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Beyond "Origin & Operation" Science, Part I: Critique of OS²

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Abstract

The terms "origin science" and "operation science" are used to explain the nature of science, especially as it relates to history. But they are an inadequate response to positivism. The proposal for multiple kinds of science was an attempt to answer claims from the 1980s creation trials that evolution was science and creation was religion. Proponents of "origin" and "operation" science sought an alternative *inside* science, rather than in the broader context of the Christian worldview. In addition to problems in their view of the history of science, "origin science" fails its own criteria and "operation science" is redundant. The past and singularities, key factors in this scheme, are not proper topics of science. Finally, the proposal includes a deficient understanding of uniformity and mistakenly accepts the "god-of-the-gaps" fallacy and methodological naturalism.

Introduction

Most Americans hear the word "vehicle" and picture a car zooming down a road. But the term might encompass anything from a snowmobile to an airboat. Context is critical. The same is true when we navigate the nature of science. Enlightenment secularists insisted that science created its own context. This "positivism" was anchored in Hume's (1748) conclusion that true knowledge consists only of "any abstract reasoning concerning quantity or number" or "any experimental reasoning concerning matters of fact and existence." There is no doubt that he wished to diminish the roles of revelation, theology, and philosophy. This agenda proceeded, and by the end of the nineteenth century, this idea had led to the rise and fall of *logical positivism*, leaving a residual belief in the infallibility of science in a truncated, materialist worldview. Positivism has proven a potent argument against Christianity's revelatory truth. Modern secular man sees "science" as hard fact and biblical truth as "blind faith." This confidence in science was extended to natural history by Lyell's uniformity principle and Darwinian evolution.

Although the secular worldview is self-refuting, positivism remains embedded in culture—more as a subjective axiom than a rational position, but its residual power drove the legal decisions against teaching creation and intelligent design in the state schools. Creationists have begun to respond to these claims by proposing that science includes different facets, often called "operation science" and "origin science" (OS²).

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These multiple kinds of "science" have gained popularity among creationists in recent years. OS^2 is a staple explanation of the nature of science in creationist magazines, books, and websites and is invariably presented at an elementary level (e.g., Ham, 2008). An in-depth analysis of this scheme is overdue. While OS^2 discusses a context of the history and philosophy of science, Geisler and Anderson (1987)—the sole in-depth reference—failed to challenge the root problem of positivism because they kept their solution *inside* science.

Although we agree with many of the ideas of creationists who inconsistently use its terminology, we disagree with this scheme. That is because concessions to positivism cannot be the Christian answer. This is no small semantic issue. As Aristotle noted, "The least initial deviation from the truth is multiplied later a thousandfold" (*On the Heavens*, 271b9–10). Secularists have won too many battles by distorting language—think of words like *science*, *naturalism*, *uniformity*, and *evolution*. Not only does OS^2 *not* get to the root of positivism, but it is also an unnecessarily complicated solution. It falls into the category that Adler described:

> The positivism or scientism that has its roots in Hume's philosophical mistakes, and the idealism and critical constraints that have their roots in Kant's philosophical mistakes, generate many embarrassing consequences that have plagued modern thought since their day. *In almost every case, the trouble has consisted in the fact that later thinkers tried to avoid the consequences without correcting the errors or mistakes that generated them*. (Adler, 1985, p. 100, emphasis ours)

We will trace the origin and development of OS^2, critique its main propositions, and, in Part II, propose alternatives that are consistent with biblical truth and the long tradition of Western thought.

Origin and Development OS^2

OS^2 appeared after court cases in Arkansas (MacLean vs. Arkansas, 1982) and Louisiana (Edwards vs. Aguillard, 1987) and focused attention on the secular "religion vs. science" argument. Despite disagreement over demarcation criteria by secular philosophers of science (e.g., Laudan, 1983), the positivist argument convinced both of these courts. Clearly, Christians had to address this secular distortion. This was done by Geisler, who first used the term "science of origins" to describe investigations into the unobserved past. This is the original appearance of the concept in print:

> The two fundamental principles of science, observation and repetition, are absolutely crucial when we are dealing with phenomena of the present world. However, when we are dealing with origins *neither observation nor repetition applies*. … This means that in the strict sense of the word *science* … there can be no science of origins. (Geisler, 1983, pp. 134–135, emphasis his)

We agree with that final statement. But Geisler discovered such a science in spite of himself. He proposed a "science of origins" that relied on four principles:

> But the lack of direct access to the events of origin does not mean that there can be no scientific approach to them. For there are several other principles of science which apply to past events we cannot observe. First, the principle of *causality* is operative for past events. … Second, there is the principle of *uniformity* (or analogy). … Third, there is the principle of *consistency*. … Fourth, there is the principle of *comprehensiveness*. (Geisler, 1983, p. 135, emphasis in original)

This brief introduction was expanded by Thaxton et al., who coined the terms "operation science" and "origin science" and introduced the basic dichotomy:

> Such theories are operation theories. That is, they refer to the ongoing operation of the universe. We shall call the domain of operation theories *operation science* for these theories are concerned with the recurring phenomena of nature. … Unlike the recurring operation of the universe, origins cannot be repeated for experimental test. The beginning of life, for example, just won't repeat itself so we can test our theories. In the customary language of science, theories of origins (*origin science*) cannot be falsified by empirical test if they are false, as can theories of operations science. (Thaxton et al., 1984, pp. 202, 204, emphasis in original)

Probe Ministries was a point of connection for these authors. It is no surprise, then, that the most detailed treatment of OS^2 was written soon afterward by Geisler and J. Kerby Anderson (1987). That book remains the only in-depth discussion (contra Chaffey and Lisle, 2008; Cosner, 2013; DeWitt, 2007; Ham, 2008). In contrast to the emphasis of scientific creationists on scientific content, Geisler and Anderson (1987) emphasized the history and philosophy of science, though it is incorrect to think those subjects were ignored by scientific creationists (e.g., Klotz, 1966; Morris, 1965).

Geisler and Anderson (1987) correctly saw the Enlightenment distortion of science, but they apparently did not see the depth to which positivism had penetrated Western thought. As a result, their attempt to rescue science fell short. However, their scheme is self-consistent. It is built around an attempt to scientifically investigate what they called *primary cause* as well as *secondary cause*. They got around the common understanding of science by subdividing it based on the two dichotomies of *past/present* and *regularity/singularity* (Figure 1). Using those as endpoints in a four-cornered graph, they distinguished four types of science; each focused on its own particular area (Figure 1B).

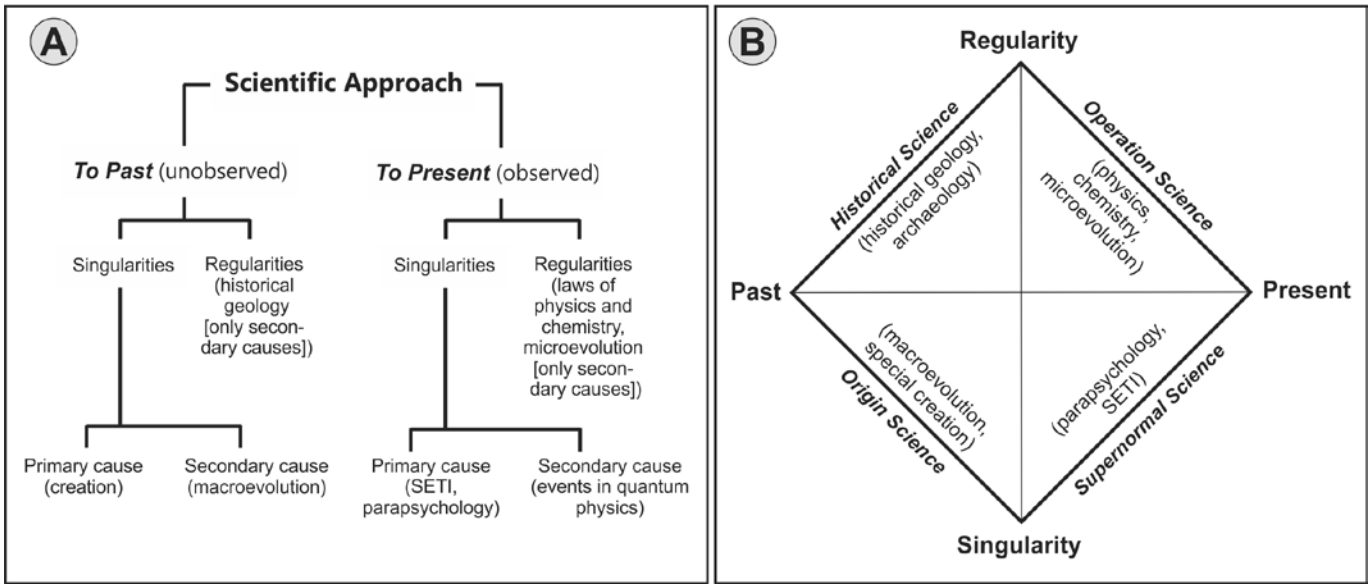

Figure 1. Geisler and Anderson (1987) derived four kinds of science based on their classification criteria of past vs. present and regularity vs. singularity. From Geisler and Anderson (1987, their figures 1 and 2).

More than a decade later, creationists began using OS^2 to explain science and to justify their opposition to geohistory and biohistory, so as to avoid the charge of being "antiscience" while still casting doubt on evolution and uniformitarianism. The simplicity of OS^2 allowed it to be used in lay publications to answer anticreationist propaganda. A search for "origin science" on the websites of the large creationist ministries returns results of this type. Typical is the article, "Do creationists reject science?" (Galling, 2008). Similar treatments could be cited. The point is that creationists have picked up the torch for OS^2.

Playing Field Is History and Philosophy of Science

Geisler (1983), Thaxton et al. (1984), and Geisler and Anderson (1987) realized that the two key areas in this debate were (1) the philosophy of science and (2) the history of science. In dealing with the philosophy of science, they made two errors. First, they assumed science provided neutral common ground with secularism. That misimpression has been used since the Enlightenment to discourage Christians from confronting naturalism *as a worldview*. Second, despite acknowledging the role of the philosophy in defining science, they sought a solution within science. OS^2 thus ignored the root of the problem—positivism. That key component of naturalism (Figure 2) links materialism and uniformitarianism. If ultimate reality is matter/energy (materialism), then truth must come from their study via science (positivism). Science is extrapolated into the past by uniformitarianism (Reed, 2001, 2013). Seen by this light, science becomes secular holy writ:

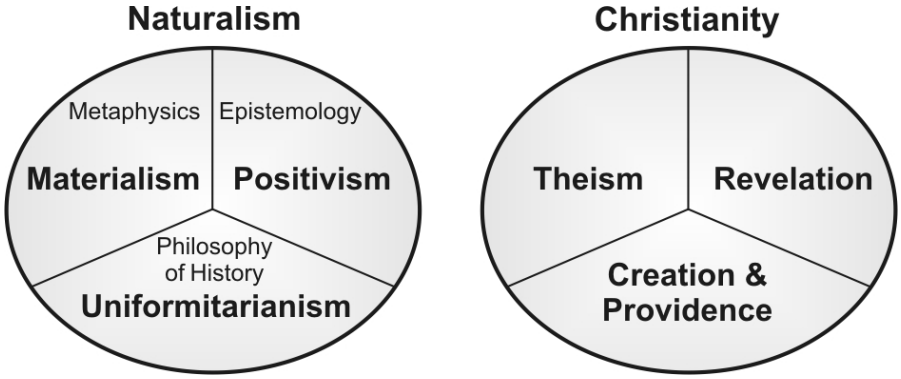

Figure 2. Positivism is the logical epistemology of naturalism, flowing from its view that matter and energy are ultimate reality. Positivism replaced the epistemology of revelation that dominated the Christian West for centuries. From Reed (2001).

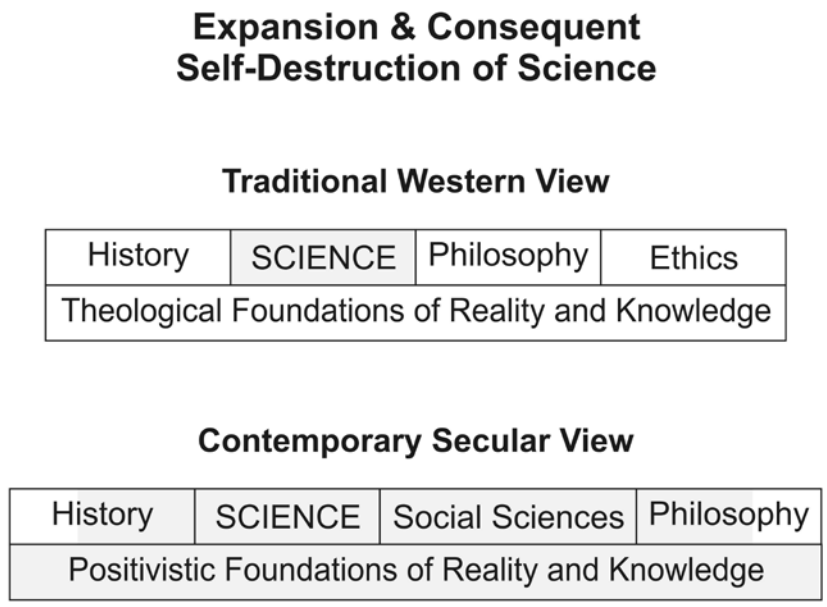

Figure 3. Traditionally, science was one of several empirical human disciplines (top). Positivism has pushed it into areas unsuited for its method (bottom), forcing vagueness in its definition. Because science displaced revelation as truth's benchmark (Figure 2), truth too is being lost.

> I know that there are enough varieties of positivism to permit the professors to retain their individuality, but I insist that behind the multiplicity of technical jargons there is a single doctrine. The essential point … is simply the affirmation of science, and the *denial of philosophy and religion*. (Adler, 1992, pp. 31–32, emphasis ours)

One consequence of positivism has been an attempt to make sure and certain knowledge "scientific" (Figure 3). But when science claims to explain *everything*, it actually explains nothing. Absent transcendent truth and absolute ethics, optimistic scientism cannot justify its presuppositions and so eventually falls prey to pessimistic nihilism. As a result, they are two sides of the same coin (Rose, 2009). The slide from optimism to pessimism corresponded to the growing loss of confidence in science, reflected in the popularity of psychological and sociological explanations of science derived from Kuhn (1962) at the expense of more traditional descriptions (e.g., Popper, 1965). Recent philosophers have noted the failure of the old demarcation criteria and have become more skeptical, even to the point of arguing against the existence of a "scientific method" (Bauer, 1992; Cleland, 2011; Feyerabend, 2010; Laudan, 1983, 1996; Moreland, 1989). Lacking absolute truth, scientific ethics are adversely affected, and then credibility (*Economist*, 2013).

OS[2] also highlighted the history of science, a pursuit continued by Thaxton, who coauthored *The Soul of Science* (1994) with Nancy Pearcey and Marvin Olasky. But the works in the 1980s missed the extent of the secular deception. To be fair, Enlightenment mythmaking was still powerful; secularists have long striven for a "scientific" history to refute the Bible:

> This attempt *to make history scientific* originated in the positivism of Auguste Comte. The term positivism was used to contrast the reliable methods of natural science with the ethereal speculations of metaphysics; and while later positivistic historians may not accept other parts of Comte's philosophy, the term itself is not too inaccurate. The aim is to discover laws by empirical observation. (Clark, 1994, pp. 99–100, emphasis added)

Geisler and Anderson (1987) tentatively discussed Christian roots of science but lacked the perspective of more recent authors like Stark (2003, 2005) or Mangalwadi (2012), especially in noting the key insight that because science was a Christian enterprise, its use as a weapon against faith is self-refuting (Reed et al., 2004).

OS[2] also failed to address the essential role of prehistory in the secular worldview (cf. Mortensen, 2004a, 2004b). Prehistory muddles the very definition of history by transferring the bulk of Earth's past to the domain of science. History was once the study of past events, defined by its own peculiar questions, method, and specific objects of inquiry. It evolved into a discipline defined by a point on a timeline (Reed, 1999). On one side was "history" (e.g., Collingwood, 1956), and on the other was "scientific prehistory." The criteria for establishing that point are nebulous, and the new "history" diminishes God and man. God is relegated to far away and long ago, and man is a random evolutionary development. Determinism and nihilism are the end result. Intellectuals thought they could have the benefits of God's creation without God, despite the non-Western world showing that to be unlikely at best (Mangalwadi, 2012; Stark, 2003, 2005). Science is a child of Western Christianity; regions dominated by other worldviews, such as Hinduism, have not done the same.

Critique of OS²

OS² falls short of recapturing a Christian view of science (Table I). Since secularists see science as *truth*, they remain blind to the deeper truth behind it and so miss a number of logical fallacies (Lisle, 2009; Reed, 2001; Rose, 2009). Christianity gave birth to science by providing an external framework of infallible truth in God that justifies fallible truth in science (Reed 2001). So how well does OS² recapture that foundation to combat positivism? Compared to other attempts, Geisler and Anderson's (1987) effort was anemic (Glover, 1984; Gould, 1987; Hooykaas, 1972, 1999; Rudwick, 2005, 2008; Stark, 2003, 2005). They did not question basic secular myths like Galileo's "persecution" by the "antiscience" church or the "god-of-the-gaps" canard. Not only did they accept the secular falsehood of a seventeenth-century scientific revolution, but they also multiplied that mistake by failing to see how the theological orientation of seventeenth-century culture created a ubiquitous sense of God's immanence (Hooykaas, 1999; Wells, 1994) that would not have allowed a positivistic epistemology.

But the primary arena is in the philosophy of science. What criteria define science and insure its relationship to truth? Geisler and Anderson's (1987) criteria fail historically (as science was originally conceived) and fail logically to show a clear distinction between Christianity and naturalism. Their fundamental assertion that science can address *primary cause* is contrary to the traditional Christian view, and the dual dichotomies that define their four kinds of science allow too much positivism. Furthermore, key terms and concepts are not correctly defined. Given these problems, creationists should be wary of OS².

One possible reason for these shortcomings is seen in the timing; OS² appeared during the transition from optimistic scientism to pessimistic postmodernism. It rightly perceived the problem but took the wrong path to solve it, assuming science could validate its own truth. Thus, we should expect differences between OS² and secular positivism:

> Our proposal then, is that there are two basic kinds of scientific explanations: primary causes and secondary causes. Likewise, there are two basic kinds of events: regularities and singularities, either of which may occur in the past or the present. It is clear that natural (secondary) causes are the only legitimate kinds of causes to posit for a regular recurring pattern of events. However, singularities, whether past or present … can have a primary or supernatural cause. But whether they have a supernatural or a natural cause, past singularities come within the province of origin science. (Geisler and Anderson, 1987, p. 17)

We should also expect these differences to fail to effectively refute the secular epistemic stance.

Aside: How Many Kinds of Science?

Many creationists use OS² inconsistently. They refer to *two* kinds of science: origin(s) science and operation(s)(al) science (e.g., Chaffey and Lisle, 2008; Cosner, 2013; Patterson, 2007). Yet Geisler and Anderson (1987) proposed four: *origin*, *operation*, *historical*, and *supernormal* (Figure 1). All are integral to OS². If the premises of OS² are accepted, all four logically follow from the dual dichotomies of *past* vs. *present* and *regularity* vs. *singularity* (Figure 1A). *Operation* science addresses present regularities. *Historical* science addresses past regularities. *Origin* science addresses past singularities, while *supernormal* science addresses present singularities. Creationist discussions typically ignore historical and supernormal science or conflate *origin* and *historical* science. In fairness to Geisler and Anderson (1987), the scheme should be used as it was proposed.

Table I. Problems with OS². These can be divided into historical problems and philosophical problems.

Problems with OS²

History of Science	Insufficient critique of secular myths
	- 17th-century origin-of-science "revolution"
	- misses 17th-century theological culture
Philosophy of Science	4 criteria of "origin science" inadequate
	"Primary cause" is not proper topic for science
	"Singularities" cannot be investigated by science
	OS² criteria of science are shallow
	"uniformity/uniformitarianism" incorrectly used
	"methodological naturalism" accepted
	"god-of-the-gaps" fallacy accepted
	no distinction between "science" and "history"
	truth in science needs foundation of absolute

Since "origin science" cannot address regularities based on controlled observation, it must rest on Geisler's (1983) subsidiary criteria of (a) causality, (b) uniformity, (c) consistency, and (d) comprehensiveness. We will first show that these four criteria are insufficient, compare OS² criteria for science in general to other proposals, address primary and secondary cause, examine uniformity, deal with the dual dichotomies, and critique secular myths of methodological naturalism and the "god-of-the-gaps" fallacy.

Failure of Criteria of Origin Science

None of Geisler's (1983) subsidiary criteria can bear the weight of "origin science." First, *causality* is a fundamental presupposition of *all* human knowledge, not just "origin science," as recognized long ago by Aristotle:

> Knowledge is the object of our inquiry, and men do not think they know a thing till they have grasped the 'why' of (which is to grasp its primary cause). (*Physics* II-3, 194b 16–21)

Philosophy and theology lean heavily on causality, as does the Bible. In Genesis 1, *God spoke* (cause), *and it was* (effects). Causality cannot discriminate between disciplines because knowledge that rejects causality has no truth value and is no knowledge at all. Second, *uniformity* (addressed more fully below) was neither defined nor applied correctly by Geisler (1983) or by Geisler and Anderson (1987). Being an assumption of all empirical observation, of which science is but one branch, uniformity cannot discriminate a distinct "origin science," especially vis a vis "operation science." The third criterion of *consistency* has the same problem. Restated as the law of noncontradiction, it is axiomatic of all truth. Fourth, *comprehensiveness*—defined by Geisler (1983, p. 135) as, "A good model explains all available data"—applies to any theorizing in any discipline. Thus, Geisler's (1983) original four criteria are not sufficiently specific to carve out a distinct "origin science."

Criteria of Science Compared

One of the projects of philosophers, historians, and scientists in the last two centuries has been the establishment of criteria to define science (Adler, 1965; Kuhn, 1962; Laudan, 1983, 1996; Meyer, 2000; Popper, 1965). Often, this project is motivated by animosity to Christianity; criteria are sought that enhance the positive reputation of science and dismiss or demean "religion." Interest in these "demarcation criteria" intensified during the creation trials of the 1980s and the Kitzmiller vs. Dover trial (2005). Despite court victories, secularism has been weakened in the eyes of many Christians (Plantinga, 1997) and atheists (Laudan, 1983) to the point where "most contemporary philosophers of science regard the question, 'What methods distinguish science from nonscience?' as both intractable and uninteresting" (Meyer, 2000, p. 6).

A complete solution of the demarcation problem is beyond this paper. However, the problem is relevant because the legal context seems to have exerted a disproportionate influence on Geisler, Thaxton, and Anderson. If science cannot be objectively defined, its rich influence on Western thought is merely psychological or sociological, and the loss of confidence in an ability to define science parallels a loss of the Christian worldview. The question "What is science?" *is* confusing when the prior question "What is truth?" is ignored. Increasing pessimism in science (e.g., Feyerabend, 2010) ironically has grown out of the simplistic "science vs. religion" assertions captured in the 1980s court cases. Secularists were forced to confront the reality that their old reliable definition of science did not cover evolution or the big bang. Philosophers—absent Christian presuppositions—know that truth is not a given. In fact, many have petulantly abandoned truth (the essence of "nihilism" per Rose, 2009) because science cannot justify itself.

The first important distinction between naturalism and Christianity is that in the latter, method is subsidiary to truth. As Rose (2009, p. 11) noted, "Error can be conquered only by Truth." All criteria of method (including those of OS^2, Figure 1) make sense only in that context. Note the first temptation: "Yea, hath God said…?" (Genesis 3:1 KJV) was a question of truth. Only God speaking to man can guarantee absolute truth, and only that can uphold the limited and tentative truth from science (or any other branch of knowledge).

OS^2 did not develop that foundation but moved straight to method—the dual dichotomies of Figure 1 and Geisler's (1983) criteria for origin science. This was a mistake. Even the method was not done well. For that reason, it is worth comparing OS^2 criteria to those of other philosophers, historians, and sociologists (Figure 4). This comparison does not answer the demarcation problem but assesses the relative depth of OS^2, especially given the failure of Geisler's (1983) four "origin science" criteria.

The criteria of Geisler (1983) and of Ruse (1982) are general and anemic. Adler's (1965) and Stark's (2003, 2005) are more specific and reflective. They cast doubt on pure scientific knowledge of the past. This problem can be traced to Lyell; he misused uniformity (Gould, 1987) to take advantage of the public's view of Newtonian mechanics, trying to create similar faith in his historical speculations (Reed, 2010). Adler (1965, p. 106) was more correct than Anderson and Geisler (1987) when he asked:

> How is history to be differentiated from science as a distinct branch of learning or mode of inquiry? Everyone knows the answer. Science and history have different objects of inquiry—not just materially different objects, but objects different in type. Hence, the questions they ask and the methods they employ to find the answers are also different in type. Scientific inquiry asks the kind of questions which call for *general* statements or formulae as answers; these are statements about classes of objects, not about particular instances. Historical research, on the other hand, asks the kind of questions which call for statements about *particulars*; these are statements about singular happenings or existences which have unique temporal and spatial determinations.

Comparing Criteria of Science

Adler (1965)	Ruse (1982)	Geisler (1983)	Glover (1984)	Stark (2003,2005)
(1) Empirical (synthetic) (2) Autonomous (3) Distinct methods/questions and objects of inquiry (4) Knowledge comes from *special experience*; yields testable, falsifiable results (5) Results can be judged by a standard of truth (6) Public enterprise; results are reproducible (7) Not esoteric	(1) Guided by natural law (2) Explain by natural law (3) Testable, empirical (4) Tentative (5) Falsifiable	(1) Observation (2) Repeatability (3) Causality (4) Uniformity (5) Consistency (6) Comprehensiveness	(1) Grounded in Christianity (2) Distinct from theology (3) Depends on theology (4) Nature is real, ordered, valuable, regular (5) Empirical verification (6) Not teleological (7) Piecemeal research (8) Instrumental use of math (9) Mechanistic (10) Open-ended	(1) Distinct method (2) Organized effort (3) Explanations of nature (4) Subject to modification and correction (5) Systematic observation (6) Theory & research (7) Not technology, lore, skills, knowledge, techniques, crafts, or engineering (8) Linked inextricably to Christian theology

Figure 4. Although contemporary philosophers of science are skeptical of finding adequate demarcation criteria, definitions based on different perspectives are worth evaluating. Note differences between historians (Glover, Stark) and philosophers (Adler, Ruse, Geisler).

Although Adler (1965) also used dichotomies to define science, his were quite different from those of OS[2]. All three of Anderson and Geisler's (1987) defining criteria are contradicted by Adler (1965), and although they may appear to have a point of commonality in their distinction between singular and general objects of inquiry (Figure 5), Adler distinguishes the two as a dividing line between science and *other* empirical knowledge, not between different kinds of science. Given this wide divergence, what is the relationship of science to singularities? We can answer that after examining the key assertion of OS[2] that science addresses primary cause.

Primary and Secondary Cause

What about the claim that both primary and secondary cause can be scientific objects of inquiry? Primary cause(s)—defined in this context as the creative work of God—is not the proper subject of science. To understand why, we must see that "primary cause" and "secondary cause" are philosophical terms derived from theology (Figure 6). The ultimate cause of anything outside of God is His absolutely free will, executed in (1) His finished act of creation, and (2) His ongoing acts of providence, of which there are two kinds. Primary cause includes God's singular work of creation and His unique works of immediate (not mediated) providence. Immediate providence includes God's direct work, or miracles

Adler (1965)	Anderson & Geisler (1987)
INVESTIGATIVE vs. NON-INVESTIGATIVE (special experience vs. common experience)	PAST vs. PRESENT (unobserved vs. observed)
EMPIRICAL vs. FORMAL (synthetic vs. analytic)	PRIMARY vs. SECONDARY CAUSE
SINGULAR vs. GENERAL	SINGULARITIES vs. REGULARITIES

Figure 5. Comparison of the criteria for dividing knowledge between Adler (1965) and Geisler and Anderson (1987). Although their use of singular vs. general (regular) events is shared by both, the authors' use is still different.

DISCIPLINE	TERM	DEFINITION
Philosphy	Primary Causality	God's finished act of creation and His ongoing act of upholding it
Theology	Immediate Works	God acts directly to accomplish His will through creation and miracles
Philosophy	Secondary Causality	God rules creation by uniform, regular, predictable acts that we call "laws of nature." Ordinary providence.
Theology	Mediate Works	God uses created things to do His will; does not disallow immediate action

Figure 6. *Primary cause* and *secondary cause* are philosophical terms describing God's acts of creation and providence. Providence can be *immediate or mediate*. Deism was the denial of providence, based on the idea that secondary cause is innate to matter. From Reed and Williams (2011).

like the Resurrection, the Exodus, and the Flood. Both are the province of theology, not science (Reed and Williams, 2011, 2012).

Secondary cause is tied to "mediate providence" (God's work mediated through created things), and so to science, because predictable regularity in nature—i.e., uniformity—was based on the prior confidence in God's mediate providence. It was the source of the idea of "laws of nature"; the original idea emphasized the *ordainer* of the "laws," not their objects. The differences between mediate and immediate providence were captured in the medieval discussion of God's *potentia ordinata* and *potentia absoluta* (cf. Glover, 1984). Science rested on the guaranteed regularity of the *potentia ordinata*, which in turn was guaranteed by the *potentia absoluta*. Classical deism kept an abstract Creator but moved the basis for natural law from God to matter, undermining the West's appreciation of God's immanence.

Geisler and Anderson failed to mention these links and so missed aspects of the seventeenth-century mind-set, while failing to confront secularism at a point of vulnerability when they noted: "Hence it is perfectly legitimate to explain the operation of the universe in terms of purely natural secondary causes" (Geisler and Anderson, 1987, p. 26). Their qualifier "purely natural" implies something distinct from God, especially in our culture. Their shorthand may have been understood by seventeenth-century Christians but has different connotations today (Reed and Williams, 2011, 2012). God is acting everywhere, all the time. Secondary causes are "natural" only in the sense that they manifest God's *potentia ordinata*, not in the sense in which nature is the source of causation. Secularists cannot justify uniform, predictable causation without Christianity.

Since secondary causes reflect God's continuing, regular mediate providence, they are the object of scientific inquiry. Primary cause is not. Even if we posited *materialistic* primary causes, they could not be the subject of science, because the method of science assumes patterns of regularity that can be repetitively observed under controlled circumstances. Anyone can *philosophize* about such causes, but that is not science. And in the case of material primary causes, there would be no basis for a rational explanation or prediction.

The Dual Dichotomies

What about the derivation of the four sciences by the dual dichotomies of Figure 1? Singularities are discussed later, but for now, we can approach the question by examining three ways to link science to truth. These include (1) positivism, (2) OS^2, and (3) our proposal, modified from Adler (1965) and somewhat similar to Popper. Our change to Adler's (1965) idea was simply making explicit his implied theological foundation. Note that he differs from Popper by the crucial distinction between "special" and "common" experience (Figure 7).

Positivists reject theology and try to place valid knowledge under the umbrella of "science." Instead of challenging Hume's original error, proponents of OS^2 split science into distinct parts:

> Without the distinction between operation science and origin science it was believed that there is just one category for science, which is simply broadened in scope to allow origin scenarios to be considered scientific. The objective distinction between regular and singular events and the different methods used in inquiry was masked and treated as though it is a superficial difference. In fact it is a major reason philosophers of science have been unable to agree on the proper place for origin questions and on a definition of science. (Geisler and Anderson, 1987, p. 125)

But their solution sees "science" in a way similar to secularists. It differs by subdividing science. Both positivism and OS^2 grant inherent truth to science. We propose that other branches of knowledge have a place of equal respectability in their relationship to truth. Christians cannot logically affirm positivism because it is contrary to their worldview (Figure 2). For that reason, we should also reject OS^2, which sides with positivism in rejecting traditional disciplines in favor of "origin science" (as well as "historical science" and "supernormal science"), conceding primacy in origins

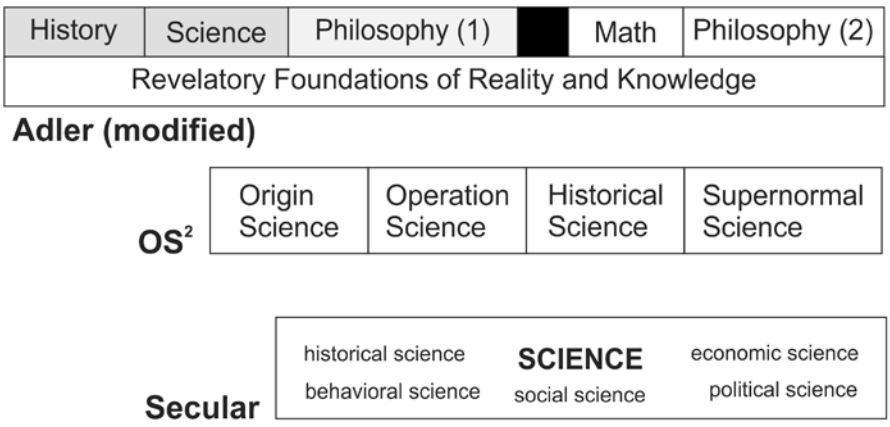

Figure 7. Three options can link science and truth. The dominant positivist view (bottom) defines all true knowledge as science. OS² (middle) distinguishes four different kinds of science based on dual dichotomies (past/ present and singular/ regular). Adler's view is modified by adding an explicit foundation of revelation. In it, first-order philosophy (1) is distinguished from second-order philosophy (2).

and earth history to something other than revelation.

Adler (1965) divided branches of human knowledge based on their distinct (1) objects of inquiry, (2) methods, and (3) questions, arguing that all disciplines were able to reach fallible truth in their own way. Adler rejected the crass positivism of his day (science = truth) by drawing a distinction between knowledge and opinion. Many (e.g. Popper, 1965, and back to Aristotle) think of "knowledge" and "opinion" as mutually distinct capacities of the mind, and today's common usage follows (Figure 8A). "Knowledge" is objective and true, while "opinion" is subjective and questionable. These are sometimes represented by the Greek terms, *epistēmē* (knowledge) and *doxa* (opinion). However, *epistēmē* in the sense of sure and certain knowledge is a slippery concept if its revelatory foundation is disallowed.

Adler (1965) redefined *epistēmē* and *doxa* (Figure 8B). He pictured subjective opinions as distinct private knowledge, separate from a spectrum of public, objective opinion, as well as from a small body of *epistēmē*. *Doxa* was not private, subjective opinion; it was fallible and conditional knowledge that could move closer to truth with increasing logical validity and/or empirical evidence. In his sense, most human knowledge (including science) is *doxa*, not *epistēmē*. When one eliminates radical skepticism by adding revelation as the underlying basis for absolute truth, Figure 7 (top) provides a good context for science. To the extent that the message of revelation is affected by human interpretation, *epistēmē* is weakened toward *doxa*; and to the extent that *doxa* is guided by *epistēmē*, it is strengthened. Building *doxa* on the foundation of positivism portends disaster (Matthew 7:26, 27), even for OS² (Figure 9).

In the Christian worldview, theology, philosophy, mathematics, history, and science can all discover limited, fallible truth but *only* because they rest on revelatory, absolute truth. That is the classic Christian position; revelation upholds all disciplines. Science is justified because its assumptions are upheld by theology, while its investigations are free to function practically without having to justify *each answer* theologically (Glover, 1984). That was the genius of the Christians who originally developed science.

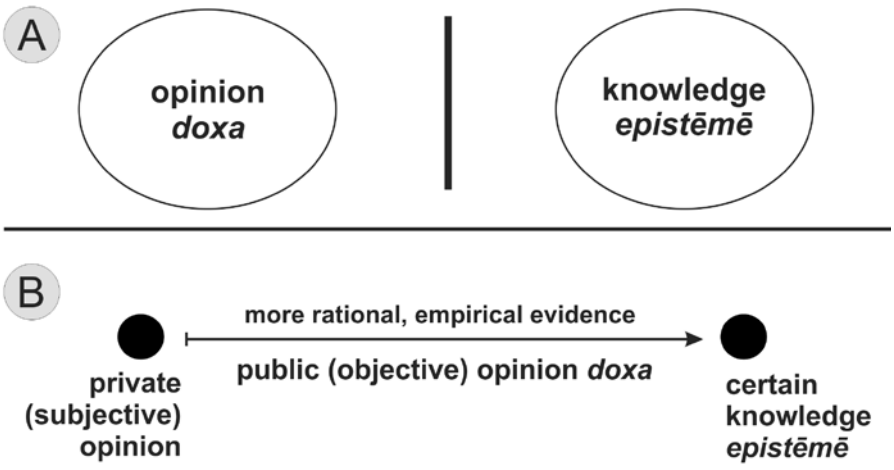

Figure 8. Knowledge and opinion are not mutually exclusive, true and false capacities of the mind (A) but can be seen as a spectrum of public increasing truth, distinct from both private opinion and sure and certain knowledge (B). See Adler (1965) for an extended discussion.

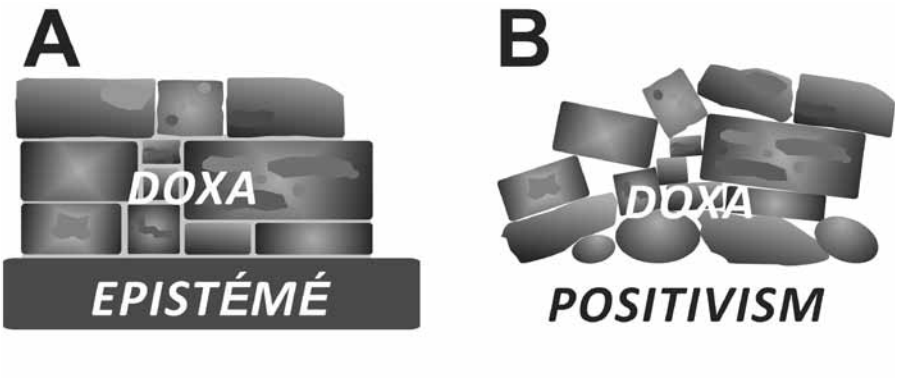

Figure 9. Revelation is the sure and certain foundation for true human knowledge (A). Positivism provides no basis for certainty, and resulting human knowledge cannot be guaranteed by absolute truth (B).

While science might appear more productive than history or philosophy, it is still one of several branches of human knowledge, all ultimately justified by biblical revelation. Absent the crass evolutionary view of Comte, there is no reason to think that truth should move in an upward progression from one branch of knowledge to another. Naturalism cannot justify science (D'Souza, 2008; Mangalwadi, 2012; Reed, 2001; Rose, 2009). But instead of asserting this directly, OS[2] sought to justify truth *within* science.

Singularities and Science

Having established that *primary cause* is not the business of science and that science must be based on a foundation of absolute truth, we turn more directly to the dual dichotomies of Geisler and Anderson (1987). One was *regularity* vs. *singularity*. They failed to make the correct theological connection. A Christian affirms the regularity of natural law because of a prior faith in divine providence, not in random interactions of matter/energy. That same faith points to God's distinct acts of creation and miracles, restricting science to truth in its own area, contrary to Hume (Glover, 1984; Reed and Williams, 2011, 2012; Stark, 2003, 2005).

That restriction invalidates their dichotomy. A synonymous dichotomy might be that between "events" and "processes." In short, science uses events to understand processes. Events are observed under controlled conditions (Adler's "special experience"). Processes are extrapolated as the same contiguous events are seen in defined conditions. Extrapolated processes become the basis for prediction of future events, and success pushes provisional *doxa* towards *epistēmē* (Figure 8). Thus, processes are validated by the successful prediction of events. But the singularities of natural history cannot work this way. Its inferred processes are not subject to special experience. Observation is indirect, and thus limited to the available data. For these reasons, it lacks the certainty of today's science.

Galileo dropping objects and timing their fall was an historical event. If you did the same, it would be a scientific test—a repetitive confirmation of Galileo's derived generalities about interactions between gravity, mass, atmospheric resistance, etc. Geisler and Anderson seemed confused by this relationship:

> Origin science is a *singularity science* about the *past*, rather than a *regularity* science which deals with a *recurring pattern of events*. (Geisler and Anderson, 1987, p. 116, emphasis added)

Past processes are not subject to the directed observation and experimentation that marks science. Scientifically, moving from a singular experience requires repetition under controlled circumstances—the essence of "special experience." Anyone can observe events and speculate about their cause, but without directed special experience, it is not science. It is instead "common experience." Likewise, Stark (2003) insisted that science was the *fusion of theory and research*.

This distinction between science and history was blurred and distorted by Lyell and the secular naturalists preceding him (Rudwick, 2005, 2008), acting on a simplistic positivist view of knowledge. Sadly, this confusion still permeates geology. However, Adler notes:

> Men who are scientists (such as geologists, paleontologists, evolutionists) sometimes attempt to establish the spatial and temporal determinants of particular past events or to describe a particular sequence of such events; but when they do so, they cease to be engaged in scientific inquiry and become engaged in historical research. (Adler, 1965, p. 107)

That is why we disagree when Geisler and Anderson state:

> This gives rise to another important distinction, that between the *object* of a scientific inquiry and the *basis* for it. The object of inquiry may be either regular or singular events. But the basis for such inquiries can only be regular conjunctions, as David Hume so forcefully argued. … Origin events are singular, and although they may be the object of scientific inquiry they can never be the basis for investigation. (Geisler and Anderson, 1987, pp. 115–116)

If "investigation" is not possible, then classifying them as objects of "scientific inquiry" begs the question. For Christians, the goal of scientific inquiry is to determine the regular patterns of God's mediate providence to better know and appreciate Him. Hypotheses that are not aimed at general rules or predictable patterns *subject to special experience* are not amenable to scientific investigation. The idea that singular events are a part of a larger pattern flows from Christian theology. So singular events of the past are not science, even though they can be investigated forensically using scientific tools (see discussion below on "mixed questions").

Some may point to forensic criminal investigations as a paradigm for the scientific investigation of the past. But this confuses the use of scientific tools used, such as DNA matching, with the essence of science as a discipline. The tools are useless until the investigator comprehends their need through a process that is not science. A DNA sample does little good if the detective cannot find a suspect to attempt a match. This is done by eyewitness testimony, knowledge of criminal behavior, or simply intuition. Likewise, practitioners of the "historical sciences" use scientific tools, but their use of prior assumptions about the past cannot be demonstrated by science (Kravitz, 2013).

True "origin events" are even more of a problem because the Christian theology that upholds science proposes a duality to God's actions. Those of creation were singular, miraculous, and complete. Being outside the "laws of nature" (mediate providence), they are outside science. We have true knowledge of them from revelation instead. The same is true of miracles. Science cannot explain the creation of light and dark any more than it can the Resurrection.

Uniformity and Uniformitarianism

Geisler and Anderson (1987) consistently mistake uniformity and uniformitarianism, undermining their attempt to justify "historical science." Lyell began the tradition of conflating the prior *principle* of uniformity with his *doctrine* of uniformitarianism:

> Lyell united under the common rubric of uniformity two different kinds of claims—a set of methodological statements about proper scientific procedure, and a group of substantive beliefs about how the world really works. … Lyell then pulled a fast one. … He labeled all these different meanings as "uniformity", and argued that since all working scientists must embrace the methodological principles, the substantive claims must be true as well. (Gould, 1987, pp. 118–119)

Recent work has been untangling this knot (Austin, 1979; Gould, 1965, 1984; Reed, 1998, 2010, 2011). But instead of evaluating Lyell critically, Geisler and Anderson (1987) accepted his work at face value and so perpetuated the error. They consistently and incorrectly defined "uniformity" as "the present is the key to the past"—making their definition of *uniformity* the cliché most associated with *uniformitarianism*! This was unfortunate because uniformity was crucial to their argument:

> At the heart of the objection to invoking the supernatural as a scientific explanation is the principle of uniformity. (Geisler and Anderson, 1987, p. 91)

After repeatedly misusing the term for most of their book, they finally note:

> There is a crucial difference between uniformitarianism and the principle of uniformity. Uniformitarianism assumes that all past causes will be natural ones like those observed in nature at the present. This is not a scientific assertion, but a philosophical one … it is philosophical naturalism. (Geisler and Anderson, 1987, p. 106)

If uniformitarianism is philosophical naturalism, then why not bring it up when they are using "uniformity" to justify "origin science"? Nor do they notice that uniformity is also a philosophical assumption.

Most practicing geologists recognize four definitions of "uniformitarianism" (Reed, 2010), of which Geisler and Anderson's (above) is but one—and it is often confused with "actualism" (Reed and Williams, 2012). Later, they persisted in incorrectly using "the-present-is-the-key-to-the-past" definition for *uniformity* (e.g., Geisler and Anderson, 1987, p. 106).

Uniformity is the idea that patterns in nature, frequently called "natural laws," operate in the same predictable manner over space, time, and (mostly) scale. When a law does not appear to "work" in a particular instance, we do not abandon it. We instead investigate for another as-yet-unknown auxiliary pattern. Uniformity is not simply at the heart of "origin science" but is at the heart of *all* science. It is the magic that transforms imperfect piecemeal observations into connected theories. Being a statement about the nature of reality, it is a metaphysical assertion, justified in the early centuries of science by Christian theology, but it remains without justification by secularists (Reed, 1998).

The primary question, then, is not what uniformity is but why we should believe it. Kravitz (2013) notes that it functions as wishful thinking for most geologists, justifying a past that cannot be demonstrated. Empirical observation cannot justify uniformity. Metaphysical statements require metaphysical justification, and uniformity was initially tied to the nature of God. Secularists raised in a Christian culture are content to use Christian presuppositions, even though they believe the worldview is false.

Geisler and Anderson (1987) defined "uniformity" incorrectly. They neglected the future half of the temporal dimension, as well as dimensions of space and scale. A poll of geologists would likely return 100% identifying "the present is

the key to the past" with *uniformitarianism*. If uniformity is essential for "origin science," then why define it in such a cavalier fashion?

Furthermore, Geisler and Anderson (1987) missed out on an opportunity to advance the Christian worldview by pointing out the inconsistencies in uniformitarianism. Secular geologists, seeing these inconsistencies in the critiques of Hooykaas (1963) and Whitcomb and Morris (1961), scrambled to salvage the concept by splitting it into four definitions, and Reed (2010, 2011) showed the problems in these. Cleaning up Lyell's mess is not done by accepting his false premise and positing "origin science" or "historical science" but by showing that science itself is consistent—and only consistent—with the faith system that uniformitarianism attempts to undermine.

OS[2] fails to see that (1) uniformity is essential to any science, not just "origin science"; (2) it is not defined simply by *past* and *present* but includes the future, as well as dimensions of space and scale; (3) it is not the same thing as uniformitarianism; and (4) it is justified *only* by Christian theology, though it continues as an axiom of secular science. The final point should be the opening of an apologetic attack, not a concession that "origins" is a science.

How Did Science Develop?

Correcting the distorted secular history of science has been an ongoing task since the groundbreaking work of Pierre Duhem (1861–1916) in the early twentieth century (cf. Aeschiliman, 2013; Glover, 1984). While Geisler and Anderson (1987) affirmed the Christian roots of science, their analysis was limited, and secular myths permeated their book. They infer a seventeenth-century "scientific revolution." However, evidence suggests a more gradual development from the medieval explosion of universities in Europe. Their error likely stemmed from a prior acceptance of the division of history into a classical "golden age," the obscurantist Christian "dark ages," and a secular "renaissance" that overthrew "religious superstition." For example, they claimed:

> Despite significant theistic influences on science, scientists were acutely aware that authoritarian religious control can stifle inquiry, and they sought to be free of such influence. (Geisler and Anderson, 1987, p. 112–113)

We now know that science was nurtured by the church; it was less a source of "authoritarian control" than many other social institutions. Also, historical context is important. What we would call "authoritarian control" today was accepted social structure centuries ago. The real "authoritarian control" has come not from the church but from *secular* governments (Day, 2008) and academia (Bergman, 2008).

Geisler and Anderson misunderstood the cultural context of the seventeenth century:

> In the seventeenth century a Greek view of reality dominated the intellectual world. An essential facet of Greek science was that the world is a living organism impregnated with divinity and final causes. (Geisler and Anderson, 1987, p. 112)

But seventeenth-century Europe had a *Christian* view of reality. There were elements of Greek thought, but these were not dominant. Scholastics had rigorously subjected Aristotle to a Christian critique, and points of essential conflict were resolved *in favor of the Bible*. The uniquely Christian university system created a network of Christian knowledge that was the seedbed of science. Glover (1984), Hooykaas (1972, 1999), Stark (2003, 2005), D'Souza (2008), Mangalwadi (2012), and many others affirm that science grew out of a Christian worldview, not a Greek one.

Geisler and Anderson also missed the theological sophistication of the seventeenth century. When they stated, "These men were interested in learning by experience how the world works, not why it exists and what higher purposes might be involved" (Geisler and Anderson, 1987, p. 111), they make it sound as if the Reformation never happened. The seventeenth century was dominated by practical outworking of competing theological issues; it was the century of Protestant creeds like the Westminster Confession and Catechisms, convened by England's Parliament. Likewise, Lutheran theology grew in Nordic and German states, and other Protestant traditions were seen in the Huguenots in France, and the Puritans in America. Wars and revolutions were fought between Catholics and Protestants, not between Christian and Greek philosophers. As late as 1754, Jonathan Edwards could enhance his scholarly reputation in Europe by writing a theological dissertation arguing that God created the universe to demonstrate His glory. As some have noted (Bartz, 1984; Hooykaas, 1999), men of that time saw nature through the lens of God's providence. Miracles were not few and far between; as Hooykaas noted, *everything* was a "wonder."

Exacerbating this mistake, Geisler and Anderson anachronistically assumed that seventeenth-century thinkers used twentieth-century categories of "origin" and "operation" science:

> Nevertheless, there seemed to be little or no appreciation of the difference between *singularity science* and *regularity science* … The process began with Descartes, who talked mostly of *operation science*. (Geisler and Anderson, 1987, pp. 112, 114, emphasis added)

Scientists then had no need of these categories. They took for granted the Christian foundation for science and distinguished it from history and metaphysics. Today's struggles were unknown, despite the concerns of Geisler and Anderson:

> In order to avoid the charge that they were making science religious

> early scientists sorely needed a way to legitimately handle the connection between their belief in a creator and the new science. (Geisler and Anderson, 1987, p. 113)

Scientists in the seventeenth century already had a way to "legitimately handle" their belief in Creation. It was called "theology," and it was congruent with their science. Modern man has been so influenced by secularism that it is hard to realize that there was once a time when theology and science were simply two conjoined aspects of human knowledge. One need only read works from that period to see how seamless that relationship was.

Methodological Naturalism?

Secularism has often succeeded by equivocation (Doyle, 2012). Especially effective has been the use of the term "naturalism." Although opposed to "philosophical" naturalism, many Christians, including Geisler and Anderson (1987), give it life by accepting the corollary that "methodological" naturalism is a part of science. Secularists insist that science restrict itself to strictly natural causes, with the implied premise that these causes are inherent to matter and energy:

> The creationist is wrong in positing a supernatural cause for any regular repeated event in nature, for a regularly recurring pattern of events necessitates a natural explanation. (Geisler and Anderson, 1987, p. 105)

In effect, Christians must leave God at the laboratory door, contrary to 1 Corinthians 10:31. This secular semantic deception promotes confusion. Christians must wade through the tangled multiple meanings of "naturalism" (Reed and Williams, 2011). Today, even terms like "natural law" imply an atheistic view of nature. Ultimately, this leads to theological error:

> The reason for this [astronomers not finding first cause] is simply that "knowledge of the creation is *not* knowledge of the Creator…" That is to say, operation science by its very nature is limited. It can provide insights into the operation of the universe by secondary natural causes, but cannot offer insights about the origin of the universe. (Geisler and Anderson, 1987, p. 27)

The Bible disagrees, most famously in Romans 1 and Psalm 19. God *is* known through what has been made, and they should have known it.

The answer to methodological naturalism is the doctrine of providence. The biblical God "[upholds] all things by the word of his power" (Hebrews 1:3 KJV). He controls nature *all the time*, not just occasionally with a rare miracle. Both primary and secondary cause point to God because only God justifies a view of causality that justifies science (Reed and Williams, 2012). If methodological naturalism is a prerequisite of science, then how did early scientists, steeped in the Christian worldview, succeed? They derived all of the essentials of the scientific method without it. When the authors of OS[2] endorse "methodological naturalism," they undercut their opposition to philosophical naturalism.

The "God-of-the-Gaps" Fallacy

Geisler and Anderson (1987) also seem to accept the "god-of-the-gaps" fallacy. Secularists have long claimed (per Comte) that "natural" science displaced theology because it gradually provided superior natural explanations (so the story goes) for phenomena previously attributed to providence. Using this template, secularists claim that Christians use God to explain the "gaps" in natural understanding. They hope that this imaginary trend will render God completely irrelevant.

The "god-of-the-gaps" idea was effective propaganda, allowing increases in human knowledge to automatically push people toward atheism. The most surprising aspect of this canard is that *Christians* would accept it. Christians are diverted by their innate belief in truth and respect for science. It has reduced many to silence. Thaxton et al. (1984) and Geisler and Anderson (1987) all fell for the basic argument:

> Basically the idea of the God hypothesis is that whenever there is a gap in our knowledge, we run God in as a "bit-player," so to speak, to fill the gap. This view is known fittingly as the God-of-the-gaps. There is legitimate concern about this means of solving problems in operations science. (Thaxton et al., 1984, p. 203)
>
> Citing God's special intervention to explain regularly recurring events is to argue for a deus ex machine; it is an illegitimate God-of-the-gaps move. (Geisler and Anderson, 1987, p. 17)

They failed to understand that the "god-of-the-gaps" accusation is easily answered by challenging the assumptions of the accusers. Because the West was monolithically Christian for so long, believers were slow to appreciate that secularists were not neutral; they have an agenda to "suppress the truth in unrighteousness" (Romans 1:18b NASB). Having hijacked science, they want to keep God out, and the "god-of-the-gaps" accusation derails Christians who start asking inconvenient questions.

As Weinberger (2008) explained, the argument works only if a *deistic* god is assumed, reality is a natural causal continuum, and divine action is "interference." This is why the doctrine of providence is so important; it teaches us that the ongoing operation of the cosmos is ultimately divine. There is nothing to "disturb"; God is already in charge. The argument also confuses epistemology and metaphysics. Gaps in our knowledge do not necessarily reflect gaps in the fabric of reality. Human limits are a sufficient reason for epistemological "gaps."

Reed and Williams (2011) noted that one key to refuting this argument is uniformity. As a precondition for science, it cannot be justified by naturalism. That is because it rests on a continuity

of cause and effect, which in turn rests on a transcendent, infinite, eternal, and unchanging God. Christian theology makes the accusation meaningless. If Thaxton et al. (1984) and Geisler and Anderson (1987) had remembered this, they might have provided a more effective argument against positivism. If you want causality and uniformity, then you must take God in the deal. Secularists cannot have it both ways.

Conclusion

Although superior to the pure positivism of naturalism, the Christian alternative of OS^2 advocated by Geisler, Thaxton, and Anderson is not a satisfactory alternative. It did point to a needed emphasis on the history and philosophy of science, but it failed to follow those trails to the proper conclusions. Since science is the child of Christianity, its axioms are justified only by a biblical worldview. This requires more fundamental revision than OS^2.

Furthermore, the idea is flawed in several key areas. Its attempt to divide science into different disciplines to study both primary and secondary causes is shortsighted because science is methodologically incapable of investigating primary cause. Philosophy and theology are better suited to answer metaphysical questions. OS^2 is built on dual dichotomies (*past/present* and *regularity/singularity*) that do not provide a sufficient foundation for science. Geisler's (1983) criteria for "origin science" fail to distinguish that proposed science from any other investigative branch of human knowledge. Finally, OS^2 fails to address the problem of positivism in aggressively biblical categories, especially the relevant doctrines of creation and providence.

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