



Science in Christian Perspective

The Philosophy Page

Are Truth Claims in Science Socially Constructed?

Kenell J. Touryan

P.O. Box [713](#)

Ken_Touryan@nref.gov

Indian Hills, CO 80454

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In a prize-winning book of essays entitled *Golem: What Everyone Should Know About Science*, sociologists Collins and Pinch claim that the establishment of scientific truth is a cultural process rather than the consequence of the accumulation of facts about the natural world.¹ The postmodern credo is that neither reason nor revelation gives us objective truth. Even truth claims in science are socially constructed by producing agreement among experts. The positive aspect of this approach to science is its refusal to champion the triumphalism of "scientific fundamentalism." Postmodernism, however, becomes pernicious when it leads to the conclusion that objective truth in science is a cultural artifact (to say nothing about the truth claims of Christianity).

In this communication, we first review the postmodern view of cultural constructionism both in its "weak" and "strong" forms. Then we very briefly explore the roots of the postmodern or deconstructionist view of science. Next, we attempt to show why this quarrel with science has some justification when scientists resort to triumphalism, ignoring the human limitations of their endeavors. And yet the evidence that reality exists out there independent of the observer is overwhelming. Science works, and it works miracles through technology. We show that, given the complexity and subtlety of nature, scientists are looking more and more for *multiplicity of strands of evidence*. Many strands are weak and often ambiguous, but when woven together, they make a coherent logical bond whose strength is enormous. Finally, we show that the same argument can also be made for the truth claims of Christianity, which has benefited from the positive aspects of postmodernism, and yet has been subjected to the same vitriolic attacks regarding its objective truth claims.

The Postmodern View of Cultural Constructionism

In their book entitled *Higher Superstition: The Academic Left and its Quarrels with Science*, Gross and Levitt challenge the cultural constructionists head-on, and try to expose their "muddle headedness" when dealing with the nature of the physical sciences, with wit and polemic efficiency.² As duly noted by Gross and Levitt, the cultural constructivist's view is too diverse and internally contentious to merit a coherent exposition. However, they do share one similarity. They all carry a hostile tone toward science. The cultural constructivist list includes: postmodernism, traditional Marxism, radical feminism, multiculturalism (e.g., Afrocentric science), and deep-ecology environmentalism.

What makes dealing with these views difficult and frustrating is that they are not based on sound arguments. Rather, they use rhetorical and polemic approaches, taking the position of moral one-upmanship. For example, if one presents a critique of feminist science, no matter how justified, he or she can be accused of being part of an old-boys network. A position against *eco-apocalyptic* environmentalism can earn one the title of capitalist-industrialist polluter. A critique against postmodernism itself can classify one as an obscurantist.

Of course, there is nothing new here for Christian scholars defending their faith against strong cultural constructivism. What is ironic, is that now the scientists, and mathematicians too, find themselves to be the whipping boys of the academic left.

Cultural constructivism has made its appearance in two generic forms: weak and strong (or soft and hard). We review each briefly.

The Weak Form

As with all human activities, science is and will always be part of human culture. Despite their honest efforts to remain objective, scientists are human beings and subject to emotional and/or irrational excesses when facing opposition to their cherished theories. The statement "science has shown" is often used as a triumphalist *shibboleth* to silence opposition, by saying effectively, "Stop arguing and believe me!" A common trap of scientific fundamentalism is the attitude of many scientists that the hypothesis of intelligent design belongs to the realm of metaphysics, or worse, religion. Yet the same scientists fail to acknowledge the faith content of their ontological naturalist position, especially as it pertains to evolutionary biology from the perspective of philosophical accidentalism.³

In his seminal work, *The Structure of Scientific Revolutions*, Thomas Kuhn exposed the reluctance of the scientific community to accept unorthodox approaches, when dealing with anomalies that cast doubts about the veracity of a commonly held theory.⁴ According to Kuhn, most scientists never question an accepted model or paradigm. They solve problems whose solutions reinforce and extend the scope of the paradigm rather than challenge it. Kuhn called this "mopping up" or "normal science." When anomalies accumulate, they may eventually trigger a revolution that could be a destructive as well as a creative act; and scientists are often reluctant to accept a new paradigm. This attitude

can turn especially nasty when scientists faced with increasingly scarce research and development funds compete for those funds. The conversion of scientists is thus both a subjective and a political process. They often adopt a paradigm simply because it is backed by others with strong reputations or by a majority of the community.⁵

A classic example of this is the manner in which Wegener was ostracized and ridiculed for his theory of tectonic plates in 1915.⁶ Wegener supported his work with extensive geological research, but died in 1930, an intellectual outcast. Now, almost seventy years after his death, his idea is accepted as common wisdom. In scientific debate and in the process by which a preference of one paradigm emerges over another, *attitudes* come into play that are in some measure dictated by social, political, and ideological preconceptions, or even by sheer professional jealousy and personal whim.

Another example deals with the law of red shift that is now well established among astronomers and astrophysicists. It is instructive to note a deplorable situation, where a maverick astronomer, Alton Arp of Max Planck Institute in Garching, Germany, has been ostracized by a powerful scientific community that disagrees with his unorthodox ideas regarding stellar red shifts.⁷ Arp has lost access to big telescopes and cannot find funds to support his work.

In his book, *Against Method*, Paul Feyerabend agreed with Kuhn on many of his points but went further by arguing that there is no logic to science, and that scientists create and adhere to scientific theories for what are ultimately subjective, or even irrational, reasons.⁸ Kuhn, in a later discussion with Horgan, chose the word *arational* to describe the above phenomena.⁹

Finally, John Wheeler was one of the first prominent physicists to propose that reality might not be wholly physical, and in some sense, our cosmos might be a participatory phenomenon, requiring the act of observation, and thus consciousness itself. In 1960, he helped popularize the *anthropic principle*.¹⁰

On the other side of the ledger, Collins and Pinch conducted case studies on seven complex and highly controversial episodes in science. These included scientific investigations in chemical transfer of memory, the Michelson Morley experiment that confirmed the theory of relativity, the story of cold fusion, Louis Pasteur and the origins of life, non- detection of gravitational radiation, the sex life of whiptail lizards, and the case for missing solar neutrinos. They concluded that a number of these investigations end up with a *consensus* by scientists that is not always based on empirical data and tested theory. Unlike most sociologists and cultural anthropologists, who make pronouncements against scientific research showing an appalling lack of understanding, Collins and Pinch have made a genuine effort to understand the subtleties of scientific research. Some of their conclusions, that science is often a poorly understood concept and that many scientists continue holding on to their "pet" theories even after being confronted with good practice and good sense from researchers with maverick ideas, are quite to the point.

Where they err, however, is when they and other social constructivists do not take into account the fact that knowledge, as a human endeavor, though never certain, can be overwhelmingly probable. In each case they discuss, Collins and Pinch follow a single strand of evidence, where, as pointed out by Mermin, there exists a multiplicity of strands of evidence that can make a coherent, logical bond that is very strong.¹¹ (More on this below.) We now turn briefly to the more pernicious trend called the strong form of cultural constructivism.

The Strong Form

In its strong (or hard) form, Gross and Levitt describe the epistemological position for cultural (or social) constructivism as follows:

Science is a highly elaborated set of conventions brought forth by one particular culture (our own) in the circumstances of one particular historical period; thus it is not, as the standard view would have it, a body of knowledge and testable conjecture concerning the *real* world. It is a discourse, devised by and for one specialized *interpretive community*, under terms created by the complex met of social circumstance, political opinion, economic incentive and ideological climate that constitutes the ineluctable human environment of the scientist. Thus, orthodox science is but one discursive community among the many that now exist and that have existed historically. Consequently its truth claims are irreducibly self-referential, in that they can be upheld only by appeal to the standards that define the *scientific community* and distinguish it from other social formations.¹²

It must follow, then, that science deludes itself when it asserts a particular privileged position in respect to its ability to *know* reality. Science is *practice* rather than knowledge, and practice involves convention and arbitrariness. The practices that most particularly embody the sacred "objectivity of science - experiment and observation- are inescapably textual practices, meaningless outside the community that endows them with meaning."¹³ In its extreme form, it is held that a series of words, whether in writing or in our minds, have at best a shadowy and unstable relationship to reality itself. In fact, even reality is a mere construct of the mind, a remnant of the Western metaphysical tradition. The logical outcome of such an approach is that verification is a discursive, linguistic event and therefore reliable knowledge cannot be distinguished from superstition!

This type of reasoning begins to look suspiciously like Eastern monistic thinking. In fact, it was Suzuki, the 60s champion of Zen Buddhism, who said: "I do not know whether I am a human being, dreaming that I am a butterfly, or a butterfly dreaming that I am a human being."¹⁴ Such imagery expresses in extreme form what Buddha taught regarding ultimate reality, i.e., ultimate reality transcends what can be expressed in words. In fact, the universal mind is alone real, and thus it behooves us to leave behind analytic reason and realize the universal mind through a flash of sudden awakening.

It seems that dissatisfaction with the purely rational- often at the expense of a dynamic faith in spiritual realities beyond the mere observable and empirical - has led many intellectuals to opt for Eastern mysticism, almost as a philosophical revenge against positivism. The latter, expressed by the likes of Ayer in *Language, Truth and Logic*, was widely supported by many physical and biological scientists in the '20s and '30s, and was devastatingly hurtful to traditional humanists, social theorists, and theologians.¹⁵

Positivism imposed severe tests of meaningfulness on all sorts of propositions. For example, empirical statements about emission or absorption spectra were perfectly meaningful, but statements regarding ethically or aesthetically inferior or superior assertions were considered meaningless.

Thus, according to J. D. Grove, the views of postmodernists became a reaction against positivism, and many humanists and social scientists embraced postmodernism as instruments of *revenge* against scientism or *physics envy* created by the positivists.¹⁶ They also interpreted Kuhn's analysis of the structure of scientific revolution in an eclectic manner, choosing the subjective component of science over and against its objective aspects.

In one sense, the Christian scholar applauds the demise of positivism that produced the *demon of rationalism*, banishing anything supernatural, such as revealed truth, angels, heaven, hell, and biblical accounts of miracles, into the domain of mythology and superstition. On the other hand, the "muddleheadedness" of the academic left in rejecting objective truth in science is a warning to us that Christianity itself is under the same attack for insisting on the existence of absolute truth. Here are two revealing examples quoted by Gross and Levitt of how cultural constructivists think.

1. The Biology and Gender Study Group identifies the image associated with the rush of the sperm in search of the ovum in the uterus as "gang rape." Or, the ovum is a passive victim, a whore, fulfilled as a proper lady only when the fertilizing sperm survives as a hero while others perish, and reaches the egg as a successful suitor!¹⁷

2. Sociological theorist Stanley Aronowitz in his book, *Science as Power*, argues that since physics has discovered the uncertainty principle, it can no longer provide reliable information about the physical world. It has lost its claim to objectivity and is now embedded in the unstable interpretations of subject-object relationships, without ever mentioning the predictive success of quantum mechanics, which can really tell us so much about the physical universe.¹⁸

It is tempting to dismiss such extreme positions as bizarre, not worthy of serious consideration. Most science critics who hold the strong cultural constructivist position, however, have high positions in such notable universities as Princeton, Berkeley, Brown, MIT, just to name a few, and thus can have great influence on the new student generation. In addition, as Christians, we face opposition from both the positivist empiricist, who champions objectivity and the hard sciences, and the postmodernist, who dismisses reality and absolute truth. The tangible, physical universe is as real to the Christian, as is the invisible, intangible, spiritual world. If the Eastern monist absorbs the material world into the spiritual, the atheist absorbs the spiritual world into the material, and Christians place a *proper balance* between the two. In fact, one (the spiritual) is the very source of the other (the physical), according to Heb. 11:3 and thus, both realities represent a legitimate, knowable domain for the Christian, irrespective of whether he or she is there to observe and know it. The very fact of the Incarnation of God taking on a physical nature and *dwelling among us* demonstrates *the importance of the physical*

universe in God's eternal plan for humankind. Therefore, we can be hardly indifferent to the untruth propagated by an elite group of academicians and intellectuals that denies the objective basis of both reason and special revelation.

Where Then Do We Go From Here?

First, as with the cultural constructivist, we reject the triumphalist attitude of many scientists, who claim that the only way to know reality is through the instruments and methodology of a narrowly defined science, i.e., *matter is the only thing that matters*. We also reject the postmodernist's credo that neither reason nor revelation gives us objective truth.

Next, we present supporting evidence in defense of the truth claims of science and technology on the one hand, and those of Christianity on the other. To this end, we use the *multiplicity of strands of evidence* approach that considers the weaving together of a number of strands of evidences, each necessary for the defense of the case but not sufficient if taken by itself, alone. Let us cite two examples: (a) the big bang theory and (b) the relationship between mathematics and the physical sciences.

The Big Bang Theory: An Example

A classic example of this type of evidence is the big bang theory. One of the solutions of Einstein's equations of general relativity led to the result that the universe is expanding while decelerating. The only physical phenomenon in which expansion and deceleration occur at the same time is in an explosion, and hence the big bang theory.

The first *strand* or *thread* of evidence that gave credence to the big bang theory was Hubble's announcement in 1929 of his law of red shifts, based on his observation of distant galaxies: the more distant a galaxy, the greater, in direct proportion, is its velocity of recession. This observation perfectly fits the simplest model of an expanding universe. The second *strand* was the contention of Eddington and other theoreticians that the second law of thermodynamics demanded the *winding down* of the universe, from order to greater disorder, as its entropy increased. A third *strand* of evidence was the 2.7260K background radiation measurement by Penzias and Wilson of Bell Laboratories in 1965. This background radiation exactly fits the black body radiation expected from a primordial cosmic explosion in complete thermodynamic equilibrium. Other *strands* include the ambient helium abundance observed for the universe, the trace amounts of deuterium, and the apparent limit on the size of the red shift observed as one moves toward the edges of the known universe. The latter implies the paucity of stars and galaxies at the extreme cosmological distances. Individually, each of these *strands* or *threads* is necessary but not sufficient by itself, to support the big bang hypothesis. When *woven* together, however, they make a rope of enormous strength.

Another approach in defense of the reality of the physical world and its interplay with the human mind is the *coincidence* that keeps recurring in human history between the physical sciences and mathematics.

Reality of Nature and Unreality of Mathematics: Second Example

It is true that scholars must distinguish between the world of natural phenomena on the one hand, and mathematical and computational models of the world on the other. And yet mathematical systems formulated by the human mind for sheer intellectual pleasure have later proved remarkably applicable to an accurate description of nature. According to Penrose, there exists a deep mathematical underpinning to physical reality.¹⁹ Two classic examples will suffice to illustrate the profound mathematical substructure that is already hidden in the very workings of nature.

In 400 B.C., Apollonius of Perga developed the trigonometry of conic sections, such as the ellipse, the parabola, and the hyperbola. Twenty centuries later, in 1640 A.D., Kepler applied the conic sections to his observation of the orbits of the planets with remarkable accuracy. Einstein, in 1912, in his efforts to explain the law that describes how matter forces spacetime to curve, was led to the *absolute differential calculus*, the *tensor analysis*, or, in the language of today, the differential geometry of Riemann (1860), Ricci (1880) and Levi-Civita (1890). These mathematical formulations fit the physical phenomena of spacetime warpage with extraordinary accuracy. It was Eugene P. Wigner who expressed his amazement at such coincidences with the following memorable words: "the miracle of the appropriateness of the language of mathematics for the formulation of the laws of nature is a wonderful gift which we neither understand nor deserve."²⁰

In view of such remarkable confluences that have occurred repeatedly in describing physical phenomena, i.e., the linking (with precision) of concepts developed in a mathematician's mind for pure intellectual pleasure with observable phenomena in nature, the academic left does disservice to the objective nature of the physical sciences when it attributes them to mere discourse or cultural constructs.

The Multiplicity of Strands Applied to Christian Truth Claims

As a final observation, I believe the Christian faith can be defended on the same basis as the *multiplicity of strands* approach discussed above. Reason is an integral part of the Christian worldview. The Great Commandment expects us to love God with our mind, as well as our heart, soul, and strength. God challenges us to reason with him (Isa. 1:18); Jesus rebukes the religious leaders for *discerning the skies* but being oblivious to God's presence in their midst (Matt. 16:1-4).

Conflict between reason and faith is as ancient as humankind. Yet, science and faith were not always in conflict when the foundations of modern physics were laid in the eighteenth and nineteenth centuries. Also, the good news of Christianity is inextricably bound with history and, therefore, open to historical verification. One can identify five strands of evidence to establish the reasonableness of the Christian faith: (1) evidences from the physical universe; (2) evidences from human nature; (3) evidences from history and archeology; (4) evidences from Scriptures; and (5) evidences from personal experience. Each evidence is necessary but not sufficient to reconcile the *scientific worldview* with the Judeo-Christian tradition. Each set of evidence represents a strand of rope that has

insufficient strength to support the affirmative response to the above query, but when *woven together*, the five evidences present a convincing argument of the unity of faith and reason.

The multiple evidences that support the Resurrection event are another example. Ten such strands of evidences can be identified, starting with the known fact of the empty tomb, the number of eye witnesses to the resurrection event, the ethical lives of the disciples who proclaimed the resurrection, the speed at which the message spread through word of mouth alone, etc.

Concluding Remarks

No serious thinker about science, most of all a Christian in science, doubts that personal and social factors influence problem choices and the acceptance of results by the scientific community. And what is more, Christians are painfully aware of the unspoken premises upon which the rejection of intelligent design by most scientists is based, viz., ontological naturalism. However, few serious thinkers about science would deny the fact that empirically verified results in science are indeed *written in nature* and have enabled humankind to benefit from its tangible, practical, verifiable results through its progeny, technological breakthroughs.

As Christian intellectuals, we have the double duty of defending our faith against both extremes: rationalism on the one hand and postmodernist relativism on the other. Our strategy should be to take the positive aspects of each position and develop a Christian constructivist approach, one that supports the importance of objective truth in the realm of the physical world and confirms the existence of objective truth in the spiritual realm.

Christian constructivism should acknowledge that scientific knowledge is important and valuable, but is not the only reliable means of knowing truth. In fact, to avoid scientism, and thus eviscerate one of the key arguments of the academic left, all we need to do is to remember to keep the following points in perspective:

(1) Science continually raises philosophical questions that go beyond the competence or purview of science; (2) evidence of random chemical processes is not necessarily evidence for philosophical accidentalism; (3) in science, an unanswered question is far more important than an unquestioned answer; (4) in science, tentative conclusions should be stated in tentative form; and (5) the confidence expressed in any scientific conclusion should be directly proportional to the quantity and quality of evidence for that conclusion.²¹

Notes

¹Harry Collins and Trevor Pinch, *The Golem: What Everyone Should Know About Science* (Fort Chester, NY: Cambridge University Press, 1993).

²Paul R. Gross and Norman Levitt, *Higher Superstition: The Academic Left and Its Quarrels with Science* (Baltimore: John Hopkins University Press, 1994), 45-7, 82, 120.

³For example, Lynn Margolis, Distinguished University Professor of Biology at the University of Massachusetts, was quoted in *Science* 252 (1991): 378-81, as saying that history will ultimately judge "neo-Darwinism as a minor 20th century religious sect within the sprawling religious persuasion of Anglo-Saxon biology (law of accrual of mutations)."

⁴Thomas Kuhn, *The Structure of Scientific Revolutions*, 2d ed., enlarged (Chicago: University of Chicago, 1970).

⁵John Horgan, *The End of Science* (Reading, MA: Addison-Wesley Publishing Co. Inc., 1996), 43.

⁶"Science Beyond the Pale," *Science* 249 (6 July 1990): 14-6.

⁷Alton Arp, *Quasars, Redshifts and Controversies* (Berkeley, CA: Interstellar Media, 1987), 165-71; also *Science* 249 (6 July 1990): 14.

⁸Paul Feyerabend, *Against Method* (London: Verso, 1975 (reprinted in 1993)). See also, "Atoms and Consciensness," *Common Knowledge* 1, no. 1 (1992): 28-32.

⁹Horgan, *The End of Science*, 43.

¹⁰Wheller's essays have been collected in *At Home in the Universe* (Woodbury, NY: American Institute of Physics Press, 1994).

¹¹David Mermin, "What's Wrong with this Sustaining Myth?" *Physics Today* (March 1996): 11-13, also "Golemization of Relativity," *Physics Today* (April 1996): 11-3.

¹²Gross and Levitt, *Higher Superstition*, 45.

¹³Ibid.

¹⁴Os Guinness, "The East, No Exit," in *The Dust of Death* (Downers Grove, IL: InterVarsity Press, 1973).

¹⁵A.J. Ayer, *Language, Truth, and Logic*, 2d ed. (New York: Dover Publications, 1946).

¹⁶J.W. Grove, "The Intellectual Revolt Against Science," *Skeptical Inquirer* 13, no. 1 (1988): 70-5.

¹⁷Gross and Levitt, *Higher Superstition*, 52.

¹⁸Ibid., 120.

¹⁹Roger Penrose, *Shadows of the Mind* (New York: Oxford University Press, 1994), 413-6.

²⁰From a private communication with Eugene P. Wigner, Nobel Laureate.

²¹Quoted from *Teaching Science in a Climate of Controversy* (Ipswich, MA: American Scientific Affiliation, 1993), 28 33, 37, and 42.
