradition. Consequently, science *never*, in some

ultimate sense, makes truth claims with a capital 'T'—rather, science is a *human* process that allows humans to build *conceptual* models.

There are some sciences, however, that tend to be more factually driven than theoretically based, such as portions of chemistry and some of the biological sciences. While in these sciences empirical relationships tend to dominate, the lack of understanding of the "facts" is freely admitted precisely because these sciences are still without a totally comprehensive theoretical foundation. Still, all the sciences, whether they possess a deep theoretical foundation or not, are engaged fundamentally in solving problems—empirical, conceptual, and methodological.

Although extremely complex, "science" is, above all, a *human* enterprise. The debate over whether scientific claims are, in the final analysis, ultimately Platonic (mathematical essentialism) or Kantian (mathematical modelism) strikes me as moot at best. Ultimately science resides in the human *mind.* To that degree, science is a construct, a description, an abstract conceptual model of—or about—reality. In short, we should never make the mistake of confusing science with reality. Science as science is *Not* reality! Nor, for that matter, is theology or religion reality. All of these *human* enterprises are just that: human. They are ways by which humans *organize* their understanding of reality; by themselves, they are not reality itself. They are what we might call "meta" structures. So, the question becomes, how closely do these meta-structures approximate reality? As far as I can tell, we can only ascertain the ontological status of a scientific or religious idea if that idea comes from God—directly by revelation. Unfortunately, human interpretation of a revelation comes only in *human* terms (language), removing the revelation one more step from the original theophany.

The school of thought called "convergent realism" argues that science is moving progressively closer to the "truth." Maybe so; but, then again, maybe not. The question is: How does one know for *certain,* for absolute certain, that we have arrived at the final, ultimate, honest-to-goodness truth? This view simply begs the initial question: Whereas "realism" drags us toward the truth, "convergence" provides no criteria of assessing the alleged truth claims.

This gets us back to Boyd. With the rise of modern science in the seventeenth century, numerous scientists and religionists attempted to predicate many, if not all, of their theological views on scientific findings or on science understood theologically. This view came to be known as "natural theology" (Paul 1986, 1979). The idea was that God could be perceived through both his written word (the scriptures) and his created works (the world). For example, because nineteenth-

century observers felt they could see order in the cosmos, and because they believed that God does nothing in vain, they then deduced that most stars must be surrounded by planets inhabited with sentient beings. This theory was known as the "plurality of worlds" idea or, in LDS parlance, "worlds without numbers." The fallacy in this thinking, of course, is that the claims of scientific theories are in a constant state of *change*. The metaphor I prefer is that scientific research is like nailing jello to the wall: as soon as your scientific theory is reasonably well confirmed, it begins to slide. History has repeatedly shown us that religionists (and scientists) who engage in natural theology end up throwing out their theology (and religion) because the changing claims of science leave their theology without foundation.

Consequently, although I mildly agree with Bailey that the LDS intellectual community should consider the philosophical (and theological?) implications of contemporary science, we must do so tentatively. To do otherwise would be to fall into the pit that natural theology has dug for itself.

Like most believing religionists, Latter-day Saint scientists are caught in an epistemological dilemma. On the one hand, their scientific training has convinced most of them that empirical and quantitative processes are valid. On the other hand, the Mormon religious tradition provides a powerful matrix of scriptural evidence, extensive personal religious experience, and a living prophet, all of which subsume extra-physical knowledge. In this larger religious context, throughout our history, Latter-day Saints have consistently claimed that traditional epistemological approaches to understanding reality are not fully adequate.

A consistent understanding of the distinction between scientific knowledge and (revealed) religious knowledge by many Mormon thinkers, such as Orson Pratt in the early years of the Church and Henry Eyring in more recent times, should compel Latter-day Saints to divest themselves of the obligations of a natural theology. Mormonism contains no compelling theological reason to engage in any form of natural theology. Properly conceived, science is not, and should never become, an intellectual partner of theology—including Mormon theology. Looking at the same concern from the religious side, genuine faith, an essential component of any theology, can *only* be sustained outside the dimensions of historical and scientific evidence.

To keep that faith, however, Latter-day Saints may need to relinquish their realist view of the world, their belief that a traditional empirical and scientific approach to understanding the universe is sufficient. By rejecting Isis, however, we should not be seduced by Osiris: we cannot assume that *no* scientific claims are valid or that all of science

is an ill-conceived enterprise. To adopt that philosophy is to assent to an irrationalism that allows any number of ad hoc claims because there is no criteria of assessment other than rank prejudice, fear of challenge, or dogmatic authority. Although a middle ground is less philosophically secure, it is nevertheless sustained by the history of science that provides incontrovertible evidence that science must be seen in tentative and approximate terms. In short, at its very core, science is not a body of answers; rather, it is a way of asking questions.

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