

Savior of Science Again

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In Raffaello Sanzio's famous painting "School of Athens," Plato is seen pointing his finger toward the heaven while Aristotle is gesturing his hand toward the earth. The image portrays the polarity between two major worldviews that have divided the issue on faith and reason. Platonists speak of abstract universals that are logically prior to contingent things. For example, the notion of redness exists whether any red things exist or not. Platonism is compatible with a transcendent God and Creator. In Timaeus, Plato included a long creation myth of a Craftsman who created the cosmos and all living things by an external creative design. Platonists believe that faith and reason are compatible.¹ Aristotelians on the other hand focus on the particulars. Aristotle believed that the cosmos is eternal. Life reproduces after its own kind by immanent action of internal cause according to its eternal soul-as-form (εἶδος). There are some debates on whether Aristotelianism can be extended to evolution because Aristotle had attributed potential consciousness to matter.² The Aristotelian universe is a closed system and is therefore the precursor of naturalism. C. S. Lewis noted that naturalism being a closed system denies the existence of the supernatural.³

In his book Savior of Science, Catholic philosopher Stanley Jaki claims that Christianity breathed life into science in the high Middle Ages by bringing objectivity into focus through a belief in the incarnated Christ, restoring the sense of purpose destroyed by theories of evolution and securing ethical guidelines against abuses of the scientific knowledge.⁴ Science writer Philip Ball concurs that it was the Medieval Period rather than the Renaissance that marked the stillbirth of science as Europe emerged from mysticism to Platonic rationality.⁵ Ball writing from a secular perspective attributes the birth of science to the transition from Platonism to Aristotelianism. Both Jaki and Ball agree that the successful operation of science depends on an intellectual framework based on the law-like regularity of Nature. Christianity is different from pagan religions in that the Creator God is not capricious and that the created world is not ruled by the whimsical wishes of divine beings. The incarnation of Christ objectifies the existence of one true God. With the focus shifted away from mythological beings, all bodies, heavenly or terrestrial, are on the same footing.⁶ A rational framework consisting of a material world set in motion and perpetuated by law-like forces paved the way for scientific thinking. Jaki is an Augustinian whose

¹ An example is the Cambridge Platonists associated with the University of Cambridge in the seventeenth century. See <http://plato.stanford.edu/entries/cambridge-platonists/>.

² A. W. Benn, "Aristotle and the Philosophy of Evolution," *Mind* 20, no. 78 (April 1911), 243-247.

³ C. S. Lewis, Miracles: A Preliminary Study (London: Collins, 1947), 12-13.

⁴ Stanley L. Jaki, Savior of Science (Washington, D.C.: Regnery Gateway, 1988).

⁵ Philip Ball, *Nature*, 452 (17 April 2008), 816-818.

⁶ Stanley L. Jaki, Christ and Science (Royal Oak, MI: Real View Books, 2000), 23.

worldview is thoroughly Platonic. Historically the Catholic Church was divided between Platonism and Aristotelianism. Pope John XXI condemned Aristotelian writings in 1277 shortly after Thomas Aquinas had synthesized the science and thinking of Aristotle into his theology. Today Aristotelian empiricism is lauded as the *sine qua non* of modern science. The struggle between science and religion (and more recently between evolution and intelligent design) traces its root back to Plato and Aristotle.

Religion has been barred from the scientific community to a large extent since the Modern Period. A recent survey by Scientific American shows that 93% of the members of the National Academies of Science are atheists. According to the atheist biologist Richard Dawkins, among the 23% of the Fellows of Royal Society who responded to a survey, 78.8% said that they are strongly atheists while 3.3% are strongly theists.⁷ Atheism expresses itself in the philosophical frameworks of Aristotelian empiricism and evolution. According to Jaki's historical analysis, both Aristotelianism and the theory of evolution are detrimental to science. Given a century's domination by atheists in the scientific community, it is the time to test Jaki's hypothesis.

Science concerns itself with the understanding of Nature while technology uses this understanding to build new tools. Technology has changed our life in a way that is beyond dispute. Technological marvels such the atomic bomb and space travel give us the impression that science is capable of infinite growth. On the other hand, the nuclear accidents in Three Mile Island in 1979 and Chernobyl in 1986, the explosion of space shuttle Challenger also in 1986 and the breakup of Columbia over the Texas sky in 2003 have shaken the faith of the public. News of scientific misconduct has also clouded the trustworthiness of the scientists. On December 29, 2005, the Seoul National University investigative team announced that there was no evidence that Woo Suk Hwang and his team had produced any of the patient-specific stem cells that they published in June 2005.⁸ More recently, Tae Kook Kim of the Korea Advanced Institute of Science and Technology is retracting two papers on a new method for imaging living cells using magnetized nanoparticles and is being suspended over charges of scientific misconduct.⁹ Self-appointed science cop Fang Shi-min has revealed cases of scientific misconduct committed by 500 individuals in China.¹⁰ In the United States, a case of possible scientific misconduct involving bubble-fusion research is being litigated.¹¹ A postdoc Kristin Roovers at Ottawa Health Research Institution is suspended for falsifying data over a period of more than 5 years.¹² According to a survey of health-related research in US, 192 among 2212 scientists surveyed (8.7%) reported cases of scientific misconducts in their

⁷ Richard Dawkins, *The God Delusion* (London: Bantam, 2006), 100-103.

⁸ Sei Chong and Dennis Normile, *Science*, 311, no. 5757 (6 January 2006), 22-25.

⁹ Dennis Normile and Jennifer Couzin, *ScienceNOW Daily News* (5 March 2008); "News in Brief", *Nature*, 452 (20 March 2008), 267.

¹⁰ Jia Hepeng and Hao Xin, *Science*, 314, no. 5804 (1 December 2006), 1366-1367.

¹¹ *Nature* 452 (24 April 2008), 925.

¹² *Nature* 452 (19 June 2008), 969.

own departments either by direct observation or with direct evidence. Among these 192 cases of suspected foul play, 164 (7.4%) pass the threshold of the federal definition for scientific misconduct.¹³ In my field of high energy physics, experiments are very expensive so that many questions are often asked. In 1969, Senator John Pastore demanded to know how a multimillion-dollar particle accelerator improved national security. Robert Wilson the director of Fermilab at the time replied,

“Nothing at all. It has only to do with the respect with which we regard one another, the dignity of men, our love of culture. It has to do with: Are we good painters, good sculptors, great poets? I mean all the things we really venerate in our country and are patriotic about. It has nothing to do directly with defending our country except to make it worth defending.”

Wilson gave a brilliant answer that is still reminisced by physicists today. Unfortunately his legacy may have outlived its usefulness. Already in 1993, Congress cancelled the Superconducting Super Collider (SSC) after its price tag had ballooned to \$12 billions. In December 2007, Congress made a historical move to cut the science budget 3 months into the fiscal year. As an aftermath, Stanford Linear Accelerator is scheduled to shut down in September 2008 ahead of its time. Fermi National Lab barely escapes a close call for its own shutdown.¹⁴ The latest report says that there will not be another collider physics project in US and is therefore an end of an era.¹⁵ Physics and astronomy in UK also face a 28% funding cut this year. If politicians represent the voice of the people, then the people either do not want or do not believe in the infinite progress of science. Recently an editorial in Nature says, “Advances made in particle physics can seem increasingly far removed from ideas that resonate in the common imagination.”¹⁶ The people of the United States are 82% Christian according to 2002 survey. The recent debacle of the evolution-versus-intelligent-design debate is forcing the public to choose. Although some scientists portray the public as science-illiterate ignoramuses, the people choose what they believe. On the conceptual level, string theory has monopolized particle physics for almost a decade. At one point, Nobel laureate David Gross claimed that string theory was “the only thing in town” as far as an ultimate theory of the universe is concerned. On the other hand, Nobel laureates Richard Feynman, Sheldon Glashow, Philip Anderson and Robert Laughlin as well as theoretical physicists Lee Smolin and Bert Schroer have publicly expressed their objection of what they perceive as a wrong headed research.¹⁷ Philip Anderson summarizes the main criticisms in these words:

“Is string theory a futile exercise as physics, as I believe it to be? It is an interesting mathematical specialty and has produced and will

¹³ Sandra L. Titus, James A. Wells and Lawrence J. Rhoades, “Repairing Research Integrity”, Nature 453 (19 June 2008), 980-982.

¹⁴ Adrian Cho, Science 320 (30 May 2008), 1148-1151.

¹⁵ Eric Hand, Nature 453 (5 June 2008), 705.

¹⁶ Nature 448, no. 7151 (19 July 2007), 225.

¹⁷ Bert Schroer, arxiv:0805.1911 (13 May 2008).

produce mathematics useful in other contexts, but it seems no more vital as mathematics than other areas of very abstract or specialized math, and doesn't on that basis justify the incredible amount of effort expended on it.

My belief is based on the fact that string theory is the first science in hundreds of years to be pursued in pre-Baconian fashion, without any adequate experimental guidance. It proposes that Nature is the way we would like it to be rather than the way we see it to be; and it is improbable that Nature thinks the same way we do.

The sad thing is that, as several young would-be theorists have explained to me, it is so highly developed that it is a full-time job to keep up with it. That means that other avenues are not being explored by the bright, imaginative young people, and that alternative career paths are blocked.¹⁸

In 2005, David Gross publicly admitted in the Solvay conference that string theory was in utter confusion and said, "We don't know what we are talking about."¹⁹ The drive toward very high energy in experiment and theory is rooted in a belief that all forces of nature will be unified into one ultimate force at the Planck scale (10^{19} GeV). In the standard model, electricity and magnetism are already unified into electromagnetism in Maxwell's equations which are in turn unified with the weak force by the Glashow-Weinberg-Salam Model. Traditionally the gravitational force has defied the best effort to be unified with quantum field theory until string theory comes along. However the objection is that unification all by itself is not enough to qualify string theory as a Theory of Everything (TOE) unless tangible predictions can be made. After having consumed a substantial amount of resources in both theoretical and experimental research, the best effort to build a science without God has turned out nothing.

Progress in science is made when the right people are working on the right problems. In his critique of the string theory culture, Bert Schroer refers to a recent sociological phenomenon in the physics community called "globalization."²⁰ He sees that the science industry is controlled by a small number of people and those who separate from the pack risk the prospect of ending their careers. Given the pyramidal structure of the science industry, it is not unusual to see careerist opportunists propelling their personal trajectories by playing the game. Frank Tipler quoted Philip Anderson in saying,

"In the early part of postwar [post-WWII] period [a scientist's] career was science-driven, motivated mostly by absorption with the great enterprise of discovery, and by genuine curiosity as to how nature operates. By the last decade of the century far too many, especially of the young people, were seeing science as a competitive interpersonal game, in which the winner was not the one who was objectively right as [to] the nature of scientific reality, but the one who was successful at

¹⁸ http://www.edge.org/q2005/q05_10.html.

¹⁹ NewScientist (10 December 2005).

²⁰ Bert Schroer, *ibid.*

getting grants, publishing in *Physical Review Letters*, and being noticed in the news pages of *Nature*, *Science*, or *Physics Today*. ... [A] general deterioration in quality, which came primarily from excessive specialization and careerist sociology, meant quite literally that more was worse.”²¹

C. S. Lewis noticed that nature is enormously wasteful.²² The working of Nature has worked its way into the social fabric of science by promoting narcissism and pretentiousness. Those who are successful in climbing the ladder of the science business do not always deserve to be there. Lewis alluded to the wastefulness of the science business by saying,

“[The selective or undemocratic quality in Nature] permits, on the one hand, ruthless competition, arrogance, and envy: it permits on the other, modesty and (one of our greatest pleasures) admiration.”²³

In his mind, competition does not always bring out the best. When it does, goodness is still worthwhile no matter how it gets there. Sometimes it takes the eyes of a newcomer to see the problem in the right way. A first year graduate student in neuroscience at the University of Oxford wrote,

“During my medical studies I loved reading anecdotes about the life and work of eminent scientists. How they came across their famous discoveries in the cloistered atmosphere of distinguished universities. How intimate scientific circles seemed to pose an enigmatic problem, contemplate it—sometimes for years—and then solve it elegantly. How these idols wove science, life and companionship together. Today I’m disillusioned about the conditions under which research is carried out. Science seems to be developing into a business, interested in a quick and focused ‘return on investment’. Within the short time of their contracts, researchers have to come with results at all costs, including exhaustion or loss of privacy. Competition with other groups and dependence on external funding generates a huge pressure that is far from the scientific arcadia of my fantasies. Actual science doesn’t resemble what can be read about it in biographies. My graduate programme aims for the best it can do. It furnishes me with the skills that this science business requires: broad knowledge of the field, scientific writing, an array of methodologies, diligence and persistence. It can’t change the face of research. But the beauty of science itself is left untouched. I hope to retain at least some of this naivety.”²⁴

In a healthy environment, scientists ought to be happy in doing what they love and in the company of those who love it. Stanley Jaki believes that science without God leads to Luciferian arrogance, self-deceit and solipsism. He said,

²¹ Edoardo Amaldi and Giovanni Battimelli, *20th Century Physics* (Singapore: World Scientific, 1998), 2029.

²² C. S. Lewis, *Miracles* (London: Fontana Books, 1947), 120-121.

²³ Lewis, 121.

²⁴ Tobias Langenhan, “Goodbye to Romance,” *Nature* 434 (7 April 2005), 804.

“It is not the place to quote utterances of Eddington, Oppenheimer, Weinberg, Gell-Mann, Hawking and other prominent physicists who specified time and again their main goal in words that are so many variations on a memorable dictum of Einstein. His was the hope that his Unified Theory would be such that even the good Lord could not come up with something better. ... When a sense of superiority over the real takes on a measure in which the universe itself is engulfed only foolhardy minds would refuse to sense the reply of a hubris which in the first place was motivated by the lure of ‘you will become like gods.’ A Luciferian undertone may be hiding in Hawking’s recent encomium of the inflationary theory that he ended with the question: ‘What place then for a Creator?’”²⁵

Science without God is an example to show that rationality all by itself is not favorably disposed to form morality. Like any other business, the science industry is capable of abuse, exploitation, discriminations and nepotism. On gender equality, one case of sexual discrimination in Sherry Towers versus Fermilab is being litigated.²⁶ On religious tolerance, Ben Stein’s movie “Expelled: No Intelligence Allowed” documents cases of scientists being fired for choosing intelligent design over evolution. Scientists have not turned into amoral animals precisely because most of them are raised in moral environments. We cannot achieve such a high level of accomplishment without the proper moral constitution such as good work ethics and an admiration of goodness. Morality is borrowed from the society where the scientists live. In the western world, that morality is still predominantly Christian. However the complete secularization of science is distancing the scientists from their society. Science without morality is blind. Science needs God and a Savior.

Nature is a closed system in Aristotelian empiricism. It does not admit the possibility of any transcendental reality or divine beings who meddle with the physical world. The orthodox Christian worldview on the other hand affirms both the transcendental and the miraculous. C. S. Lewis said,

“The difference between Naturalism and Supernaturalism is not exactly the same as the difference between belief in God and disbelief. Naturalism, without ceasing to be itself could admit a certain kind of God. The great interlocking event called Nature might be such as to produce at some stage a great cosmic consciousness, an indwelling ‘God’ arising from the whole process as human mind arises (according to the Naturalists) from human organisms. A Naturalist would not object to that sort of God. The reason is this. Such a God would not stand outside Nature or the total system, would not be existing ‘on his own.’ It would still be ‘the whole show’ which was the basic Fact, and such a God would merely be one of the things (even if he were the most interesting) which the basic Fact contained. What Naturalism

²⁵ Jaki, 121, 125.

²⁶ Geoff Brumfiel, “Data Show Extent of Sexism in Physics”, Nature 452 (24 April 2008), 918.

cannot accept is the idea of a God who stands outside Nature and made it.”²⁷

Lewis called the incarnation of Christ the greatest miracle in human history. A miracle contradicts the claim that Nature is closed. The unity of the triune Godhead is a mystery but not a miracle. The Apostle Paul says, “For since the creation of the world God’s invisible qualities—his eternal power and divine nature—have been clearly seen, being understood from what has been made, so that men are without excuse” (Romans 1:20). Since God is trinitarian, Nature ought to mirror the Trinity on the deepest metaphysical level. According to C. S. Lewis, naturalism logically leads to pantheism. Without the help of Christian theology, the unification scheme in particle physics will be pantheistic. Applying Pauline natural theology, the correct theory of unification ought to be trinitarian. The theory space is infinitely large. It has been a century since Einstein began the search of TOE. Einstein was a pantheist and therefore was not inclined to refer to the Trinity for answers. Enormous resources have been invested in the last 40 years in both theory and experiment in the search of TOE. Today the search is left with a crisis. The next scientific revolution can very well be introduced by physicists who are trinitarians. So far versions of TOE are all limited to unification at very high energy at the Planck scale. God is trinitarian in all scales and is not limited to a spacetime singularity. Missed lessons in theology may very well be the reason of missed opportunities in particle physics. A trinitarian worldview can impact academic fields much wider than particle physics. It is recently discovered that music has a geometrical structure that is congruent to the 3-möbius band that I used to model the Trinity.²⁸ Particle physics and music are the two extremes in the spectrum of the arts and sciences. If trinitarian metaphysics is seen at both ends of the spectrum, other examples of trinitarian imprints are likely to be found in other academic disciplines.

In conclusion, 100 years of Aristotelian empiricism has taken us in a big circle back to the pre-science struggle in the Middle Ages. Our technology has greatly improved since the Medieval Period. We have filled our libraries with books on DNA, quarks and leptons. However our progress along the road toward the ultimate theory of the universe is beset with detours. Despite of all our technological achievements, we are still asking the same basic questions as the Medieval thinkers: Where do we come from? Is there a world outside of this universe? Historians will most likely continue to think about the impact of Platonism and Aristotelianism on the development of science. As I have tried to argue, science needs Christ today as much as it did during Middle Ages. Science in the West has always had the residual benefit of Christian influence. C. S. Lewis, said,

²⁷ Lewis, 12-13.

²⁸ Rachel Wells Hall, “Geometrical Music Theory”, *Science* 320 (18 April 2008), 328-329. Alfred Tang, “Science and Theology: An Integrative Approach”, Th. M. Thesis, Talbot School of Theology, La Mirada, CA (1997).

“Professor Whitehead points out that centuries of belief in a God who combined ‘the personal energy of Jehovah’ with ‘the rationality of a Greek philosopher’ first produced that firm expectation of systematic order which rendered possible the birth of modern science. Men became scientific because they expected Law in Nature, and they expected Law in Nature because they believe in a Legislator. In most modern scientists this belief has died: it will be interesting to see how long their confidence in uniformity survives it. Two significant developments have already appeared—the hypothesis of a lawless sub-nature, and the surrender of the claim that science is true. We may be living nearer than we suppose to the end of the Scientific Age.”²⁹

As Christians and members of the scientific community, we are in a unique position to become the Martin Luther of science. Reformers are insiders who are not yet poisoned. Only insiders have the credibility and the knowledge to make reforms. A Science Reformation is not just an idea created by Christians for the Christians. Even secular researchers now agree that the science culture needs repair.³⁰ Saint Augustine attributed the fall of the Roman Empire to paganism. We ought to take our lesson from Rome and to understand that it is our time to reaffirm the place of Christ in science.

²⁹ Lewis, 109-110.

³⁰ Titus, *ibid.*