

PERSPECTIVES on Science and Christian Faith

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*"The fear of the Lord
is the beginning of Wisdom."
Psalm 111:10*

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When Fraud Knocks on the Door

Fraud, plagiarism, cheating, embezzlement, lying, deception, and breach of copyright are periodically topics of news items. When investigative journalism chronicles an exposé of deceit, frequently a pattern of misrepresentation emerges that characterizes the life of the individual.

When prior generations struggled with fraud, a specific vocabulary emerged describing some of the common occurrences. Snake oil, counterfeit money, and "smoke and mirrors" used by charlatans were vogue expressions a century ago. In the twenty-first century, technology enhances fraudulent opportunities. Consequently business scams (online auctions, bogus invoices, slamming, prize promotions), telemarketing schemes, counterfeit drugs, and internet fraud are part of our experience today.

Internet fraud is criminal, rather than a harmless prank. Internet crime is defined by the Internet Crime Complaint Center (www.ic3.gov) as:

... [A]ny illegal activity involving one or more components of the Internet, such as websites, chat rooms, and/or email. Internet crime involves the use of the Internet to communicate false or fraudulent representations to consumers. These crimes may include, but are not limited to, advance-fee schemes, non-delivery of goods or services, computer hacking, or employment/business opportunity schemes.

According to the National Fraud Information Center (NFIC) web site (www.fraud.org), Internet fraud in the early months of 2005 reflected a dramatic increase from the prior months in 2004. In 2004, the average reported fraud scheme to the NFIC resulted in a consumer loss of almost \$900, while the reported frauds in the first six months of 2005 reflected an average consumer loss of \$2,500. During the first six months of 2005, the top ten reported Internet scams listed by the NFIC in descending order of occurrences were: online auctions (44%), sales of general merchandise (30%), Nigerian money offers (7%), fake checks (5%), phishing (4%), lotteries (3%), information/adult services (2%), work-at-home plans (1%), computer equipment/software (1%), and prizes/sweepstakes (1%).

In my role as a biology professor at Eastern Mennonite University, I encounter plagiarism by students who are writing term papers. At times it occurs through ignorance or not understanding what constitutes plagiarism; other times it seems intentional. I have worked at the issue with my students by clarifying the use of information from

other sources versus from one's personal "idea bank." Requiring a major paper to be developed in stages through a thesis statement, outline, preliminary drafts with current bibliography, prior to writing the final document draft, helps direct students through an appropriate writing process. In a few cases, however, I awarded an "F" to the term paper writer for work that was obviously plagiarized.

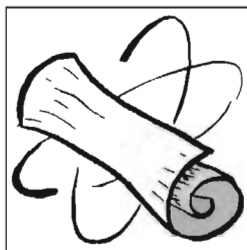
As editor of *Perspectives on Science and Christian Faith*, I occasionally encounter authors who submit manuscripts that contain either plagiarized sections or directly quoted paragraphs or sentences that they "failed to cite." These "errors" are typically caught by vigilant peer reviewers who have expertise in the manuscript's topic and are familiar with the literature. If the noncited sentence is short and not a major part of the manuscript, I typically advise the author that this citation is missing and he or she should revise the manuscript with the appropriate citation. If large sections or major ideas are not cited but are passed off as the author's own ideas, I tend to suspect fraud and reject the manuscript. Fortunately, that has been a rare occurrence. A related editorial issue is copyright infringement when diagrams, illustrations, or published works owned by another is used without permission or payment. Again modern technology—copy machines and "cut and paste" computer technology—readily contribute to such violations.

More recently, fraud in science has reared its vigorous head again in the falsification of research data. Most notorious during the past months has been the example of Dr. Hwang Woo-suk, who resigned from Seoul National University after fabricating cloning research data. The prestigious journal, *Science*, retracted Hwang's stem cell articles that had been published earlier.

The Psalmist, describing a wicked person, says: "The words of his mouth are wickedness and deceit; He has ceased to be wise and to do good" (Ps. 36:3 NKJV). A lying tongue is number two on the list of seven things that God hates (Prov. 6: 16–19). Consequently, it behooves us as followers of Jesus, who said, "I am the ... Truth," to be careful that our life and work is characterized by honesty and integrity. To fail in that endeavor is to experience catastrophe! Let's resolve that when we hear the knock of fraud, we will turn a deaf ear to its illusionary appeal.

aveo veritas,

Roman J. Miller, Editor



Prospects for Theistic Science

Roy Clouser



Roy Clouser

*I [think that]
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vasive; yet at
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[I deny] that
the engagement
consists
primarily in
Scripture
(or theology)
supplying con-
tent to theories.*

This article first tackles the issue of defining what counts as a religious belief, and shows why obtaining such a definition opens the way to discovering a deeper level of interaction between divinity beliefs and the scientific enterprise than the prevailing views of the science/religion relation allow for. This deeper level of interaction is illustrated by applying it to twentieth-century atomic physics. It is then shown why this level of interaction implies a distinctive anti-reductionist perspective from which theists should do science, a perspective in which belief in God acts as a regulative presupposition. Finally, reduction as a strategy for explanation is critiqued and found bankrupt.

Among theists, the most popular view of the engagement between science and religion (henceforth the S/R relation) is a minimalist one. They see the role of religious belief to science as primarily negative such that any theory can be acceptable to a theist so long as it does not outright contradict any revealed truth of Faith. On this view, conflict between science and religion is not only possible but is the only (or the most important) relation between them: if a theory outright contradicts revealed truth it is false; otherwise, it is theistically unobjectionable. There is, therefore, no such thing as theistic science; there is at most theistically compatible science.

A lesser number of theists take religious belief to have a thicker engagement with science than merely acting as a negative, external check for falsehood. For them, religious belief can supply content to theories as well. The majority of this "thicker-engagement" party hold the position that although theistic belief has little to contribute to the natural sciences, it can provide content to theories of the social sciences such as the teaching that humans are morally responsible for their actions. Fundamentalists extend this by insisting that revealed truths can yield

positive content for virtually every science. And some theists have proposed still other ideas of thicker engagement. For example, recent writers have claimed that theism's positive contribution to science is not so much that of providing actual content to theories as it is that religious ideas inspire scientific ideas. There are permutations on these views, of course, and a number of mix-and-match combinations of them are possible.

In what follows, I write as a theist who agrees with the thicker-engagement position, but who finds all of its presently popular versions to be deficient. What I offer here is a distinctive interpretation of the S/R relation according to which religious belief engages science in a way that is not merely thick, but pervasive; yet at the same time, it denies that the engagement consists primarily in Scripture (or theology) supplying content to theories. Because the position is complex, I will not have the space to critique the other views in detail. Their relative weaknesses will be exposed only indirectly by defending my view. There is room for only the following preliminary comment on them.

It seems clear to me that each of the theistic versions of the S/R relation is able to point to cases which instantiate it. Surely, it cannot be wrong for a theist to say that a theory must be false if it outright contradicts a tenet of theism, and it seems equally certain that there are theistic teachings that should be included in theories. The fundamentalist goes too far, in my opinion, by regarding Scripture as a sort of encyclopedia of inspired information on virtually every

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topic. However, despite the Scriptures' distinctly religious focus, they do occasionally speak on issues that can bear even on natural sciences—as when they teach that the universe is not eternal, or speak of laws, space, and time as created by God. And, finally, there seem to be clear cases of scientific theories having been inspired by religious or theological ideas. But even if each of these ideas of the S/R relation is at times true, it seems equally plain that merely citing such instances is not sufficient to justify the claim that any of them is the right way to think of the S/R relation *generally*, or even that it is the most important part of that relation. Instead, advocates of each view simply apply their favored idea to various issues while ignoring the other positions (except for fundamentalism which attacks, and is attacked by, all the others). The discussions therefore strike me as both one-sided and dogmatic. They lack the sort of analysis that could uncover any deeper metaphysical underpinnings to the S/R relation.

In all views of the science/religion relation, a crucial element is missing from the discussion. That missing element is nothing less than a clear definition of the nature of religious belief.

The main reason for this sorry state of affairs, I suggest, is that in all views of the S/R relation, a crucial element is missing from the discussion. That missing element is nothing less than *a clear definition of the nature of religious belief*. There are, by contrast, many attempts to account for the nature of scientific theorizing. So it is troubling that present discussions of the S/R relation are deafeningly silent about the general nature of religious belief and seem to assume that it is unnecessary to be precise about what religious belief is in order to gain clarity about its relation to science. In fact, abstracts of some papers for recent S/R conferences provided on the Templeton listserv have asserted that there is nothing to be learned in this direction! "We all know what religion is," one of them said, "so let's concentrate on science." But is it not implausible that we can explain the relation between two enterprises without a clear definition of *both* of them? And is it not just possible that discovering what counts as a religious belief might go a long way toward also discovering the correct idea of the general S/R relation?

The rest of this paper is dedicated to the proposition that the answer to these questions is "yes." I will argue

that an essential definition of religious belief is possible, actual, and important. It allows us to uncover an otherwise hidden level of interaction between religion and science which is in fact their most general and pervasive relation.

Some Remarks on Definitions

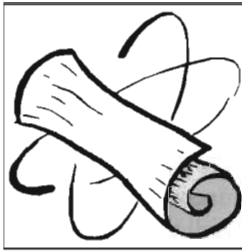
Narrowing the Scope of the Term "Religious"

The first thing that must be avoided is ambiguity in the adjective "religious." The term could be used to connote the subjective manner in which a belief is held or used. In that case, it might include such features as being held consciously and fervently, being given great (or even supreme) importance, being used to inspire worship and/or to enforce a moral code, or being accompanied by emotions such as awe, penitence, humility, and gratitude. Important as these subjective accompaniments are in many cultic religious traditions, they do not get at the meaning of the adjective "religious" as a modifier for "belief" that can distinguish religious belief from nonreligious belief. Every party to the discussion appears to agree with this point since all of the specific relations they have proposed as prototypes of the general S/R relation concern the *content* of religious beliefs vis à vis science rather than the subjective manner in which those beliefs are held or used. I think they are right to do that for two reasons. First, the components of these subjective attitudes can just as well apply to the game of golf as to belief in a divinity. Someone can regard golf with fervor, awe, and value it above all else although golf is no more a religion than religion is a sport. Second, there are actual religious beliefs lacking in every one of those components. Clearly, then, what is needed is to define religious belief by finding what they have in common. Then we could look for the most general sort of relation between their common component(s) and the scientific enterprise.

Essential Definitions

Any essential definition has two requirements that are notoriously difficult to meet. On the one hand, it must pick out characteristics true of everything that is a member of the class being defined or it will be too narrow; on the other hand, what it picks out may not apply to anything that is clearly not a member of that class or it will be too broad. Since these difficulties can baffle the best attempts to formulate such definitions, we often settle for something less precise. In the past thirty years, a number of influential scholars have concluded that settling for less is exactly what must be done for "religion."¹ But whether that is true for religion as a whole is beyond my concern here. My claim is that we can get such a definition for the nature of religious *belief*, whether or not it can be done for religion as a whole.

Even when an essential definition can be formulated for a class of things, there are often difficulties that plague



Dialogue: Article

Prospects for Theistic Science

*Any essential
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defined ... [and]
what it
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may not apply
to anything
that is clearly
not a member
of that class.*

its acceptance. There is something disturbing about paring back the characteristics of a type of things until we are left with just the features shared by all and only that type. Such definitions can be surprising or disappointing, and can be rejected for those reasons. Take the case of defining what counts as a tree. Everyone easily recognizes many things as trees, and yet it is hard to state exactly what features are shared by all but only trees. Once formulated, however, the definition can be disappointing since so much that is obvious or valuable about trees is not included—their beautiful foliage, shade, or uses as wood, for example. And surely we can expect similar disappointments from defining “religious belief.” Restricting ourselves to its essentials all but guarantees that much of what people usually associate with the religion(s) they know best will not appear in the definition. Moreover, some people even think that religion is distorted by the very project of definition. So it needs to be kept in mind that the sort of definition I am seeking does not *do* anything to religious belief as practiced. It is not to be a definition of the whole of “religion,” nor has it anything to do with over-intellectualizing actual religious experience and life. What I am seeking is no more an over-intellectualization of religion than defining marriage is an over-intellectualization of love.

We need to recognize, too, that the more initial imprecision there is about a type of things the more likely it is that formulating its clear definition will produce surprises. For example, many years ago whales were classed as fish. They had bodies shaped like fish; they lived in oceans and swam like fish. But in time they were reclassified as mammals. There were good reasons for this. Whales have four-chambered hearts and are warm blooded; they lack gills and breathe air with lungs, and they both bear their young alive and nurse them. So despite their very fish-like tails and fins, and despite the fact that they cannot live on land but spend their lives in oceans, whales are defined as mammals. Perhaps this redefinition was surprising to some people when it was first put forward, and perhaps it was even offensive since it means that whale bodies have more in common with human bodies than with fish bodies! But it was not wrong for those reasons.

Misunderstandings of Religious Belief

Because the most widespread understandings of “religious belief” are both seriously mistaken and deeply entrenched, I cannot simply ignore them. So before proceeding to the defining element(s) of religious belief, let us briefly consider why three popular ideas will not do. In criticizing these ideas, I will make use of an undefended assumption, namely, that although belief in a god is not the only sort of religious belief, it is indeed one sort. Therefore any definition entailing that belief in a god is not a religious belief will be rejected as absurd. I will call this the “god rule.”

1. Religious Belief Is Belief in a Supreme Being

Many people think this is not only a good definition, but even suspect that all religions actually believe in the same Supreme Being under different names. The reason this seems plausible in Europe and North America is that the theistic religions dominant on those continents—Judaism, Christianity, and Islam—do in fact all believe in one God who created the universe. Thus this definition would be quite right if theisms were the only possible religions. But that is far from being the case.

Many religions are polytheistic, and in some of them there is no one supreme god. Thus the definition violates the god rule because it requires that people who believe in many gods but have no Supreme Being have no religious belief whatever. Moreover, there are yet other religions that are literally atheistic and do not believe in any gods! Brahmin Hinduism and Theravada Buddhism are examples.² According to the Brahmin theology, the gods of popular Hindu worship and practice are but accommodations of religious truth to the level of the average person. The Divine (Brahman-Atman) is not a person or even an individual but is “Being-itself.” So religious belief cannot be defined as belief in a Supreme Being since that would force us to say that Brahmin Hinduism, Theravada Buddhism, and polytheisms with no supreme god are all ruled out as religious beliefs.

2. Religious Belief Inspires or Supports Worship

This definition is also defeated by Brahmin Hinduism and Theravada Buddhism, since

neither practices worship.³ Nor are they the only examples. Aristotle believed in a being he alternately called the “prime mover” and “god.” But since he also held that this god neither knows nor cares about humans, he neither advocated nor engaged in its worship. Similarly, the Epicureans believed in many gods but also never worshiped them for the same reasons as Aristotle’s. Therefore making inducement of worship a defining feature of religious belief fails because there are forms of two major world religions that lack it and because it violates the god rule.

Nor will it help to reply that it is ritual taken broadly, not worship construed narrowly, that is a hallmark of religious belief. No matter how broadly we construe the notion of ritual, it will still be inadequate to distinguish religious beliefs since so many rituals are not religious. Think of the rituals accompanying swearing-in ceremonies, graduations, inductions into clubs, national anniversaries, and even birthday celebrations. Gathering around a cake with candles on it and singing “Happy Birthday” is surely a ritual, but not a religious one.

If there were a specific list of rituals associated with only religious beliefs, this definition might work. However, there is a huge list of activities that are at times religious and at other times not: burning down a house, setting off fireworks, fasting, feasting, having sexual intercourse, singing, chanting, cutting oneself, circumcising an infant, covering oneself with manure, washing, killing an animal, killing a human, eating bread and wine, having one’s head shaved, etc. The only way to know which rituals are religious is to know what those who take part in them *believe* about them. Without that, even an act of prayer can be indistinguishable from fantasizing or talking to oneself. Thus trying to determine which beliefs are religious by looking at the rituals they give rise to does not work since we would need to know whether the beliefs that motivated the rituals were religious to know whether the rituals were.

3. Religious Belief Is Belief in Our Highest Value

This definition appears more plausible than it deserves because of the way we sometimes speak of peoples’ obsessions as their “religion”—as when a golf fanatic jokingly calls golf his religion. But even if someone’s love of golf, or career, etc., is like the devotion and fervor of saints or prophets, that will not make it true that religious belief concerns what is valued most. In fact, there are good reasons to think it is *not* true.

For starters, we can notice that there are polytheistic traditions whose gods are counter-examples to this definition because they are little valued or even hated. So this definition turns out to violate the god rule. Nor are those the only counter-examples; Christianity is one, too! For although what a person values most figures impor-

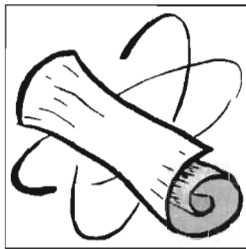
tantly in Christian teaching, God himself is not the supreme value or a value at all. What a Christian is supposed to value above all else is God’s *favor* (Matt. 6:33). If that is right, then belief in God is neither itself a value nor the belief in a value, but *the basis for the proper ordering of all values*. Unless a person already believed in God’s existence and in the faithfulness of his covenant promises, that person could not possibly value God’s favor and Kingdom above all else (Heb. 11:6). Belief in God, then, is not religious because it is what a Christian values most; rather, what a Christian values most is a result of his or her belief in God. Thus belief in God and the valuing that results from it cannot be identical.

A Definition of Religious Belief

Locating What Religious Beliefs Have in Common

Let us start by observing that every religious tradition regards something or other as divine. That seems true enough, but not very enlightening; it simply shifts the problem to finding something common to every idea of “divine.” Can this be done? It does not take much reflection to see why it may appear hopeless. Even if we confine our search only to a few traditions—say, the theistic idea of God, the Hindu idea of Brahman-Atman, the idea of Dharmakaya in Mahajana Buddhism, and the idea of the Tao of Taoism—isolating a common element would be a daunting task. And if it could be done for them, we would then have to discover the same element(s) in every other idea of divinity: those of ancient Egypt, Babylon, Palestine, and Greece, of China and Japan, of the Pacific islands, of Australia, of the Druids, and of the tribes of Africa and North and South America. So is it not painfully obvious that there is no common feature to all these divinities?

Tackled in this way, I agree the project is impossible. If an essential definition requires finding a property common to every candidate for divinity, then surely their natures are so diverse as to have no feature in common. However, this is not the only way such beliefs can have a significant common element. We could also look for commonality in the *status* of divinity rather than in the natures of all putative divinities. To illustrate this difference, consider the two ways we can understand the question: “Who is the President of the U.S.?” We could take it to ask for a description of the person holding that office, and answer by describing that person. Or we could take the question to be about the *office*, and answer by stating the duties, powers, and limitations of the Presidency. The difference is important. If an election were in dispute, people could disagree as to the description of the candidate who was now really President, but still agree on the office to which they claim their candidate was elected. Similarly, although people differ widely over the right description of *what* is truly divine, there could still be common agreement among all religions as to *what it means to be divine*.



The divine status [is] that of having unconditionally, nondependent reality. ... Religious beliefs are not confined to identifying what has divine status. Many are about how all that is nondivine depends on the divine, and others are about how humans can acquire the proper relation to the divine.

Dialogue: Article

Prospects for Theistic Science

Just such an agreement is exactly what I have found to be the case! After more than forty years of study in comparative religion, I have never found a religious tradition that fails to regard the divine status as that of *having unconditionally, nondependent reality*. The divine is whatever is “just there” while all that is nondivine depends for existence on the divine. This is not to say that every myth or body of teaching has been precise about this point, or has used such expressions “nondependence,” “self-existent,” or “absolute,” etc. Some simply trace everything nondivine back to an original something the status of which is neither emphasized nor explained. But in such cases the original something is still spoken of as though it has independent reality; all is traced back to it and there is nothing it is said to depend on. Thus it is tacitly given non-dependent status so far as the teaching goes.

It must also be added, however, that religious beliefs are not *confined* to identifying what has divine status. Many are about how all that is nondivine depends on the divine, and others are about how humans can acquire the proper relation to the divine. To cover these additional senses of “religious belief” as well, our definition must have three parts:

A belief, B, is a religious belief if and only if:

1. B is a belief in something as divine no matter how that is described or
2. B is a belief about how the nondivine depends upon the divine, or
3. B is a belief about how humans may stand in proper relation to the divine,
4. where the meaning of “divine” is (minimally) having the status of utterly unconditional reality.

I find this definition to cover the plethora of religious beliefs while no other does. For openers, it can locate a common element among the God of theism, Brahman-Atman, the Dharmakaya, and the Tao—the list that earlier appeared so daunting. Moreover, it is also true of Nam in Sikhism, Ahura Mazda (Ohrmazd) in early Zoroastrianism or Zurvan in its later development, the soul/matter dualism of the Jains, the high god of the Dieri Aborigines, the Mana of the Trobriand islanders, Kami in the Shinto tradition, the Raluvhimba of Bantu religion, and the idea of Wakan or Orenda found among native American tribes. It holds as well for the

ancient Roman idea of Numen, for Chaos or Okeanos as found in the myths of Hesiod and Homer, and for a host of beliefs found in other ancient myths. I cannot, of course, claim to have investigated every religion that ever existed, or to know that there is no religion yet to be discovered which does not have this idea of divine status. But I can say that neither I nor any of the other thinkers who have endorsed this definition⁴ have ever come across a religion that fails to regard as divine whatever they identify as the non-dependent reality (or realities) on which all that is nondivine depends.

Some Confirming Consequences

In addition to covering the field and avoiding the difficulties found in other definitions, this definition helps clarify some important differences and unique features of certain religious beliefs. For example, it is well known that in theism there is but one God who is the only divine reality, so that God and divinity are identical. In these traditions, everything other than God is creation, and the creation is not divine. By contrast, however, other religions believe there to be a difference between what is divine per se and their gods. That is, they believe in a per se divine reality that is the source of the gods and goddesses as well as of humans and the rest of the nondivine world. The ancient Greek and Roman myths are examples of this. Hesiod and Homer called the divine reality Chaos and Okeanos, while it was called Numen in ancient Roman religion. And there are similar beliefs in other polytheisms both ancient and contemporary. This explains why the individual gods of such religions do not fit the definition just given for “divine.” It is because in those traditions, individual gods do not have unconditional existence but are beings *thought to possess more divine power than humans do*. Their religious importance lies in their superhuman powers and in their being the means by which humans can properly relate to divinity per se.

The definition also sheds light on the fact mentioned earlier that in some polytheisms where the divine and the gods are not identical, there are gods which have no important role in human affairs or are even malevolent.⁵ It has puzzled some scholars how belief in such gods could arise despite

their not doing anything good for those who believe in them. This definition makes it clear why this is possible—and is the only one that does so—by making clear why it is not beneficence or usefulness to humans that is the defining characteristic of divinity or of a god, but non-dependence which characterizes divinity and greater participation in divine power which characterizes a god.

Yet another feature of the different ideas of the divine which this definition handles is the large variety of ways the nondivine can be thought to depend on the divine.⁶ For example, there are religions which believe all non-divine things to be partly divine, while in others there are two or more divine principles and every single nondivine thing is partially dependent on both. Still others hold that a particular range of nondivine things depends on one divinity while another range of nondivine things depends on another. There are also religions that believe in a whole realm of divine beings, thus increasing the number of ways these can be thought to relate to one another and to the nondivine world. This definition covers all these variations.

Replies to Objections

The Definition Is Too Broad

The most frequent objection to this definition is that although it seems to cover all religious beliefs, it also seems to make some nonreligious beliefs count as religious because it defines *anything* believed to have unconditional reality as a divinity belief. The rub is that this would include not only the divinities of traditional religions but also the proposals of many metaphysical and scientific theories such as matter, Forms, numbers, monads, substances, sense perceptions (or their “permanent possibility”), logical sets and laws, etc. All these—and more—have been overtly defended or tacitly presupposed by theories as being ultimate explainers because they have independent reality. So, it is objected, is not the definition too broad? Is it not obvious that those are not religious beliefs?

But just why is that obvious? To be sure, these beliefs do not occur in the context of a cultic tradition. Neither are they always accompanied by an elaborate set of beliefs and practices concerned with how humans may stand in proper relation to whatever is divine. That is true—but irrelevant! The question was not whether such beliefs are *employed* for the same purpose in theories as they are in cultic traditions. Surely they are not. In religions they are aimed at obtaining the proper personal relation to the divine, while in theories they guide the construction of explanatory hypotheses. But how can those differences possibly cancel the fact that something is being accorded the status of divinity in both cases? If unconditional non-dependence is really the essential characteristic of divinity, merely employing such beliefs differently cannot alter that fact.

What is shown instead is that beliefs about what has divine status play an important role in theories as well as in cultic traditions. This happens because whatever serves a theory as its ultimate explainer could only have *that* status if it also had the status of divinity (and the fact that it may be called “metaphysically ultimate” rather than “divine” changes nothing, so long as the status of unconditional reality is ascribed to it). Thus, determining what has divine status turns out to be as crucial for theories as it is for religion. Whatever has that status is the ultimate guarantor of human destiny in a religion, and is the ultimate explainer in a theory.

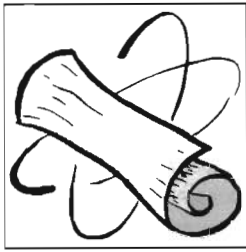
If this sounds strange, recall some of the points made earlier: in many cultic religions, the divine is not personal; in a number of religions, the divine is not worshiped, and in several religions, the divine is matter. Moreover, some religions have no ethic attached to them. For these reasons, the “too-broad” objection strikes me as nothing more than the narrowly culture-bound reaction that it is too different from what the objector is most familiar with. It stems from taking, say, belief in God as the prototype for all religious beliefs, and regarding a belief as religious only to the degree it is like the prototype. So notice that if this objection is allowed to count against the religious nature of the beliefs that guide metaphysics and science, then it must also count against the religious nature of the divinity beliefs of the ancient Greek Mystery religions, Brahman Hinduism, Theravada Buddhism, and a number of other religions.

Let me make one final point. It cannot be denied that Bible writers regard taking anything other than God as unconditionally real to be idolatry as it is ascribing to something other than God the status that belongs only to God.⁷ So if belief in God is the true religious belief, how could believing anything else to have divine status fail to be a contrary *religious* belief? Matter, numbers, sense perceptions, logical sets and classes, etc. are different ideas of *what* is divine from the idea found in the biblical writings, but they have clearly been accorded divine status so far as *what it means to be* divine.⁸

A Belief Is Religious Only if Taken on Faith

This objection says that even if the status of nondependence correctly picks out what is common to all divinity beliefs, that still does not make every such belief religious because it is also essential that religious beliefs be taken on faith. The difference, then, is in the *ground* of a belief rather than its content. Such beliefs are religious when taken on faith, whereas if they are held on the basis of arguments and reasons they are metaphysics.

The first thing to notice is that this objection violates the god rule, having the utterly implausible consequence that belief in God is nonreligious for anyone who accepts a proof of God’s existence! What is worse, its plausibility



Dialogue: Article

Prospects for Theistic Science

Taking [my definition] to be correct, I will now argue that (1) any scientific theory is bound to contain or presuppose some metaphysics and (2) any metaphysical view is bound to contain or presuppose some religious belief. If this is right, then ... understanding the S/R relation as the project of harmonizing two independent sources of information is seriously misguided.

depends on assuming that “faith” means belief without any evidence or belief beyond the evidence. This is a widespread misconception, but it is still a misconception; it is not a biblical use of “faith.” No Bible writer ever uses “faith” to mean blind trust that God is real. The biblical use of “faith” always means trusting the *promises* of God, while the existence of God is called “knowledge.”⁹ This is why Augustine, Aquinas, Luther, Calvin, and Pascal—to name but a few—all held the existence of God to be certain knowledge rather than evidentially deficient belief. The defense of this point is a complex issue that cannot be adequately argued here, so I can only say that a number of recent works in the epistemology of religious belief have offered convincing defenses of it. These works show why there are as many good reasons for saying that belief in God can be knowledge without proof as there are for saying that logical and mathematical laws can be knowledge without proof.¹⁰

I find, therefore, that there simply is no good objection to the definition offered above. Taking it to be correct, I will now argue that (1) any scientific theory is bound to contain or presuppose¹¹ some metaphysics and (2) any metaphysical view is bound to contain or presuppose some religious belief. If this is right, then an important consequence for the S/R relation follows immediately, namely, that *understanding the S/R relation as the project of harmonizing two independent sources of information is seriously misguided*. No (consistent) metaphysical or scientific theory can fail to be compatible with its own presuppositions, just as it cannot fail to be incompatible with presuppositions contrary to its own. *Thus the project of harmonizing a theory with a divinity belief is either unnecessary or impossible.*

Let me reiterate right away that religious and metaphysical beliefs more often guide a theory by *regulating* it rather than providing *constitutive* content. Such presuppositions set parameters for hypotheses rather than supply the hypotheses themselves; the presuppositions under-determine which particular entities a theorist may postulate. So I am not suggesting that a scientist who holds religious belief A will propose or accept hypothesis X, whereas a scientist who holds religious belief B would propose or accept hypothesis Y instead. My claim is that *one or*

another divinity belief regulates how any theory conceives the nature of whatever hypothetical entities it proposes. For example, if matter is regarded as divine, then some form of materialist metaphysics is assumed and the postulates of the scientific theory will be *physical*. By the same token, if sense perceptions are accorded divine status, then a phenomenalist view of reality is assumed and the hypothetical entities will be exclusively *sensory* in nature. For a theory to do otherwise would be for it to postulate entities while at the same time admitting those postulates are not the real explanation of whatever they are being offered to explain. If, say, a materialist postulated a nonphysical entity to explain anything, it could only be as a pro-tem, stop-gap measure pending the real explanation. The upshot is that whenever a theory presupposes some kind of properties-and-laws found in creation (physical, sensory, logical, etc.) as qualifying the nature of divinity, that belief requires that *the nature of its postulated entities correspond to the nature of whatever is believed to be divine*. And there is no way to avoid the issue of the *nature* of the entities postulated by a theory. It is never enough just to say, e.g., there are atoms. We have to know what *kind* of a thing an atom is to know what it can explain.

Religious Belief, Metaphysics, and Science

The foregoing description applies equally to the construction of both metaphysical and scientific theories. The central issue in metaphysics is to specify the ultimate nature of reality. Traditionally, the way such theories have been tackled is by picking a particular kind of properties-and-laws exhibited by the objects of our experience as the essential nature of reality because it is supposed to be the nature of whatever is taken to have nondependent existence. The theory then explains all the rest of reality as either identical with, or dependent on, the divine reality. Whatever cannot be understood in those ways is either reduced to the divine or dismissed as illusion. Examples of such theories were mentioned in the list given earlier, which I will now repeat in a more precise way. This time I will use italicized adjectives for the *kinds* of properties (and laws) selected to qualify the nature of the divine, and will use non-italicized nouns to name

the class of entities supposed to possess that nature and thus have nondependent existence. A brief list of samples from the history of metaphysics goes like this: *mathematical* laws, sets, or numbers; *physical* matter/energy; *sensory* perceptions; *logical* sets, laws, or Forms—to name but a few. Combinations of these have also been advocated, claiming that reality is ultimately *logical* Forms and *physical* matter, *sensory* perceptions and *logical* categories, *logical* minds and *physical* bodies, etc. Thus metaphysics plays an intermediary role between divinity beliefs and scientific theories, and it does so by regulating not only the natures of scientific postulates, but also the very notion of “explain.” For once the divine is taken to be part of the universe, what else could an explanation consist of than showing how that which is to be explained is either eliminated in favor of, identical with, or dependent on, the divine? In other words, from a pagan religious outlook, explanation cannot mean anything other than some form of *reduction*.¹²

Let me reiterate that this does not mean that there is no difference between metaphysics and religion. As I said earlier, in cultic religions, a divinity belief is the basis for other beliefs about how to acquire the benefits of a proper personal relation to the divine. By contrast, metaphysics primarily uses a divinity belief as the basis for constructing explanatory theories. That is an important difference in emphasis, but not one that cancels the religious character of a divinity belief. For whatever is taken to have ultimate reality regulates the explanation of *all* the rest of reality—human destiny included. If anyone wants to say that when such a belief occurs in a metaphysical theory it can just as well be called metaphysical as religious, I will not quibble about terms—as long as that is not taken to mean it has been stripped of its religious import. A divinity belief is the point at which religion and metaphysics converge and so can be spoken of, used, or evaluated in either way. However, even in a metaphysical context, it still purports to yield personal benefit by supplying the correct view of human nature and destiny.

Three Sample Theories from Science

We have now seen the sense in which scientific theories are regulated by some metaphysics, and any theory of reality is regulated, in turn, by some divinity belief. To illustrate this, I will now offer a brief account of how the three major versions of atomic theory held in the twentieth century varied relative to what they presupposed as divine.

Ernst Mach held the view that atomic theory is a “useful fiction” because he took the nature of all reality to be *sensory*. For him, all that we can know to exist are sensations and the feelings that arise from them. So there are no distinctively *physical* properties or laws. He says:

If ordinary matter [is] a ... natural, unconsciously constructed mental symbol for a ... complex of

[sensations], much more must this be the case with the artificial hypothetical atoms and molecules of physics and chemistry?¹³

Moreover, Mach is clear about the metaphysical ultimacy (divinity) his view ascribes to the sensory:

The assertion, then, is correct that the world consists only of our sensations. In which case we have knowledge *only* of sensations.¹⁴

By contrast, Einstein takes physics to be about real, exclusively physical things that exist independently of us and are, in fact, the cause of our sensations. He holds this view despite admitting that we never directly experience anything physical. So whereas Mach starts by taking all we experience to be sensory and claims we cannot get past that, Einstein agrees that all we experience is sensory but denies we cannot discover that there is more. This is because although our perceptions are purely sensory, our concepts have a *logical* nature that is independent of sensation:

the concepts which arise in our thought ... are all ... the free creations of thought which cannot be gained from sense experiences ...¹⁵

This is what makes it possible for us to infer the existence of physical objects independent of our sense perception:

... the concept of the “real external world” of everyday thinking rests exclusively on sense perceptions ... what we mean when we attribute to the bodily object a “real existence” ... [is] that, by means of such concepts ... we are able to orient ourselves in the labyrinth of sense perceptions.¹⁶

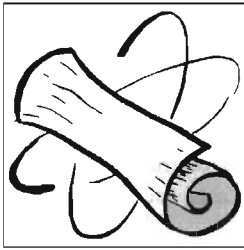
Anyone familiar with the history of metaphysics will immediately recognize this as virtually the same position made famous by Descartes. For both Descartes and Einstein, the mind contains both sensory percepts and logical concepts while extra-mental reality consists of physical/spatial objects. Though perception never directly acquaints us with anything extra-mental, logical/mathematical thinking enables us to conceive of physical objects and to confirm that they exist. As Descartes summed it up:

... all things which, generally speaking, are comprehended in the object of pure mathematics, are truly to be recognized as external objects.¹⁷

Einstein admits this means that we are less than certain there are physical objects, and calls belief in them “the physicist’s faith.” But he adds that the successes of science “give a certain encouragement to this faith.”¹⁸

Is there a divinity belief regulating this view? Einstein thought so. Besides the independent existence of the physical/spatial world, he also acknowledged the divinity of the logical/mathematical principles which make possible both human thinking and the order of nature.

I cannot conceive of a God who rewards and punishes his creatures, or has a will of the kind we



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*If there are
distinct
interpretations
of scientific
hypotheses
that vary
with whatever
is believed
to be divine,
this means
that there
should be an
interpretive
stance for
scientific
theories
that is
unique
to theism.*

experience in ourselves. I am satisfied with ... the awareness and glimpse of the marvelous structure of the existing world ... of the Reason which manifests itself in nature.¹⁹

The difference between Einstein's and Heisenberg's views of the nature of reality is subtler than the difference between Mach's and Einstein's. Both Einstein and Heisenberg believed in the divinity of the physical world and the principles of rationality, with the latter ordering the world and making human thought possible. But for Einstein, rational principles can be known for certain to govern our thinking minds, whereas it is uncertain to what extent they apply to the purely physical reality outside our minds. That is why he called belief in an external world the physicists' "faith."

Heisenberg, however, takes a more restricted view of rationality than Einstein did. For Heisenberg, it was not logical and mathematical laws that chiefly characterize rationality, but the mathematical alone. So while he—along with Einstein—holds that the extent to which our logical concepts apply to reality is doubtful ("we do not know how far they will help us to find our way in the world"), he maintains that mathematical concepts are immune from that doubt. For him, the mathematical order of reality is universal and certain because it is the very nature of reality; mathematical laws govern everything absolutely. This means that although the extra-mental realities physics deals with are forms of energy, they have an essentially mathematical nature. Thus he affirms the old rationalist motto: "the real is rational and the rational is real" while Einstein holds only to the first part, that the rational is real. So while they all believe that whatever mathematical thinking can calculate is to be taken as real, they disagree on the second part as to whether every real thing is mathematically calculable. That is why whereas Einstein held that real objects might have properties we cannot calculate mathematically, Heisenberg denied it:

... when modern science states that the proton is a certain solution of a fundamental equation of matter it means that we can deduce mathematically *all possible properties of the proton* and can check the correctness of the solution by experiments *in every detail* (italics mine).²⁰

Clearly, the difference of Heisenberg's view of physics from Einstein's was due to the different metaphysics he employed, which in turn rested upon a different religious conviction concerning the nature of divinity. For Einstein, reality has a nonrational side as well as a rationally ordered side, and each side has its own independent (divine) principle. But for Heisenberg all reality is essentially mathematically ordered—a view he admitted to be a religious conviction:

... we may hope that the fundamental law of motion will turn out as a simple mathematically simple law ... It is difficult to give any good argument for this hope ... [It] ... *fits with the Pythagorean religion* and many physicists share their belief in this respect, but no convincing argument has yet been given to show that it must be so (italics mine).²¹

The General S/R Relation

A similar case can be made for the religious regulation of theories in every other discipline from mathematics to ethics.²² This provides a powerful case for the view that the most general S/R relation lies at the level of divinity beliefs acting as regulative presuppositions to theory making. That does not mean there is no work to be done dealing with conflicts between specific hypotheses and specific religious beliefs, or with occasions in which a religious teaching may actually be part of a theory. Ditto for cases of specific religious ideas inspiring a specific scientific hypothesis. These have their place. But none of these can be properly evaluated without examining the metaphysical/religious presuppositions that determine the precise meaning of a hypothesis. Without recognizing this underlying relation, trying to understand the specific ways this or that religious belief may relate to this or that hypothesis is like trying to understand the outline of the continents by examining the impact of each wave on their shoreline while ignoring the movement of their tectonic plates. Waves make some difference to a shoreline, just as specific religious concepts occasionally impact scientific theories and vice versa. However, the first is not the best way to explain the shape of the continents any more than the second is the way to explain what is most basic to the S/R relation.

If there are distinct interpretations of scientific hypotheses that vary with whatever is believed to be divine, *this means that there should be an interpretive stance for scientific theories that is unique to theism*. To put the same point another way: if every other belief about what is divine makes crucial differences to metaphysics and hence to science, why would belief in God be the only one that does not? This must especially be the case if the belief that God alone is divine rules out anything else as having that status. In that case, it is not the mathematical, physical, sensory, logical, or any other kind of properties-and-laws found in creation that qualify the ultimate reality and explain all the nondivine kinds. So how could this view fail to make a difference?²³

A Theistic Perspective for Metaphysics and Science

The Perspective Approximated

The earliest theories we know of were invented by thinkers who did not know God. So what the Psalms, prophets, and New Testament say is typical of fallen humanity was true of these people too: they took something about the created universe to be divine rather than God (Rom. 1:25). As Werner Jaeger put it:

When Hesiod's thought at last gives way to truly philosophical thinking, the Divine is sought within the world – not outside it as in Judeo-Christian theology that develops out of the book of Genesis.²⁴

The paganism of the Greek thinkers, e.g., was expressed in their holding the divine to be earth, air, fire, water, atoms, numbers, matter, and Forms plus matter. And from the start, such theories defended their candidates for divinity with the strategy we now call “reduction”: they argued that everything is either identical with, or dependent on, their favored candidate for divinity.

Unfortunately, when theists joined the theory-making enterprise, they generally pursued the same reductionist strategy for explanation. Despite the fact that they recognized and rejected the pagan religious assumptions behind that strategy, they failed to recognize that it is by requiring its rejection that theistic belief can play its proper regulative role. So instead of developing distinctively non-reductionist theories, most theists attempted to neutralize the pagan content of reductionist theories but maintain the strategy itself. To do that, they devised a simple ploy, namely, they stipulated that whatever it is in creation that everything else reduces to, in turn depends on God. In this way, everything still depends ultimately on God, even though the resulting theories still explain their data in exactly the same way whether the theistic stipulation is appended or not. So although the explanatory power of such a theory still rests entirely on something in creation, that something is taken to be a penultimate rather than the

ultimate reality. This allows belief in God to be compatible with virtually any theory, and so supports the idea that belief in God has no role for theories other than ruling out those that flatly contradict it. It leads to a position that an atheist philosopher once criticized this way: “Don’t you see that God is just a fifth wheel for theories? It makes no difference to the content of a theory whether you add belief in God or not, so why bother?”

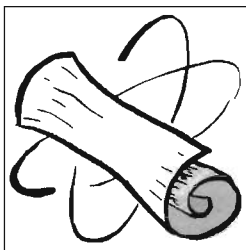
The Universal Impact of Religious Belief

The most regrettable thing about this ploy for making reductionist hypotheses theistically acceptable is that it is outright denied by biblical teaching, and thus violates its own rule that a theory is unacceptable if it contradicts revealed truth! The texts referring to the fear of the Lord as “the principle part of wisdom and knowledge” (Ps. 111:10; Prov. 1:7, 9:10, 15:33; and Jer. 8:9) are well known, but are often dismissed as poetic hyperbole. So I will pass them by for now.

More significant is Jesus’ remark in Luke 11:52 that those who distort God’s law have “taken away the key to knowledge.” Notice he does not say – as those who try to retain reductionist theories would have it – that distortions of God’s Word take away the key to the knowledge of God. He just says “knowledge.” Those who favor the ploy for keeping reductionist theories may want to claim the expression is elliptical in this respect. But compare it to 1 Cor. 1:5 where Paul asserts that knowing God through Christ has enriched us with respect to “*all* wisdom and knowledge.” This does not sound at all like hyperbole or an elliptical expression, and it cannot mean only the knowledge of God. For later in the same book (12:8), he speaks of the various gifts God gives to believers, and includes the gift of knowledge. Then, in chapter 13 he says that the gift of knowledge will pass away along with other gifts such as tongues and prophecy, but the knowledge of God will be perfected. Hence the knowledge that is impacted by knowing God is not just (redundantly) the knowledge of God.

No knowledge is religiously neutral.

Finally, it is important to notice the way many Scriptures use the metaphor of light to stand for truth, and use being “enlightened” to mean acquiring knowledge. Psalm 43:3 confirms this usage when it declares “send out your light, even truth.” So when Ps. 36:9 asserts that “in [God’s] light we see light” it certainly sounds *prima facie* that it is saying precisely what 1 Cor. 1:5 says, namely, that the knowledge of God plays a key role in the acquisition of all other sorts of truth. The New Testament



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Prospects for Theistic Science

*All the entities
found in the
universe,
along with all
the kinds of
properties
they possess,
all the laws
that hold
among
properties of
each kind,
as well as
causal laws,
and all the
precondition-
relations that
hold between
properties of
different kinds,
depend not
only ultimately,
but directly,
on God.*

continues the use of these metaphors. For example, 2 Cor. 4:3–6 says that unbelievers are blind to seeing the light of the Gospel and affirms that this “light” is the “knowledge of God.” With this in mind, Eph. 5:9 gives the strongest statement of all by insisting that the consequences of that light are to be found “in *all* that is good, just, and *true*.”

I conclude, therefore, that the cumulative effect of these passages is to support the general biblical outlook that a right view of creation depends upon knowing its Creator, so that no knowledge is religiously neutral. This conclusion bequeaths to us the question of understanding how belief in God could have such a universal impact. Surely it cannot be the fundamentalist program of deriving (or confirming) theories from Scripture; not even the most fervent fundamentalist ever thought that *all* knowledge and truth could be so derived! But what if this point is taken in conjunction with the way we have now seen divinity beliefs impact even the most abstract theories? What if we understand it to refer to the way belief in God can regulate how the natures of creatures – postulates included – are conceived?

We have noted how the reductionist strategy for explanation originated with the religious outlook that identified the divine as some part or aspect of the created universe. And we have seen why the traditional ploy for neutralizing the anti-theistic roots of that strategy fails. So why is not the most plausible interpretation of the universal impact of belief in God precisely that it requires the rejection of reduction? Why not say that the regulative principle to be derived from theism is that since nothing in creation is divine, nothing in creation is that to which all else is to be reduced? Instead of trying to stay as close to the pagan-based strategy as possible, why not start with the principle that whenever a theory is reductionist, it has gone astray?²⁵ (Please notice that this would make nonreduction a necessary but not sufficient condition for the truth of a theory. A theory may be nonreductionist and its hypothesis simply wrong; but no matter what truth it hits on, a theory will be partly false if reductionist.)

At its heart, this principle is no more than an extension of the doctrine that God created the heavens and earth. Nothing within the

universe is uncreated: no thing, event, state of affairs, or relation, or class of them. Ditto for the kinds of properties those entities possess and for the laws governing them. All depend on God. There is, therefore, no reason for a metaphysics that eliminates either the entities we experience or any of the kinds of properties and laws we experience to be true of them. Nor is there any reason for claiming that there are entities whose nature is to have only the kind of properties that qualify divinity, and then take those entities to be the cause of the existence of all the other kinds of entities, properties, and laws found in creation. (For example, the theory that there are solely physical/spatial things which combine so as to produce new things in which emerge other kinds of properties such as biotic, sensory, logical, linguistic, etc.).

From a nonreductionist point of view, there is no created kind of properties and laws that *causes* the existence of the other kinds of properties and laws. Although specific properties of one kind are often preconditions for the *occurrence* of specific properties of other kinds, such preconditions are never the sufficient condition for why there are such other kinds at all. Rather, all the entities found in the universe, along with all the kinds of properties they possess, all the laws that hold among properties of each kind, as well as causal laws, and all the precondition-relations that hold between properties of different kinds, depend not only ultimately, but directly, on God.

This notion of a systematically nonreductionist metaphysics able to regulate scientific theories, is not merely a promissory note or future hope. Such a theory has already been worked out brilliantly and in impressive detail, and I find it to exceed any other I know of in its explanatory power. As you would expect, it is far too complex to be explained here.²⁶ It does not, however, rest only upon religious objections to reductionism but offers a philosophical critique of it as well. So I will close with a brief statement of part of that critique.

An Anti-Reductionist Argument

The key issue for the reductionist strategy is its claim to have located in creation the *kind* of thing(s) that exist(s) independently. That is the reductionist’s reason for explaining by reducing everything else to that kind of thing. Thus the reductionist—whether

pagan or theist—has to say that whatever is identified as basic to everything else is basic in the sense of being able to exist independently of the things it explains.

So let us now focus on the alleged independence of any particular *kind* of things. Can any kind of properties-and-laws so much as be conceived apart from all the others? Reduction says, yes. It claims the basic realities are purely *physical*, or *sensory*, or *logical*, or whatever. To see if this makes sense, I ask that you now perform a thought experiment. The experiment is to try to think of any of these kinds of properties-and-laws as having independent reality. In other words, let us try to conceive of what it would mean for anything to be *exclusively* physical, or sensory, or logical, etc. Can we really do this? To make the experiment more specific, let us try it on the three views of an atom we discussed earlier.

Start with Mach's theory. Try to conceive of any meaning for "sense perception" that is *purely* sensory—restricted to only sensory properties. Take any ordinary perception and one by one strip away from it every property that is quantitative, spatial, physical, biotic, logical, linguistic, etc. Now tell me what you have left. When I try it, I get nothing at all. I cannot so much as frame the idea of anything as purely sensory. Yet that is what Mach says everything is. Thus he rejects that there are physical objects and holds atomic physics to be a "useful fiction."

Now try it for Einstein's metaphysics. Start with his view of percepts. It is the same as Mach's, so if you could not conceive of anything purely sensory in the last experiment you will not get anything now either. Next take his view of concepts. As opposed to Mach, Einstein held that our minds contain purely logical concepts in addition to purely sensory percepts. This is what he regarded as our share of the divine Reason in the world. But what is left of the idea of "logical" once it is stripped of all connection to every other sort of property-and-law? Even the fundamental axiom of noncontradiction says that nothing can be both true and false in the same *sense* at the same *time*. It therefore contains an essential reference to other "senses" (other kinds of properties) and to time. But if we cannot so much as conceive of logical properties or laws in isolation, how can we justify the claim that they have independent existence? What reasons can be given for believing the truth of a claim we literally cannot frame any idea of? Finally, take Einstein's view of the nature of extramental objects. They are supposed to be purely physical. But can you form a concept of anything purely physical? If you mentally strip all that is quantitative, spatial, sensory, logical, and linguistic from a thing, what is left of its *physical* characteristics?

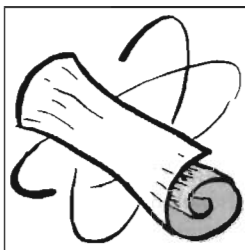
The same conceptual failure plagues the metaphysics of Heisenberg's theory as well. Reality is essentially physical *and* mathematical for Heisenberg (recall that he admitted

that his view, like that of the Pythagoreans, regarded numbers and mathematical laws as divine). But once again: can you conceive of what it means for anything to be quantitative if that idea is held in isolation from all other kinds of properties-and-laws? What, for example, is left of our notion of a law of mathematics if it is stripped of every logical and linguistic property? Can there be a mathematical concept that does not logically distinguish what it includes from what it excludes? Can such a concept both include and exclude the same thing at the same time? Or can we have a concept of a mathematical law that is not expressed in language?

There is no good reason for theists to retain the reductionist strategy for theories ... every argument ever given for every version of it has failed for over 2,500 years because every deification of some aspect of the creation is unjustifiable because it is inconceivable.

Please do not misunderstand the purpose of these experiments. They are not intended to show that every pagan idea of divinity is false, and still less to be proofs of God. Their purpose is to show that there is no good reason for theists to retain the reductionist strategy for theories. That strategy does not possess powerful theoretical advantages the theist needs to salvage. On the contrary, every argument ever given for every version of it has failed for over 2,500 years because every deification of some aspect of the creation is *unjustifiable* because it is *inconceivable*. Pagan divinity beliefs (like belief in God) are not conclusions of arguments or inferences from evidence; they are imported to science rather than derived from, entailed by, or required by it. *And it is high time theists brought relief to science from the dogma of reduction.*

Consider just one benefit of a nonreductionist standpoint relative to the atomic theories discussed above. From this view, there are no such things as purely physical atoms, purely sensory percepts, or purely logical concepts. In a nonreductionist metaphysics, everything in the universe has *all* these (and other) kinds of properties and is governed by *all* these (and other) kinds of laws. This means that not only the things of everyday experience, but also the postulates of science are to be thought of as



Dialogue: Article

Prospects for Theistic Science

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"multi-aspectual." So if atoms really exist—and surely the evidence for that is overwhelming!—they too are multi-aspectual. Atoms have not only quantitative, spatial, kinematic, and physical properties but also (though in a different sense)²⁷ biotic, sensory, logical, linguistic, and many other kinds of properties, and are governed by every kind of laws that hold in the created universe. This point alone yields a distinctive result for atomic theory as compared with the three just reviewed.

This same approach can yield a distinctively nonreductionist version of theories in math, biology, psychology, logic, etc. as well as physics. There is, for example, a nonreductionist version of human evolutionary origins²⁸ just as there is a nonreductionist view of atoms. In recent years, a number of thinkers have produced some remarkable work from this nonreductionist standpoint, and in some cases, have actually solved or obviated some longstanding problem in a science. For example, there has been an impressive treatment of the history of physics,²⁹ of the old question as to whether there is a real or only potential infinity in math,³⁰ and there have been innovative cases of problem solving (or avoidance) in biology.³¹ Moreover, I find it significant that an increasing number of nontheistic thinkers in many fields have been calling for, and attempting to develop, nonreductionist theories. Why not? After all the years of one-sided exaggerations provoking and being replaced by other one-sided exaggerations, it is high time to look for something better. And it is just such a better, nonreductionist, program for explanation that theism can supply to science if it would only stop trying to baptize the pagan strategy for theorizing, and begin living up to its own true legacy.

⌘

Notes

¹For example, W. C. Smith, *The Meaning and End of Religion* (New York: Harper & Row, 1978), see esp. pp. xiv, 11 ff., 141 ff.

²This shows that atheism and religion are not opposites, and that the rejection of God (or gods) is not the same as having no religion at all. Atheism relates to religion the way vegetarianism does to eating: what someone does not believe to be divine does not tell us what he does believe to have that status, any more than knowing someone is a vegetarian tells us what she likes to eat.

³For an account of yet other difficulties with this definition and with several other definitions, see chap. 2 of Roy A. Clouser, *The Myth of Religious Neutrality* (Notre Dame, IN: University of Notre Dame Press, 2005).

⁴This definition was held by Plato and Aristotle, and Werner Jaeger has shown that it was common property of a number of pre-Socratic Greek thinkers in *The Theology of the Early Greek Philosophers* (New York: Oxford University Press, 1960). In the past century alone, it was also held by W. James, *The Varieties of Religious Experience* (New York: Longmans, Green and Co., 1929), 31, 34; A. C. Bouquet, *Comparative Religion* (Baltimore, MD: Penguin Books, 1973), 21, 38, 45, 48; M. Eliade, *Patterns in Comparative Religion* (New York: The New American Library, 1974), 24–30; H. Dooyeweerd, *A New Critique of Theoretical Thought 1* (Philadelphia, PA: Presbyterian & Reformed Publishing Company, 1955), 57; N. K. Smith, *The Credibility of Divine Existence* (New York: St. Martin's Press, 1967) 396; Paul Tillich, *Systematic Theology 1* (Chicago: University of Chicago Press, 1951), 9, 13; Hans Kung, *Christianity and the World Religions* (Garden City, NY: Doubleday & Co., 1986), xvi; and C. S. Lewis, *Miracles* (New York: Macmillan, 1948), chapters 2 and 4.

⁵This is so for those religions in which demons and jinn are regarded as minor deities or where there are malevolent divinities such as the Dakota Indian evil Great Spirit. See James Fraser, *The Golden Bough* (New York: Macmillan Co, 1951), 308. Plato is also an example since he insisted on an evil world Soul as well as a good one (Laws X, 896.).

⁶Although the monism of Hinduism and Buddhism seems to preclude any dependency relation, the very distinction between the divine and the illusory world (Maya) still leaves a relation to be explained. Hinduism explicitly deals with the point, teaching that Brahman-Atman generates the illusion; Buddhism generally avoids the topic on the grounds that it is spiritually unhealthy to think about the illusory world at all. Compare Robert Neville's *The Tao and The Daimon* (Albany, NY: SUNY Press, 1982), 116.

⁷Scripture accords this status to God in several places. God's holy name revealed to Moses is said to be "I am that I am" (Exod. 3:13), which connotes God's self-existence. In Isa. 42:8, God says: "'I am' is my name; my glory I give to no other, nor my praise to graven images" thereby connecting God's identity with his self-existence which is the glory not to be ascribed to anything else. Isa. 6:3 confirms this when it says: "Holy, holy, holy is the I am of hosts; to fill the whole earth is his glory." This connects God's holiness to his self-existence and his self-existence to his being the Creator who fills earth with creatures. Moreover, Isaiah calls giving that status to anything other than God "idolatry" (having a false god). And finally, Rev. 4:8–11, after repeating the quote from Isaiah 6, declares that God is worthy to receive glory, honor, and power, *because* he has created all things.

In short, while the average worshiper may not always focus on God's aseity, the things for which he is most often praised and thanked, all presuppose it; God's promises are reliable just because his existence is unconditional and all else depends on him. Compare Calvin's remarks, *Institutes*, I, x, 2 and I, xiv, 3.

⁸In many theories, however, such beliefs function both metaphysically and as cultic religion. They provide personal guidance for values, attitudes, ethics, happiness, and a view of human destiny. This is evident for the theories of Pythagoras, Plato, Aristotle, Epicurus, and Lucretius, and also of Hegel, Marx, Bradley, Whitehead, Heidegger, Sartre, and Russell.

The following prayer to the number 10 evinces that for the Pythagoreans numbers were divine in both the cultic and metaphysical senses:

Bless us divine number, thou that generatest gods and men!
O holy, holy tetraktys, thou that containest the root and source of eternally flowing creation. For number begins with the profound, the pure unity until it comes to the holy four; then it begets the mother of all, the all-encompassing, the all-bounding, the first born, the never-swerving, never tiring holy ten, the keyholder of all (T. Dantzig, *Number: the Language of Science* [Garden City, NY: Doubleday Anchor, 1954], 42).

Also, keep in mind that some ancient Greek mystery religions referred to the divine as the "everflowing stream of life and matter," and one form of present day Hinduism teaches that Brahman-Atman is matter. This shows that it is not *what* is believed to be divine which makes a belief religious, but whether it is accorded unconditional reality.

⁹Bible writers always speak of believers as "knowing God." For example, Deut. 4:35 says that God has revealed himself so that Israel may "know" him, and Ps. 19:7 says that God's Word is certain. John 6:69 says that God's people "both believe and know" the truth about God, and 1 Tim. 4:3 also speaks of those "who know and believe the truth." First John 2:21 addresses believers as those who "know the truth and that no lie comes from the truth." Believing God is real, then, is never *mere* belief but is also knowledge.

¹⁰For example, Alvin Plantinga, "Reason and Belief in God" in *Faith and Rationality*, Plantinga & Wolterstorff, eds. (Notre Dame, IN: University of Notre Dame Press, 1983), 16-91; and Alvin Plantinga, *Warranted Christian Belief* (New York: Oxford University Press, 2000); Nicholas Wolterstorff, "Can Belief in God Be Rational If It Has No Foundations?" in *Faith and Rationality*, 135-86, and —, "The Migration of the Theistic Arguments: From Natural Theology to Evidentialist Apologetics" in *Rationality, Religious Belief, and Moral Commitment*, Audi & Wainwright, eds. (Cornell University Press, 1986), 38-81; W. Alston, *Perceiving God* (Cornell University Press, 1991); and Roy Clouser, *Knowing with the Heart: Religious Experience and Belief in God* (Downers Grove, IN: InterVarsity Press, 1999).

¹¹"Presuppose" is used here in a broadly epistemic sense as a belief condition, rather than a strictly logical truth condition. Formally: a belief *x* presupposes another belief *y*, if and only if *x* and *y* are not identical; one would have to believe *y* in order to believe *x*; *y* is not believed on the grounds of *x*; and *x* is not deduced from *y*.

¹²It should be clear by now that not every use of "reduction" is of the ontological sort I am finding theistically objectionable. A rough breakdown of objectionable types is as follows: (1) *Meaning Replacement*: The nature of reality is exclusively that of *X* kind of properties governed by *X* laws, since all non-*X* terms can be replaced by *X* terms with no loss of meaning. (Berkeley, Hume, and Ayer argued this way to defend positivism.) (2) *Factual Identity*: The nature of reality is constituted by exclusively *X* kind of properties governed by *X* laws, even though non-*X* terms cannot be wholly replaced by *X* terms. The defense of *X* is that the only or best explanations of everything whatever are those whose primitive terms refer to *X* properties and laws. (J. J. C. Smart defended materialism this way.) (3) *Causal Dependency*: The nature of reality is basically constituted of *X* properties and laws, while there is a one-way dependency of all non-*X* properties and laws on the *X* kind. (Aristotle and Descartes defended their theories this way.) (4) *Epiphenomenalism*: This is much like causal dependency except that the non-*X* kinds of properties are thought to be much less real. They have no laws of their own, e.g., and cannot be objects of scientific investigation. (Skinner defended his behaviorism this way.)

These strategies can be combined in various ways. It should also be noted that some thinkers use "supervenience" to designate an order in the appearance of properties without wishing to commit to an ontological reduction in any of the senses defined above. That would be unobjectionable if it did not entail any of the objectionable types.

¹³J. Blackmore, "The Conservation of Energy" in *Ernst Mach* (Berkeley, CA: University of California Press, 1972), 49.

¹⁴The Analysis of Sensations, quoted in Blackmore, *Ibid.*, 327, n. 14.

¹⁵Einstein, *Ideas and Opinions* (New York: Bonanza Books, 1954), 22.

¹⁶*Ibid.*, 290-1.

¹⁷R. Eaton, ed., *Descartes Selections* (New York: Scribners, 1953), 178.

¹⁸Einstein, 295.

¹⁹*Ibid.*, 11.

²⁰Heisenberg, *Physics and Philosophy* (New York: Harper, 1958), 74-5. In reply to this, Einstein once quipped: "Not everything that can be counted counts, and not everything that counts can be counted."

²¹*Ibid.*, 72-3.

²²For an account of how such religious regulation also holds for theories in math and psychology, see chapters 7 and 9 of Clouser, *The Myth of Religious Neutrality*. For the case as to why such regulation is unavoidable, see chapter 10.

²³This bears on the controversy about whether both theists and nontheists should do science as "methodological naturalists." If that meant only that science, as such, should not appeal to miracles, I would agree. But it cannot be correct that it is proper for theists to proceed as though any part of created reality exists independently of the rest of it, and is thus the ground of the existence of the rest.

²⁴Jaeger, *The Theology of the Early Greek Philosophers*, 17.

²⁵Notice that although I have been speaking of theories, this point has universal impact because it extends to every *concept*, not just every hypothesis. Any concept, fully explicated, is either reductionist or not. The point therefore impacts all truth and knowledge which is the gist of the Scripture passages cited.

²⁶This point, along with the rest of the nonreductionist theory of which it is a part, is developed in Herman Dooyeweerd, *A New Critique of Theoretical Thought* 4 vols. (Lewiston, NY: The Edwin Mellen Press, 2005) His nonreductionist metaphysics is in vol. 3. I have summarized many of its main points in chapters 10-13 of *The Myth of Religious Neutrality*.

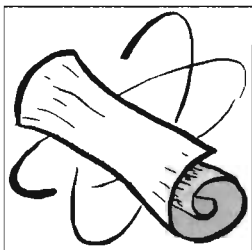
²⁷A thing may possess a property actively or passively. Thus objects can be seen (passively) to be red that cannot (actively) see, and objects can be (passively) conceived that cannot (actively) form concepts. In this same way, it is plausible that all things have passive properties of every kind including biotic, sensory, logical, linguistic, economic, ethical, etc. See Clouser, *The Myth of Religious Neutrality*, chapter 11.

²⁸See my articles, "Genesis on the Origin of the Human Race" in *Perspectives on Science and Christian Faith* 43, no. 1 (March 1991); and "Is Theism Compatible with Evolution?" in *Intelligent Design Creationism and Its Critics: Philosophical, Theological, and Scientific Perspectives*, ed. R. Pennock (Cambridge, MA: MIT Press, 2001).

²⁹Marinus Dirk Stafleu, *Time and Again* (Toronto: Wedge Publishing, 1980).

³⁰D. F. M. Strauss used a nonreductionist metaphysical basis to solve the old conundrum in mathematics as to whether there is actual or only potential infinity. See "Primitive Meaning in Mathematics: The Interaction among Commitment, Theoretical Worldview and Axiomatic Set Theory" in *Facets of Faith and Science* 2, ed. J. Van der Meer (Lanham, MD: University Press of America, 1996), 231 ff.

³¹In "The Influence of Evolutionary Biology on Hierarchical Theory in Biology, with Special Reference to the Problem of Individuality," Uko Zysra exposes some severe difficulties with regarding evolution reductionistically. See Van der Meer, ed., *Facets of Faith and Science* 2, 287 ff. See also his "Intelligent Design Theory: A Case for Biotic Laws" in *ygon* 39, no. 1 (March 2004).



Dialogue: Response

Is Clouser's Definition of Religious Belief Itself Religiously Neutral?



Pierre Le Morvan

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Is Clouser's Definition of Religious Belief Itself Religiously Neutral?

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Let me begin by noting points of agreement and my admiration for Roy Clouser's project. "Prospects for Theistic Science" strikes me as correct in the main. I agree that no theory, scientific or otherwise, can escape having religious presuppositions. This extremely important point merits far more attention than it has yet received in the literature. I also concur with his definition of religious belief. I know of none more accurate or comprehensive. Going beyond noting points of agreement, however, this response will point to some key areas where Clouser's stance on religious neutrality deserves further discussion and clarification.

In his article, Clouser builds on some central points articulated in his *The Myth of Religious Neutrality*. In both works, he deploys what he takes to be the correct definition of religious belief to show that no theory is religiously neutral in the sense of having no religious presuppositions. Though he wisely does not conflate definition with theory, one interesting question worth posing in this connection concerns whether Clouser's definition of religious belief is itself religiously neutral.¹ Note that "religious neutrality" can be taken in at least two senses:

- (1) x is religiously neutral if and only if it has no religious presuppositions,
- (2) x is religiously neutral with respect to y relative to religious presupposition(s) p if and only if x and y share presupposition(s) p .

Understanding (1) and (2) requires understanding what is meant by "presupposition." Following Clouser, we may understand it as a belief informationally required for another belief; thus, "no one could coherently hold the belief while denying any of its presuppositions, even though its presuppositions are not known by being logically inferred from the other belief."² Worth noticing here is that "a presupposition need not be conscious to exercise its influence on the other beliefs of the one who believes it."³

Employing Clouser's definition of religious belief articulated in "Prospects for Theistic Science," we may thus say that for x to be religious neutral in sense (1) is for x to have no presupposition about the divine "no matter how that is described," or no presupposition "about how the nondivine depends on the divine," or no presupposition "about how humans may stand in proper relation to the divine, where the meaning of 'divine' is (minimally) having the status of utterly unconditional reality" (see p. 6).

Let me explain religious neutrality in sense (2) with an example. Take the Jewish and Muslim faiths. Though they differ in numerous respects, as monotheistic faiths they also share a number of religious presuppositions. Consider the overlap in the religious presuppositions of these two faiths. Call these " p ." The Jewish faith is religiously neutral in sense (2) with respect to the Muslim faith (and vice versa) relative to p . Religious neutrality in sense (2) is thus a relational notion.

Having distinguished senses (1) and (2) of "religious neutrality," the following issues come to the fore. To begin, I see no reason

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to think that Clouser would take his definition of religious belief to be religiously neutral in sense (1). If he did so, then it would presumably follow on his view that *definitional religious neutrality* in sense (1) is not only possible but actual, as exemplified by his own definition of religious belief. And why should this definition be the only one so neutral? If definitional religious neutrality is not only possible but actual in one case, why could it not be so in others?

How does [Clouser's definition of religious belief] capture the essence of religious beliefs qua religious belief that have religious presuppositions at odds with his?

Accordingly, clarification of Clouser's position on the following matters would be helpful. First, to the extent that his definition of religious belief is *not* religiously neutral in sense (1) and therefore has religious presuppositions, should he not concede that it would be justifiably rejected by those who reject for whatever reasons these presuppositions? Or is his position that his definition has religious presuppositions that no one may justifiably reject? Second, I understand that Clouser has argued at length that his definition captures the essence of religious beliefs *qua* religious belief. However, if his definition of religious belief has religious presuppositions that many may reject, how does it capture the essence of religious beliefs *qua* religious belief that have religious presuppositions at odds with his? Does it capture the essence of religious beliefs *qua* religious belief in virtue of at least some religious presuppositions shared by all religious beliefs?

These questions naturally lead us to consider whether Clouser's definition of religious belief is religiously neutral in sense (2). It either is or is not. Suppose Clouser took the position that it is. In fact, Clouser appears to commit himself to the religious neutrality in sense (2)—and so, of the non-neutrality in sense (1)—by pointing out that his definition of religious belief has been endorsed by significant Christian and non-Christian thinkers alike (p. 14, note 4).⁴ Although these Christian and non-Christian thinkers undoubtedly differ on a number of religious presuppositions, their religious presuppositions presumably overlap to a sufficient degree for them to concur on the definition of religious belief. For how else could they so concur? Moreover, since Clouser has argued at length that

his definition captures the essence not just of Christian or even monotheistic religious belief, but of religious belief *tout court*, would it not follow that it has to be (to that extent at least) religiously neutral in sense (2)? Has Clouser not uncovered one or more shared religious presupposition(s) of all religious beliefs, and does this not show that definitional religious neutrality in sense (2) is not only possible but actual, as exemplified by his own definition of religious belief? And if definitional religious neutrality in sense (2) is not only possible but actual in one case, could it not be so in others?

Suppose Clouser took the position that his definition of religious belief is not religiously neutral in sense (2). To the extent that it is *not* so neutral and therefore has religious presuppositions not shared by those who accept other religious presuppositions, we may ask yet again whether the latter would not be justified in rejecting this definition on whatever grounds they have for rejecting Clouser's religious presuppositions. Yes, Clouser has argued that his definition captures the essence of all religious beliefs *qua* religious belief (or at least of all those he is familiar with); but if his definition of religious belief has religious presuppositions not shared by those who accept other religious presuppositions, a question arises once more concerning how his definition could succeed in capturing the essence of religious beliefs *qua* religious belief that have religious presuppositions at odds with his own.

Finally, though I have briefly explored herein whether Clouser's definition of religious belief is religiously neutral in senses (1) and (2), I think it would be helpful for Clouser and his defenders to clarify whether any theory of religious (non)neutrality they maintain is itself religiously (non)neutral in senses (1) and (2). I see no way of neatly separating the issues raised herein concerning definitional religious neutrality from theoretical religious neutrality.

Summary

This response paper distinguishes between two kinds of religious neutrality: (1) *x* is religiously neutral if and only if it has *no* religious presuppositions, and (2) *x* is religiously neutral with respect to *y* relative to religious presupposition(s) *p* if and only if *x* and *y* share presupposition(s) *p*. I raise the question whether Clouser's definition of religious belief is itself religiously neutral in senses (1) and (2), and argue that his views thereon deserve further discussion and clarification. ☞

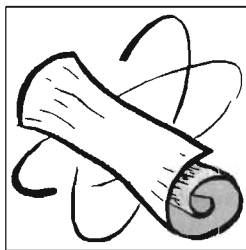
Notes

¹Strictly speaking, it would be more accurate to say "whether believing Clouser's definition of religious belief is religiously neutral."

²Roy Clouser, *The Myth of Religious Neutrality* (Notre Dame, IN: Notre Dame University, 1991), 106.

³*Ibid.*, 106.

⁴Cf. Clouser, *The Myth of Religious Neutrality*, 16–24.

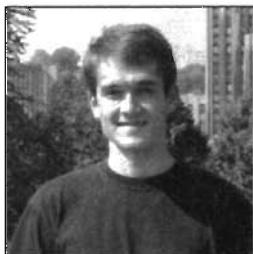


Dialogue: Response

Comments on Clouser's Claims for Theistic Science

Comments on Clouser's Claims for Theistic Science

Hans Halvorson



Hans Halvorson

*Clouser's
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In "Prospects for Theistic Science," Roy Clouser sketches a framework for the relationship between religious and scientific beliefs. In particular, he develops—building on previous work¹—a neo-Calvinist view, according to which religious belief is a presupposition of, and is relevant to, any other body of beliefs.

According to Clouser, we should expect religious beliefs to play a "regulative," rather than a "constitutive" role with regard to scientific theorizing. (Indeed, Clouser indicates that religious beliefs do, in fact, regulate scientific theorizing—whether or not we are aware of it.) That is, while we should not typically expect religious beliefs to provide the content of scientific theories, we should expect religious beliefs to provide a methodological framework within which scientific theories are developed and evaluated.

What is more, Clouser claims to have identified the central methodological maxim of Western monotheism (henceforth, "theism"): reject reductionism—that is, do not attempt to explain everything in terms of the structure and behavior of a special class of "fundamental" entities within the created universe. According to Clouser, this methodological maxim is a corollary of the doctrine of creation: God is the only self-existent being.

Clouser's proposal holds out the promise for a more systematic approach to questions about science and religion. Nonetheless, there remain a few issues on which one might press for clarification.

First, Clouser claims that theists and atheists alike believe that there is a privileged class of self-existent (or "divine") beings; they differ only on which beings they identify as divine. Clouser also claims that religious beliefs regulate scientific theorizing because a scientist will attempt to reduce everything to (or, explain everything in terms of) what she takes to be the self-existent beings. But this proposal comes into tension with Clouser's claim that the theist should be a nonreductionist. In particular, if Clouser is correct that a scientist will try to explain everything in terms of what she thinks are the self-existent beings, then will not the theistic scientist attempt to explain everything in terms of his divinity, viz., God? If this is so, then in what sense is the theist different from the atheist? In what sense is the theist a nonreductionist?

Now, Clouser might claim that there are crucial differences between the two cases—e.g., the atheist's divinities are "located within the universe" (see p. 9). But, what is it about a thing's being located outside the universe that makes explanation in terms of that thing nonreductionist? Or is it that we cannot explain facts about the universe in terms of something that is not in the universe? And, if so, why not? In general, it would be helpful to have the notion of being "located within the universe" spelled out more precisely. "Located within the universe" cannot mean "in space and time," because numbers, sets, and sense perceptions are not in space and time, but Clouser clearly thinks of them as located in the universe. Similarly, it will not do to say that a thing is located in the universe if it is causally connected to things in space and time, because that would arguably entail that God is in the universe, but numbers are not. Finally, we cannot define the universe to be the collection of things that are dependent on something else, or created, because then

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on Clouser's view, even the atheist's divinities would be (according to her belief system) outside the universe.²

If Clouser is correct that a scientist will try to explain everything in terms of what she thinks are the self-existent beings, then will not the theistic scientist attempt to explain everything in terms of his divinity, viz., God? If this is so, then in what sense is the theist different from the atheist? In what sense is the theist a nonreductionist?

Second, it would be interesting to consider Clouser's proposal in light of the distinction between the content of a scientific theory and an interpretation of that theory. For example, it is standard among philosophers of science to distinguish between quantum mechanics (as a recipe for deriving predictions about the outcomes of various experiments) and some interpretation of quantum mechanics—

say, Bohmian mechanics or Everett's "many worlds" interpretation. While there seems to be little question that everyone should accept quantum mechanics as approximately true, the theist will justifiably think that some attempts to interpret quantum mechanics are motivated by a confused idea about the aim and scope of physical theory. For example, the Everett interpretation has sometimes been motivated by the idea that fundamental physics needs to "explain" the emergence of consciousness.³

Finally, Clouser claims that "there is no good reason to retain the reductionist strategy for theories" (p. 13). However, this claim is too strong. The reductionist strategy has been, and continues to be, extremely fruitful in the development of physics—witness the enormous success of the kinetic theory of gases, or of the standard model of particle physics. Indeed, it could be positively harmful to the interaction between religion and science if theists attempted to develop some special sort of "nonreductionist physics." But even if reductionism might be a helpful strategy within a particular science, Clouser has given compelling grounds for suspicion of attempts to globalize this strategy. ¶

Notes

¹Roy Clouser, *The Myth of Religious Neutrality*, 2d ed. (Notre Dame, IN: University of Notre Dame Press, 1994).

²Perhaps Clouser would use Dooyeweerd's notion of "modal aspects" to make the appropriate distinction: viz., a divinity is "located in the universe" if it is qualified by some aspect.

³See, e.g., D. Deutsch, *The Fabric of Reality* (New York: Penguin Books, 1998).

Books Received and Available for Review

Contact the book review editor if you would like to review one of these books. Please choose alternate selections. Richard Ruble, Book Review Editor, *Perspectives on Science and Christian Faith*, 212 Western Hills Drive, Siloam Springs, AR 72761. richardanne@cox.net

George Bataille, *The Cradle of Humanity: Prehistoric Art and Culture*, Zone Books, 210 pages, 2005

Doug Beason, *The E-Bomb: How America's New Directed Energy Weapons Will Change the Way Future Wars Will Be Fought*, Da Capo Press, 256 pages, 2005

Chris Bosso, *Environment, Inc.: From Grassroots to Beltway*, Univ. of Kansas Press, 224 pages, 2005

Joseph Bracken, *Christianity Process Thought: Spirituality for a Changing World*, Templeton Foundation Press, 156 pages, 2006

Nigel Brush, *The Limitations of Scientific Truth: Why Science Can't Answer Life's Ultimate Questions*, Kregel, 300 pages, 2005

Geoffrey P. Dobson, *A Chaos of Delight: Science, Religion and Myth and the Shaping of Western Thought*, Equinox, 478 pages, 2005

Taner Edis, *Science and Nonbelief: Greenwood Guides to Science and Religion*, Greenwood Pub. Co., 285 pages, 2006

David Fitch, *The Great Giveaway: Reclaiming the Mission of the Church*, Baker Books, 265 pages, 2005

Paula Fredriksen, *On the Passion of the Christ: Exploring the Issues Raised by the Controversial Movie*, Univ. of Cal. Press, 284 pages, 2006

Mark Isaak, *The Counter-Creationism Handbook*, Greenwood Press, 330 pages, 2005

Allan Josephson and John Pettet, *Handbook of Spirituality and Worldview in Clinical Practice*, American Psychiatric Pub., 180 pages, 2004

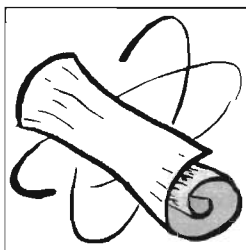
Daniel Lee and Robert O'Gorman, eds., *Social Work and Divinity*, Haworth Pastoral Press, 165 pages, 2005

Francesca McCartney, *Body of Health: The New Science of Intuition Medicine for Energy and Balance*, New World Library, 300 pages, 2005

Brenda McNeil and Rick Richardson, *The Heart of Racial Justice: How Soul Change Leads to Social Change*, IVP, 188 pages, 2004

Stephen A. McKnight, *The Religious Foundations of Francis Bacon's Thought*, Univ. Missouri Press, 194 pages, 2006

Michael Meredith, *The Thoughtful Guide to Science and Religion*, O Books, 200 pages, 2005



Dialogue: Response

On Reducing Nearly Everything to Reductionism

On Reducing Nearly Everything to Reductionism

Del Ratzsch



Del Ratzsch

*I am
suspicious
of all three
[of Clouser's
contentions
concerning the
relationship
between
"divinity" and
science].*

Let me begin by endorsing my friend Roy Clouser's commitment to "thick" conceptions of science/religion engagement. That seems right, and I am with him there and on a variety of other points as well. However, I have reservations concerning a number of Clouser's other contentions, and in what follows will focus on some of those.

Definitions

Clouser begins with an attempt to characterize *religious belief*.¹ The core of that characterization consists of two stipulations: that to be *divine* means (minimally) to have unconditional reality, and that beliefs are *religious* in that they involve the divine in specified ways. Although I cannot pursue them all here, I have a number of reservations concerning this part of the paper.² In any case, Clouser's proposed characterizations of "divine" and "religious belief" would (as he notes) turn propositions, numbers, sets, necessary truths and other such things (as frequently conceived) into divinities, and would turn various beliefs about such things into *religious* beliefs. Clouser, however, embraces that implausibility.³ But define things how you like, I am not convinced that my mathematician friends who believe in the abstract independent existence of sets thereby hold *religious* beliefs in mathematical *divinities* in any sense of "religious" or "divinity" of interest to science/religion discussions.

Del Ratzsch (Ph.D., Philosophy, University of Massachusetts) specializes in philosophy of science, with a particular interest in science/religion questions. His most recent book, *Nature, Design, and Science*, is an investigation of the philosophical and conceptual underpinnings of the concept of intelligent design in scientific contexts. Ratzsch is an avid cyclist, but is far too concerned for the aesthetic well being of others to wear Spandex cycling shorts. He may be contacted by email at dratzsch@calvin.edu

Metaphysics, Philosophy of Science and Science

Terminology aside, Clouser contends that (a) every scientific theory implicitly presupposes some explanatorily ultimate independent existent (divinity), that (b) every such divinity-presupposition *regulates* every scientific theory generated under its auspices (by setting parameters for the nature of postulates, postulated entities, explanations, explanatory strategies, etc.), and that (c) particular presuppositions concerning specific divinities uniquely and characteristically impact the content, character, and truth of the theories in question.

I am suspicious of all three. Does accepting kinetic theory of heat inevitably commit one to anything very substantive concerning what ultimately independently exists ("divinity")? Does believing that God alone independently exists generate significant parameters for chemical bonding theory? Do Richard Dawkins and Owen Gingrich really have significantly different theories concerning the type of nuclear processes occurring in our sun? Or concerning why windows break when hit by bricks? Should their theories differ here? Given an epistemological coherentism such views might appear plausible, and although I suspect that something like that underlies Clouser's intuitions here, Clouser has certainly given us no such philosophical case.

I think that Clouser is correct that deep metaphysical differences (call them what you will) *can* make substantive differences in theoretical science.⁴ But Clouser's *universalization* of such claims is a quite different question. In fact, it might even be true that taking the collection of all theories as a whole "there should be an interpretive stance for scientific theories that is unique to theism" (see p. 10). But it does not follow

from that that *every* theory individually will have some unique theistic imprint, or that *every* theory generated under pagan divinity beliefs will inescapably be “partly false” (p. 11).

The difficult matter ... is in (1) establishing whether specifically religious belief and issues in the usual sense are among the deep matters having potential consequences for science, and if so in (2) establishing the whats, wheres, and hows of those consequences.

In any case, the difficult matter—and, it seems to me to be the *real* issue of interest—is in (1) establishing whether specifically religious belief and issues in the *usual* sense⁵ are among the deep matters having potential consequences for science, and if so in (2) establishing the whats, wheres, and hows of those consequences. The mere general fact that deep metaphysical matters can have scientific theoretical consequences does not by itself, of course, tell us much of anything on either of those points—not even if one chooses to *call* some such beliefs “religious.” So what sort of relevant case does Clouser give us here?

(Real) Religious Belief and Science

The heart of Clouser’s case emerges in “A Theistic Perspective for Metaphysics and Science” (p. 11). Scripture, as Clouser reads it, teaches not only (d) that God, as sole Creator, is the only explanatorily ultimate, independently existing divinity, but also (e) that belief in God must have *universal impact*—impact even upon our most abstract theories. That, of course, fits very nicely into Clouser’s above general picture concerning “divinity” beliefs and universal theory regulation. Since belief in God is not only a divinity-belief but the only legitimate one, it will be the sole (relevant) regulative presupposition of a believer’s proper theorizing. Since that belief will impact *all* such theorizing (both as required by Scripture regarding (e) and as entailed by (b) above), every proper theory of a believer will bear the imprint of that foundation and of *only* that foundation (as ultimate). Identification of anything *other* than God as independently existing (as explanatorily ultimate, as divine) will constitute a forbidden *reductionism*—idolatry, even—so any theory bearing the imprint of

ultimate explanatory appeal to that other alleged “divinity” will itself be (in a derivative sense) idolatrous.

I have several reservations here. For instance, it is not obvious to me that the specified scriptural passages are intended to apply to, say, ballistics (contra (e)). Nor, again, is it obvious (*pace* (d)) that the belief that *the law of non-contradiction has independent existence* is reductionistic (or idolatrous). However, I will not pursue such issues now, but will turn instead to one of Clouser’s major moves.

Creation and Causation

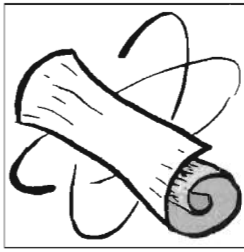
The theories of unbelievers, on Clouser’s view, will be *a fortiori* reductionistic, and any reductionistic theory “no matter what truth it hits on” is thereby “partly false.” What that means, according to Clouser, is that attempts to baptize and appropriate the theories of pagans intact (the facet of creation mistakenly identified as divine merely being declared itself to be a dependent creature of God, all other ramifications of the theoretical structure built on that reductionistic foundation being incorporated unaltered) will be illegitimate from a proper believing standpoint. Why so?

The immediate problem with these theories involving merely indirect causal dependence upon God will (on Clouser’s view) be that the appropriated theoretical entities, their very construction having been regulated by pagan divinity presuppositions, will lack the required constitutive “impact” of belief in God.⁶ The (still pagan) upper reaches of the hybrid structure will thus be implicitly inconsistent with the ramifications of belief in God, which is alleged to ultimately undergird this conceptual chimera. Thus, believers’s attempts to appropriate intact the theoretical structures generated out of nonbelieving presuppositions will produce, at best, theories of God’s indirect creation which violate the scriptural “universal impact” requirement (e), and, at worst, conceptual edifices which are flatly incoherent.

Granting his various premises (which I do not propose to do), Clouser’s intuitions might be right to this point. Unfortunately, Clouser takes a further step. Clouser insists that *any* theory involving merely indirect causal dependence upon God is unacceptable, asserting that

all entities found in the universe, along with all the kinds of properties they possess, all the laws that hold among properties of each kind, as well as causal laws, and all the precondition-relations that hold between properties of different kinds, depend not only ultimately, but directly, on God (p. 12).

But why so? It does not obviously follow from *divinity* considerations (i.e., only God existing independently and only God being explanatorily ultimate) that only God has causal capability. Surely God (being divine, omnipotent, Creator) could have directly created some dependent existent (property, law, whatever) with causal capabilities,



While Clouser has argued that the “impacts” of belief in God must be universally present, he has given no reason for thinking that such impacts must be universally directly caused by God – that they cannot be produced by secondary causes themselves deliberately designed and created by God for exactly that purpose.

Dialogue: Response

On Reducing Nearly Everything to Reductionism

that creature then exercising that capability to cause the existence of other (even all other) creatures. Aside from God, all else would depend ultimately upon God (only God being divine), but not all would depend *directly* on God. In fact, claiming that God *could not* do that would apparently commit one to the view that there were principles (concerning the capabilities of omnipotence) which existed *independent* of God and beyond his control – in violation of Clouser’s claimed rejection of “reductionism” (in his sense).

Nor does Clouser’s claim seem to follow from the *universal impact* requirement. While Clouser has argued that the “impacts” of belief in God must be universally *present*, he has given no reason for thinking that such impacts must be universally *directly caused* by God – that they cannot be produced by secondary causes themselves deliberately designed and created by God for exactly that purpose. Complicating the situation is the fact that we are given few details concerning what such impact consists of and concerning how regulation works.

Let us suppose that regulation operates by constraining presuppositions, or conceptions, or possibilities. If the directly divinely created creatures (entities, properties, laws) reflect those constraints not only in themselves but in their causal capabilities, then whatever they in turn cause will presumably fall within bounds also reflecting those constraints – i.e., the impact is passed on. Or suppose that rather than constraint, impact (in theoretical matters) involves an implicit commitment (somehow imprinted or melded into the theory) to some specific proposed divinity. We have been given no reason to think that this component – if it really is *inextricable* from all aspects of the theory – does not flow through the implications of the theory as well. And if it is instead *extractable* from the theory, then in what sense is it *not* a theoretically inert “fifth wheel” of the sort Clouser decries?⁷ (My suspicion, again, is that there is an epistemological coherentism lurking in the depths here, but I will not pursue that.⁸)

Conclusion

It seems to me, then, that some of Clouser’s assumptions are shaky, that aspects of his philosophy of science are highly questionable, and that some of his major inferential

moves are suspect. Furthermore, we have been given little detail concerning the specifics of regulative functioning, concerning exactly how theories carry the “impact” of belief in God, and concerning exactly what the sort of view Clouser has in mind really comes to. Only if Scripture intends to teach that belief in God is undetachably relevant to all theory, only if unbelief so affects the scientific theories of unbelievers that such theories are all “partly false,” only if God did not or could not create dependent beings with causal capacities – only if all of those are true (and they are far from obvious) – has Clouser given us reason to think that we need the sort of view he has in mind (whatever that view would look like in detail) much less that the specific candidate view he refers us to elsewhere is a superior, adequate, or even plausible exemplar of the type. ☒

Notes

¹Discussion in this area constitutes about three quarters of the paper.

²For instance, Clouser’s “god rule” requires that requisite beliefs about a god be classified as *religious* beliefs, his definition entails that a belief is religious only if it concerns something divine, and yet Clouser cites examples he claims to be of religions involving gods who are not divine. Beliefs about such *gods* would be religious (“god rule”), but would apparently not involve *divinity* in the ways stipulated by the definition of “religious belief.” I also think that Clouser sometimes gives his own peculiar definition to a term, then simply attributes *that* meaning to anyone who uses that term.

³“What is shown instead is that beliefs about what has divine status play an important role in theories ...” [his emphasis], p. 6.

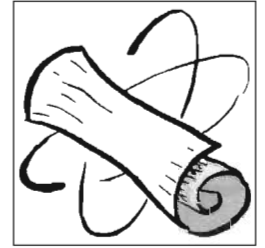
⁴Many (perhaps most) philosophers of science have accepted that sort of position for decades.

⁵I take that sense to involve the divide between metaphysical naturalism and nonnaturalism, between theism and nontheism, etc.

⁶Indeed, what we might call their “impact sites” will be filled by paganly-shaped impacts from the mistakenly identified “divinities,” preventing the right sort of impacts from gaining any traction.

⁷Despite Clouser’s suggestion that the nonreductionism just *is* the denial that anything other than God is divine, the “impact” will have to be more than an implicitly embedded insistence that the other things in question are really just creatures, only God being divine. Were that all it came to, the “partly false” part of a pagan theory could be stripped off and the “what truth it hits on” part be preserved and attributed to God’s creating, thus avoiding reductionism. Clouser, however, emphatically rejects that move, so *something* else must be operating here.

⁸I also suspect that there is some epistemology/ontology slippage occurring in the vicinity, but I will not press the issue.



Replies to the Comments of Le Morvan, Halvorson, and Ratzsch on "Prospects for Theistic Science"

Roy Clouser

Let me begin with Pierre Le Morvan's question as to whether my definition of religious belief is itself religiously neutral. The short answer is, no. But its non-neutrality does nothing to undercut its force; it is not thereby rendered self-canceling or significant only for theists. Here is why.

When an entity is postulated by a theory, the concept of its nature will differ drastically depending upon what the thinker regards as divine. If a thinker regards a particular kind of properties-and-laws as divine, then all the other properties and relations included in the concept of that entity will be conceived as dependent on the properties of the divine kind. The result is that the nature of the postulate will be quite different relative to various divinity beliefs, and the entity's explanatory role will also vary accordingly (think of the three concepts of atoms and sub-atomic particles held by Mach, Einstein, and Heisenberg).

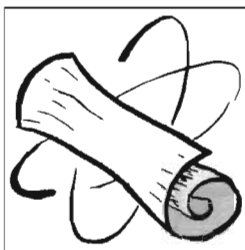
For the concepts we form of things we experience, on the other hand, the impact of divinity beliefs is not nearly as obvious or divisive. Such concepts are not invented, and we go to pains to include in them only those properties and relations we experience as true of the things of which they are concepts. So if I ask a materialist to pass me the salt, our concepts of the saltshaker are sufficiently alike that he knows what I am talking about. The fact that I regard all the properties of the saltshaker as equally real while he regards them all as identical with or dependent on its physical properties, will not prevent our mutual identification and use of the

correct object. This illustrates how the impact of differing divinity beliefs on concepts of experienced objects is weaker than it is for postulates of theories. For concepts of experienced objects, the impact is usually evinced in differences as to *what we are likely to notice about the saltshaker, and the relative importance we ascribe to what we notice*. These differences can be important, but they do not prevent those with different divinity beliefs from sharing the same world; all who experience it can agree on the saltshaker's color, size, shape, location, use, etc. And the definition of a saltshaker will be the statement of the properties common to them all.

The same holds true, I think, for the definition of religious beliefs as for our concept of saltshakers. We can all confront a multitude of religious beliefs and can examine their features. We can all discover that they include a divinity belief with the essential feature I called attention to. No doubt my belief in God made me more likely to notice that feature, and more likely to give it the prominence I gave it in my definition. So it is not religiously neutral. But that weaker nonneutrality need not prevent others from being able to see ascriptions of nondependent reality in any divinity belief they may care to examine.

Consider a parallel case. Aristotle took rational Forms and laws of logic to be divine. No doubt that helped focus his attention on logic in a way that led to his formulating the law of noncontradiction. That would also be a case of this weaker sort of religious influence as compared to what I argued takes

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self-canceling
or significant
only for theists.*



My thesis is that since everyone has some religious belief or other, everyone will in fact hold either an ontologically reductionist or nonreductionist view of the kinetic theory – whether consciously or unconsciously, and that a crucial part of a properly theistic view of science is to hold a nonreductionist view of it and everything else.

Dialogue: Reply

Replies to the Comments of Le Morvan, Halvorson, and Ratzsch on "Prospects for Theistic Science"

place in hypothetical postulates; but it is religious influence all the same. Nevertheless, no one needs to agree with his religious belief to see the truth of that law. Of course, thinkers holding other divinity beliefs will thereby be led to *interpret* the law differently. For example, some have held the law applies to our thought alone and not to extra-mental reality, some have held it applies to the world of everyday experience but not to the subatomic realm, yet others that it is an accidental by-product of the way our brains happen to have evolved, and still others have held that it applies to language but not to mathematics.

In a similar way, I hold that: (1) my definition is open to all to confirm by their own examination of religious beliefs, (2) my definition was influenced by my belief in God and by the fact that God's aseity is such a prominent part of the biblical revelation, and (3) what I have found to be the defining factor of religious belief may, indeed, be interpreted differently by others holding substantively different divinity beliefs.

But the latter point does nothing, so far as I can see, to undercut the force or value of the definition. Unlike the strong control divinity beliefs exercise over forming postulates in theories, this weaker sort does not prevent those with differing divinity beliefs from seeing the factor being pointed to. In fact, whenever anyone interprets that defining factor in the light of what they take as substantively possessing divine status, it only serves to confirm my central claim about the impact of such beliefs on all other beliefs.

Hans Halvorson questions the meaning of "reductionist" as I used it, and asks whether my own view is not also reductionist. He then asks how we are to distinguish God from creation since I claim that nothing in creation (the universe) is to be reduced to anything else in creation. And finally, he asks whether there are not some senses of "reduction" that science has found genuinely useful.

I tried to make clear that there are varying senses of "reduction" not all of which are objectionable, and described the religiously objectionable senses in note 12 (p. 15). The objectionable ones are those that reflect a belief in some aspect of creation as having divine status, and I think the note makes

clear why the sense Halvorson cited as useful to science—the "reduction" involved in the kinetic theory of heat—is not one of the objectionable senses. The sense in which the kinetic theory is "reductive" is that it explains heat as the kinetic energy of molecules, not that the nature of the molecular activity that explains heat has been restricted to one (or two) of the kinds of properties-and-laws it exhibits. Someone may, indeed, go on to interpret the kinetic theory in an objectionably reductionist way by understanding it from a materialist or phenomenalist point of view, for example. But the kinetic explanation can also be understood in an ontologically nonreductionist way such that none of its factors have their natures identified with only one (or two) kind(s) of properties-and-laws. Moreover, my thesis is that since everyone has some religious belief or other, everyone *will in fact* hold either an ontologically reductionist or nonreductionist view of the kinetic theory—whether consciously or unconsciously, and that a crucial part of a properly theistic view of science is to hold a nonreductionist view of it and everything else.

As to whether my own view is reductionist in an objectionable sense, the short answer to that too is, no. Again, here is why. Theories of reality have traditionally used "reduction" to mean one of two things: (1) that only one of the kinds of properties-and-laws we experience is real at all, or (2) that one (or two) kind(s) of properties-and-laws wholly generate(s) all the others. What both senses have in common is that the reduced kinds are rendered *less real* than the reducing kind(s). Thus (1) reduces what is real by eliminating all other kinds and dismissing them as illusory. A familiar example is the theory that there exist only physical things with physical properties subject to physical laws.² It claims that although we seem to experience things as having quantitative, spatial, biotic, sensory, logical, and other kinds of properties, we are in fact wrong in thinking such kinds are real; there simply are only physical properties-and-laws. By contrast (2) reduces the *level* of reality of any kinds that are reduced. The latter exist, but are wholly generated and determined by the kind(s) to which they reduce and are less real for that reason. Like the denizens of *Animal Farm*, all the kinds are real, but some are more real than others.

Now it is important in this discussion not to confuse *dependency* with either the no-reality or the less-reality reduction claims. (Notice that although there is a one-way dependency in the second of the objectionable senses, there is none at all in the first sense.) So while a theist holds that there is dependency between God and creation, that dependency neither eliminates any kind of properties-and-laws nor diminishes the status of any of them *relative to any other kinds*. This is not an incidental issue for the ontology which I find best develops a nonreductionist view of reality.³ That ontology is the only one I know that makes it possible to take every kind of properties-and-laws in creation as equally real. That is to say, e.g., things no more really have physical properties than they have logical properties (and vice versa), and are no more really subject to logical or physical laws than they are to ethical laws. All the kinds directly depend on God, and all are equally real aspects of all things in his creation.

Halvorson's last question about how to distinguish God from creation is, of course, made all the more urgent by my last two paragraphs. Simply speaking of "creation" or "the universe" as other than God needs more precision, as he points out. There are several ways theologians have drawn this distinction. The simplest is to say that everything other than God is creation. That is correct according to Scripture (Rom. 1:24, e.g.) but not adequate here since his question includes whether numbers, sets, and perceptions are in the universe at all. Another way to draw the distinction is one mentioned but rejected by Halvorson: everything in time and space. This is actually a good suggestion, it seems to me, and his rejection of it is problematical. Why should we think that perceptions are outside time or space? Are not perceptions spatially located and ordered? Do they not occur in temporal sequence? And why should we think that numbers are outside time? Aside from the intellectual traditions influenced by those who deified numbers, they have quite plausibly been construed as symbols designating *properties* of the objects we experience.⁴ The same is true for logical sets.

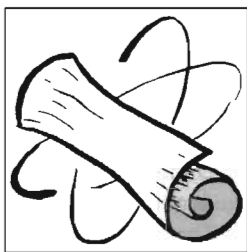
In this context, however, perhaps the best way of distinguishing between God and creation is the one proposed by Calvin. He stressed that God is the Creator of all the laws for creation, so that everything existing under law is creaturely.⁵ Since numbers, sets, perceptions, and all else we can abstract from the world around us are subject to nomic order, they are creatures and not the Creator who is the law-giver. Conflated, these criteria amount to saying that anything other than God that is in time or space, and subject to law-order, counts as creation. This is why none of the kinds of properties-and-laws exhibited by things in time and subject to laws should be reduced to one another in the objectionable senses defined. To do so is to attribute to one or another kind of properties-and-laws the divine status that belongs to God alone, and thereby to reduce the reality of the rest of them relative to the one(s) deified.

Del Ratzsch begins by titling his comments so as to suggest that I have made my anti-reductionist proposal the whole story of the theistic view. That seems strange when my article began by saying that the other major proposals about the S/R relation are *all* at times correct, though none has ever justified the claim that it is the *general* way religious belief and theories relate. Moreover, none of the others even attempts to accommodate the dozen or so Scriptures that say knowing God favorably impacts "every sort of knowledge" and "all that is ... true" (e.g., 1 Cor. 1:5; Eph. 5:9). Each of these views proposes instead a relation that admittedly leaves a good bit of knowledge and truth religiously neutral. An anti-reductionist stance, by contrast, impacts not only every theory but also every concept; all are either reductionist or not.

[Ratzsch's] description of my position as holding that some divinity belief or other regulates every scientific theory, leaves out an important step. My claim was that divinity beliefs regulate an ontology, which in turn regulates scientific theories.

So I am puzzled that he asks whether a Christian and a non-Christian should have a different view of "nuclear processes in the sun or why windows break when hit by bricks." The theories I used to illustrate my view showed this difference for atomic theory concerning the *nature* of nuclear processes. Are they to be understood as "useful fictions" (Mach), the actions of purely physical entities (Einstein), the determinations of eternal and divine mathematical laws (Heisenberg), or (as I suggest) as irreducibly multi-aspectual processes? On the other hand, that a brick can hit and break a window is not a theory but an experienced regularity that needs to be *explained* by some theory, and that theory too will either be reductionist or not. I must also add here that his description of my position as holding that some divinity belief or other regulates every scientific theory, leaves out an important step. My claim was that divinity beliefs regulate an ontology, which in turn regulates scientific theories. How that works was, I think, amply illustrated by the three atomic theories cited.

As to the questions about my definition of religious belief, I must reiterate that it is based upon an enormous



Dialogue: Reply

Replies to the Comments of Le Morvan, Halvorson, and Ratzsch on "Prospects for Theistic Science"

*Ratzsch
construes
my proposal
to say that
what is wrong
with adapting
reduction
theories is that
they would
then "lack the
required
constitutive
impact of belief
in God."
My point
was that
they would
unavoidably
exhibit the
impact of a
God-surrogate
instead of
God ...*

empirical base. It is not a matter of "calling them what you will," but of isolating the only feature shared in common by every major world religion and dozens and dozens of lesser ones (note 4, p. 14, listed only a few of the thinkers who accepted this definition because it covered every religion they knew of). Nor do I see why it is a good objection to this definition to say that many theists still regard sets or numbers as having independent existence. This does not show that doing so is not a mistake, especially in light of the fact that those who first proposed such views gave the divinity of such entities as their reason for it (see note 8, p. 15). And since theistic thinkers have often unwittingly had their theoretical work infected by nontheistic beliefs, it will not do simply to say that there are theists who believe in God but also attribute divine status to "abstract entities" and then suggest that because they do so, there must be something wrong with the definition. Why should we not conclude instead that since every known divinity belief centers upon the unconditional reality of its putative divinity, this should serve to warn theists not to attribute that status to anything but God?

Now had I given only the latter (historical) point as the reason for denying divine status to anything but God, I could have justly been accused of guilt by association or committing a genetic fallacy. But I supported the point with a specific argument as to why it is unjustifiable to regard numbers, sets, laws, etc. as capable of independent existence. In the section, "An Anti-Reductionist Argument" (p. 12), I showed why the claim that anything is purely physical, or sensory, or logical, etc., is incoherent. We can say the words—just as we can say "square circle"—but in neither case have we any idea what we are talking about. And that serves to show why it affords no explanatory advantage to hold that any one kind of properties-and-laws generates the existence of the other kinds: if we cannot so much as frame the idea of any as independent of the rest, then how can any be used to explain the reality of the rest? This was the basis of my contention that all of the kinds of properties-and-laws found in creation should be regarded as directly dependent on God.⁶

This argument, however, has been ignored rather than rebutted. In fact, several

times Ratzsch says I gave no argument for it whatever and that I further seem to be assuming (also with no argument) a form of "epistemological coherentism." Now, it is true that I did not present the *entire* case for the universal impact of divinity beliefs on views of reality, and views of reality on scientific theories.⁷ Assuming a theistic audience, I presented the scriptural basis for the universal impact for belief in God, and offered an interpretation of its relation to theories that satisfies that demand while none of the other views of that relation even attempts to do so. But it is not true that I gave no argument against reduction and thus for the direct dependence of every kind of properties-and-laws on God. Nor is it true that I presented the claim of every theory's being impacted by belief in God as an inference simply from there being a general theistic stance for theories. That all truth is thus impacted is at least strongly suggested by Scripture and fits with the general biblical view that no one understands creation who does not know its Creator. And since the regulatory impact of any divinity belief is conveyed to theories via ontology, no separate argument is needed for its universality.

Ratzsch then proceeds to consider what role "religion in the *usual* sense" can have for science. But what, pray tell, is the "usual sense" of that term? I covered three of the most common misunderstandings of it in the article, and there are many more.⁸ Even more importantly, the view he then attributes to me and assesses negatively is not the view I presented. His paraphrase takes me to have said that "only God has causal capability" (p. 21) whereas the quote he takes to entail that specifically says "causal laws" are created by, and depend upon, God. Furthermore, the context of the quote shows that my main point there was the claim that no one (or two) kind(s) of properties-and-laws exhibited by things we experience is the sole nature of those things or the cause of the other kinds of properties-and-laws true of them—the point for which I gave the anti-reductionist argument.

Nor is it the case that by saying that things and events and their causal interactions depend upon God, I made any claim about what God *could not do*.⁹ The question was how to relate belief in God to our theorizing given the tenor of Scripture and

the emptiness of reduction claims; it has nothing to do with other ways God *could* have made the world. And why is it “not obvious” that the law of noncontradiction should not be accorded independent existence? The nonreductionist argument I gave was specifically applied to that law, and that too was ignored.

Perhaps the most important misunderstandings, however, are in “Creation and Causation” (p. 21). There Ratzsch construes my proposal to say that what is wrong with adapting reduction theories is that they would then “lack the required constitutive impact of belief in God” (p. 21). That is true, but too weak. My point was that they would unavoidably exhibit the impact of a God-surrogate instead of God, by taking some aspect of creation as what generates and explains everything else in creation. He then adds that I have given no reason to think the influence of a religious belief would “flow through all the implications of the theory as well” (p. 22). Once again, this misses my point that a divinity belief impacts a scientific theory via ontology rather than directly. And surely the examples I gave showed how this works. What was regarded as divine by Mach, Einstein, and Heisenberg impacted how they saw everything else in physics. It was not extractable, leaving behind a core of theoretical proposals that would otherwise be the same for all physicists. Rather, their views of what is divine regulated how they viewed reality as a whole, which in turn regulated the sense of *every concept* employed in their physics. In fact, it is not too much to say that they advocated three different atomic theories and contrary notions of what physics is.¹⁰

There are a number of other comments Ratzsch makes in his response, which I do not know how to answer because they are of the hit-and-run variety. Saying “I am not convinced that ...” or “it is not obvious that ...” is not to give reasons for doubting my proposal, so there is nothing to which I can reply. All I can do is point to the argument I gave that was ignored, and to the Scriptures whose meaning he says is not “obvious” despite saying exactly what I take them to say.

To be sure, the view I have proposed in “Prospects for Theistic Science” is very different from those held by most theists. It is not the scholastic tradition that concedes from the outset that most theories are religiously neutral, nor is it the view that theories can only be impacted by belief in God if specific biblical teachings are included in them. Instead it extends to theories the biblical teachings that: (1) only God has independent self-existence while all else depends on God, and (2) no truth can be religiously neutral. So while it is not the whole theistic story for theories, it is, I contend, the most basic feature of the S/R relation; the one that grounds the other views rather than discards them. For that reason, however, if the other views ignore it, they will fail to be fully theistic no matter what other biblical teachings they may reflect or incorporate in science. ☞

Notes

¹Even those forms of Buddhism that attempt to minimize as far as possible any description of the divine reality still describe it to be that into which humans can be re-absorbed, thus escaping the cycle of rebirth and the suffering accompanying it.

²For example, J. J. C. Smart, *Philosophy and Scientific Realism* (London: Routledge & Kegan Paul, 1963) and Paul M. Churchland, “Eliminative Materialism and the Propositional Attitudes” in *Contemporary Materialism*, ed. Moser and Trout (London: Routledge, 1995).

³The theory has been given a remarkable elaboration by Herman Dooyeweerd. See esp. *A New Critique of Theoretical Thought*, 4 vols. (Lewiston, NY: Edwin Mellen Press, 1997).

⁴On the temporality of number, see M. Dummett, *Elements of Intuitionism* (Oxford: Clarendon Press, 1977), 18 ff.; and S. C. Kleene, *Introduction to Mathematics* (Amsterdam: North-Holland Publishing Company, 1952), 62. On numerals as symbols for the quantitativeness of things, see Tobias Dantzig, *Number the Language of Science* (Garden City, NY: Doubleday, 1954), 1–20. Some theologians have held this view precisely to avoid regarding numbers as divine, the Cappadocian Fathers, for example. See J. Pelikan, *Christianity and Classical Culture* (New Haven, CT: Yale Press, 1993), 100–2.

⁵See Dooyeweerd, *A New Critique of Theoretical Thought* I, 518, 519. Also see Calvin’s *Of Eternal Predestination*, C.R. 36; *Commentary on the Fifth Book of Moses*, C.R. 52, 49; and *Institutes* III, 23, 2 and 4.

⁶This is one of several points to which I anticipated an objection and replied to it in advance, only to have it raised as though I had never mentioned it. Besides this point, and my argument against the nondependence of the law of noncontradiction, the same also happened with my explanation as to why beliefs in gods who are not per se divine are still religious beliefs. Compare Ratzsch’s note 2 with my explanation of the point under “Some Confirming Consequences” (p. 6).

⁷I do give arguments for each step of this view in *The Myth of Religious Neutrality* (Notre Dame, IN: University of Notre Dame Press, 2005).

⁸In *The Myth of Religious Neutrality*, I deal with ten additional definitions that do not stand up to scrutiny.

⁹My objection to the tactic of reducing all creation to one or two of its kinds of properties-and-laws and then saying the reducing kind(s) in turn depend on God, is an old one in theology. E.g., Colin Gunton refers to St Basil’s point that in creation “... there are no degrees of being: that is to say, everything created has the same ontological status” (*The Triune Creator: A Historical and Systematic Study* [Edinburgh: Edinburgh University, 1998], 71). This is based, of course, on Col. 1:15–18 where Christ alone is said to mediate God’s creating and sustaining power to creation. See also Calvin, *Inst.* I, xiii, 14.

¹⁰There is also an odd confusion between ontological and epistemological meanings of the term “impact” in this paragraph. I take Scripture’s teaching that “every sort of knowledge” and “all that is ... true” are “enriched” by knowing God to mean that theories also are favorably *impacted* by belief in God. Ratzsch then asks why such impacts must be directly caused by God and why they could not be indirectly caused by him instead. But as I used “impact,” it referred to the way our *belief* in God regulates theories about creation, not to how creation depends on God. The answer to the intended question, however, is the conjunction of the texts cited above together with the anti-reductionist argument.

Upcoming ASA Conferences

July 28–31, 2006:

Location: Calvin College, Grand Rapids, MI

Program Chair: Hessel Bouma III

Local Arrangements Chair: Larry Molnar

August 5–8, 2007:

Location: Edinburgh, Scotland



Article

Needed: A New Vocabulary for Understanding Evolution

Needed: A New Vocabulary for Understanding Evolution

Fredric P. Nelson



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Microevolution and macroevolution must be defined such that each reflects the complexity of the change in the information occurring at the level of DNA.

Correctly defined words are essential for understanding evolution. Confusion reigns because microevolution and macroevolution are defined at the level of species rather than at the level of DNA. Causative agency is frequently ignored or ascribed to naturalistic mechanisms without supporting evidence. Biological relationships do not reveal causal agency in DNA alterations. Natural selection refers to the elimination of inferior individuals and not to the production of abundant protein variations. Methodological naturalism is only an approximation of how the universe usually runs. No scientific theory of evolution exists. Intelligent design and natural science are separate entities. Biology is composed of scientific systems and nonscientific origins.

Understanding the field of evolution requires a unique vocabulary. Unfortunately, the current vocabulary includes words, which are inappropriately defined. Also, some standard definitions are simply ignored. This vocabulary has created the greatest confusion in the debate concerning biological origins.

Microevolution, Macroevolution, and DNA

Charles Darwin stated that evolution was "descent with modification through variation and natural selection."¹ This definition had two fundamental deficiencies, for it stated neither the cause of the modifications nor the site of the modifications. Since descent began with the initial replication, Darwin's definition excluded the evolution of the first cell.

Unfortunately, modern definitions fare no better. In 2001, Ernst Mayr, the late Alexander Agassiz Professor of Zoology at Harvard

University, defined microevolution as evolution at or below the level of species and defined macroevolution as evolution above the level of species including the evolution of higher taxa and the production of new structures and other evolutionary novelties.² In 2002, John Rennie, senior editor for *Scientific American*, defined microevolution as changes within species over time and macroevolution as changes in taxonomic groups above the level of species over time.³ As with Darwin's definition, these modern definitions state neither the cause of the modifications nor the site of the modifications, and they also exclude the evolution of the first cell.

Evolutionary change occurs at the level of DNA. Microevolution and macroevolution must be defined such that each reflects the complexity of the change in the information occurring at the level of DNA. Further, each must have a modifier that states the causal agency of the change.

Microevolution is best defined as an alteration of the information present within DNA molecules, which already exist and already function. Causal agency in microevolution could be natural causes, genetic engineering by scientists or aliens, or supernatural genetic engineering, hereafter referred to as intelligent design. Examples of microevolution, therefore, include point mutations, deletions, recombinations, exon shuffling, and the addition of DNA via plas-

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mids, viruses, or other DNA segments. Gene duplication is microevolution-in-progress, although a nonfunctional duplicate may have originated in an ancestral genome many millions of years previously. Probably most surprising is that the evolution of the first eukaryote cell, as described by Mayr, would be a form of microevolution. He wrote:

The origin of the first eukaryote was a major evolutionary step. What apparently happened was the formation of a chimera through symbiosis between an archaebacterium and a eubacterium to produce the first eukaryote ... The mitochondria were derived from the alpha subdivision of the purple bacteria (proteobacteria) and the chloroplasts of plants from cyanobacteria.⁴

In this scenario, a spectacular form of microevolution occurred as existent, functional DNA from several bacteria recombined to form new organisms. The causative agency for the assembly of the first eukaryotes is not known, but the agency could have been naturalistic microevolution, microevolution by the genetic engineering of aliens, or microevolution by intelligent design. A fourth possibility is that the eukaryotes were created anew by progressive creation.

Microevolution is best defined as an alteration of the information present within DNA molecules, which already exist and already function. ...

Macroevolution is best defined as the generation of new, coherent, and comprehensive information within DNA molecules.

Macroevolution is best defined as the generation of new, coherent, and comprehensive information within DNA molecules. At some point in time, the information generated by naturalistic macroevolution did not exist in nature. Causal agency in macroevolution could be natural causes, genetic engineering by scientists or aliens, intelligent design, or progressive creation. Macroevolution may be as minimal as a *specific* mutation occurring in a single, *specific* codon as the final step in producing a functional enzyme following exon shuffling. Or it may be as extensive as aligning the hundreds to thousands to millions

of nucleic acids needed to code for a functional enzyme, a functional metabolic process and/or a functional organ.

The complexity of the generation of new, functional information occurring in macroevolution is many, many orders of magnitude greater than the complexity of the alteration of existent information occurring in microevolution.

Unique Categories of Evolution

The unique categories of evolution, which are of general interest and debate, are:

1. Naturalistic evolution of the first cell (chemical evolution)
2. Naturalistic microevolution
3. Naturalistic macroevolution
4. Intelligent design including the intelligent design of the first cell, of microevolution, and of macroevolution
5. Progressive creation including the creation of the first cell and the progressive creation of a phylum, class, order, family, genus, and/or species

Each category is unique. The alteration of existent DNA—microevolution—is not the foundation for the generation of new, coherent, and comprehensive information within DNA—macroevolution. In 1980, Roger Lewin wrote:

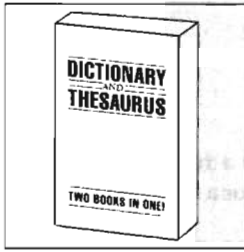
The central question of the Chicago conference was whether the mechanisms underlying microevolution can be extrapolated to explain the phenomena of macroevolution. At the risk of doing violence to the positions of some of the people at the meeting, the answer can be given as a clear, No.⁵

In current communication, two types of errors frequently occur. Firstly, the specific category of evolution is not stated or not known. Secondly, a set of data belonging to one category of evolution, usually naturalistic microevolution, is applied to another category, usually naturalistic macroevolution. No biologist, scientist, or teacher should refer to evolution without stating causative agency and without using the appropriate modifier—of the first cell, micro-, or macro-. Hopefully, no Christian would fail to state causative agency, for though we can render unto nature that which is naturalistic, we are to render unto God that which is God's.⁶

The origin of a new protein, phylum, class, order, family, genus, or species by one category of evolution does not preclude the origin of a different protein, phylum, class, order, family, genus, or species from occurring by one of the other categories of evolution.

Relationship vs. Causation

Naturalistic evolutionists use comparative data obtained through the study of DNA, proteins, homologous struc-



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tures, and fossils to reveal relationships between species. They claim that these relationships occurred only by naturalistic processes. However, DNA gives no clue as to the causation of its assembly. DNA would be identical whether it was assembled by naturalistic macroevolution, by intelligent design, or by progressive creation. No smoking gun exists. DNA from different species could be congruent to any extent desired by an intelligent designer. A 99.9% congruence of DNA between two species may reflect the purpose of the designer rather than descent from a common ancestor. Since DNA does not reveal the causative agency in its assembly, neither do proteins, homologous structures, or fossils. A fossil record, which included every desired transition fossil, would not imply causation by naturalistic macroevolution to the exclusion or detriment of intelligent design or progressive creation.

The sum of the scientific data, which uniquely and unequivocally supports naturalistic macroevolution to the exclusion of intelligent design and progressive creation, can be tallied as follows:

All supporting data from the study of	
DNA	0
RNA	0
proteins	0
homologous structures and species	0
fossils	+ 0
Total of all supporting data	0

Naturalistic macroevolution has absolutely no unique and unequivocal supporting scientific data, for what could a naturalistic universe do that an intelligently designed universe not do? The belief that all evolution occurred naturalistically is based on two presuppositions: (1) the universe conforms exclusively to methodological naturalism and (2) no supernatural agency exists.

Natural Selection Equals Elimination

Mayr stated that natural selection should be considered a two-step process. The first step is the production of abundant variations. The second step is the elimination of inferior individuals.⁷

Unfortunately, the term "natural selection" provides no indication that it is a two-step process. It certainly implies the

elimination of inferior individuals, but it does not imply the production of abundant variations. And this is no idle matter. Mayr stated: "The theory of evolution by natural selection ... no longer requires God as creator or designer."⁸ And "Darwin's theory of natural selection made any invocation of teleology unnecessary."⁹

At first glance, Mayr seems correct. The elimination of inferior individuals by natural selection certainly appears devoid of supernatural intervention. However, the first step, the production of abundant variations by naturalistic processes would not be abundant enough. As is noted under the following heading, naturalistic macroevolution fails to be adequate for the production of even one small, integrated, functional, complex enzyme.

The elimination of inferior individuals, by itself, cannot be the driving force behind evolution, because eliminating any individual *decreases* the total gene pool. The production of abundant protein variations occurs by microevolution and macroevolution, not by the elimination of inferior individuals. This production necessarily precedes natural selection, for a protein that is never assembled is never subjected to natural selection.

The complexity of macroevolution far exceeds the complexity of natural selection between unequal organisms. Macroevolution is the limiting factor in evolution, and, by comparison, natural selection between unequal organisms is almost a mundane process. Natural selection, as the term implies, only should refer to the elimination of inferior individuals and never to the production of abundant protein variations.

Science and Supernatural Agency

The National Academy of Sciences wrote: "The statements of science must invoke only natural things and processes."¹⁰ Similarly, the National Science Teachers Association stated: "[Science] cannot use supernatural causation in its explanations."¹¹

Actually, science can invoke supernatural causation for physical objects that have been supernaturally designed and assembled. Failure to do so would result in erroneous

attribution and scientific error. Two examples where causation should be attributed to supernatural agency will suffice.

Example #1: Since nearly 99% of the human genome is identical to the chimpanzee genome,¹² most scientists believe that *Homo sapiens* and chimpanzees evolved naturalistically from a common ancestor. This branching would have occurred less than ten million years ago.¹³ The human genome contains more than 20,000 genes.¹⁴ The genetic code for the equivalent of two hundred or more genes would have assembled in the human genome over the past ten million years. Each birth is equivalent to one try or one chance toward the naturalistic macroevolution of *Homo sapiens*. The number of these births has never exceeded ten billion (10^{10}) births in any year. The number of ancestors to *Homo sapiens* over the past ten million years has been less than 10^{17} individuals.

Naturalistic macroevolution fails to account for the assembly of only one small, integrated, functional, complex enzyme, and absolutely fails to account for the evolution of all species.

The probability of naturalistically assembling the genetic code for a small, integrated, functional, complex enzyme of one hundred amino acid residues is about one chance in 10^{65} per try.¹⁵ The probability of naturalistically assembling just one such genetic code with fewer than 10^{17} tries is less than one chance in 10^{48} , which is less than one chance in a trillion trillion trillion trillion. If a wager were made of one atom of gold at the odds of one chance in 10^{48} , a win would net a sphere of solid gold that would be 5% of the mass and 1.5% of the volume of Earth.

Naturalistic macroevolution does not account for the assembly of the genetic code equivalent to one and much less two hundred integrated, functional, complex enzymes. The naturalistic macroevolution of *Homo sapiens* from a common ancestor with the chimpanzee is a highly irrational scientific hypothesis. *Homo sapiens* exist because of God's supernatural design and activity.

Example #2: *E. coli* are about 2 microns in length and 0.2 microns in diameter and have a volume greater than 0.25 cubic microns. Since a cubic meter contains 10^{18} cubic microns, fewer than 4×10^{18} *E. coli* could be stacked into one cubic meter. A collection of 10^{50} *E. coli* would fill a volume greater than 2.5×10^{31} cubic meters.

Earth contains less than 1.5×10^{18} cubic meters of water. A volume of 2.5×10^{31} cubic meters is 1.666×10^{13} times the volume of Earth's water. A collection of 10^{50} *E. coli* could fill 100% of all bodies of water on Earth every day for more than 45 billion years. Therefore, fewer than 10^{50} *E. coli* have existed on Earth over the past 3.5 billion years, and, as a logical deduction, a total of fewer than 10^{50} individual organisms from all species have existed on Earth during the same period of time.¹⁶

Every step of naturalistic macroevolution for all species had to have occurred with fewer than 10^{50} tries. The probability that naturalistic macroevolution ever assembled just one small, integrated, functional, complex enzyme with fewer than 10^{50} tries is less than one chance in a million billion. Naturalistic macroevolution fails to account for the assembly of only one small, integrated, functional, complex enzyme, and absolutely fails to account for the evolution of all species. The naturalistic macroevolution of all species is an extremely irrational scientific hypothesis.

Science attributes the design and assembly of a watch to intelligent human agency. Science can and must attribute the design and assembly of *Homo sapiens* and of every species/genus/family to supernatural intelligent agency.

No Scientific Theory of Evolution Exists

The National Academy of Sciences wrote: "Evolution is one of the strongest and most useful scientific theories we have."¹⁷ Is this statement true?

Confusion exists between the definition of a scientific theory, a scientific hypothesis, and the popular definition of a theory. Many scientists talk about a scientific theory when, in fact, they are talking about a scientific hypothesis or conjecture.

The National Association of Biology Teachers stated:

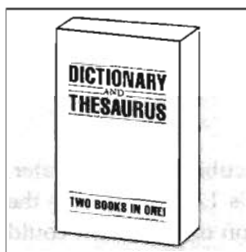
In science, a theory is not a guess or an approximation but an extensive explanation developed from well-documented, reproducible sets of experimentally-derived data from repeated observations of natural processes.¹⁸

The National Academy of Science stated that:

An idea that has not been sufficiently tested is called a hypothesis. Different hypotheses are sometimes advanced to explain the same factual evidence. Rigor in the testing of hypotheses is the heart of science. If no verifiable tests can be formulated, the idea is called an *ad hoc* hypothesis.¹⁹

Therefore, a *scientific* theory requires confirmatory data derived from valid, reproducible, scientific experimentation and cannot be based on observations alone.

A scientific hypothesis is "an unproved theory, proposition, supposition, etc. tentatively accepted to explain



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certain facts or to provide a basis for further investigation.”²⁰ In common usage, a theory is “a speculative idea or plan as to how something might be done, and, popularly, a mere conjecture or guess.”²¹ For naturalistic evolution to be a *scientific* theory, each of three components must be a *scientific* theory. They are: (1) the naturalistic evolution of the first cell; (2) naturalistic microevolution; and (3) naturalistic macroevolution.

John Rennie wrote: “The origin of life remains very much a mystery.”²² Alvin Plantinga wrote: “(A)t present all such accounts of the origin of life are at best enormously problematic.”²³ Since a *scientific* theory cannot be based on a scientific mystery or on enormously problematic accounts, the naturalistic evolution of the first cell cannot be a component of a *scientific* theory of evolution.

Francisco Ayala wrote: “[S]cience relies on observation, replication and experimentation, but nobody has seen the origin of the universe or the evolution of species, nor have these events been replicated in the laboratory or by experiment.”²⁴ David Depew wrote: “I could not agree more with the claim that contemporary Darwinism lacks models that can explain the evolution of cellular pathways and the problem of the origin of life.”²⁵

A *scientific* theory cannot be based on events that have been neither observed nor replicated, and a *scientific* theory cannot be based on the unknown evolution of cellular pathways. Nor can a *scientific* theory be based on promissory materialism. As noted earlier, naturalistic macroevolution has absolutely no unique and unequivocal supporting data and is an irrational scientific hypothesis. Naturalistic macroevolution is not a component of a *scientific* theory of evolution.

No *scientific* theory of evolution exists because the naturalistic evolution of the first cell and naturalistic macroevolution do not qualify as *scientific* theories. The naturalistic evolution of the first cell and naturalistic macroevolution are actually *ad hoc* hypotheses, because the exact chemical and physical conditions present during specific steps in evolution cannot be known and because no scientific data exist to indicate that a specific mechanism was actually operative for any specific step.

Mayr wrote that evolutionary biology is a historical science based on observation, comparison, and classification²⁶ and that experimentation is inappropriate for understanding the historical progression of evolution.²⁷ He claims that theories in evolutionary biology are based on concepts rather than laws as is the case in the physical sciences.²⁸ The evolutionary biology of Mayr is an ordering and stratification of data, not a *scientific* theory. Further, the observations, comparisons, and classifications taking place in evolutionary biology do not and cannot reveal causative agency.

Intelligent Design and Methodological Naturalism

Many advocates of intelligent design believe that intelligent design is scientific. John Angus Campbell, Director of Graduate Studies in the Department of Communication, University of Memphis, and co-editor of *Darwinism, Design, and Public Education*, wrote:

ID is a science, a philosophy, and a movement for education. As science, ID is an argument against the orthodox Darwinian claim that mindless forces—such as variation, inheritance, natural selection, and time—can account for the principal features of the biological world.²⁹

Part III of this book is subtitled, “The Theory of Intelligent Design: A Scientific Alternative to Neo-Darwinian and/or Chemical Evolutionary Theories.”³⁰

Warren A. Nord, who taught the philosophy of religion at the University of North Carolina, Chapel Hill, wrote:

Of course, advocates of ID theory typically claim that it is a scientific theory—at least when science is freed of its philosophical commitment to naturalism.³¹

Most scientists believe that intelligent design is not scientific. Michael Ruse, Lucyle T. Werkmeister Professor of Philosophy at Florida State University, wrote:

[I]t is quite wrong to teach creationism—call it intelligent design or what you will—in science classrooms. Keep it out and put it in the comparative religion or history classes.³²

These quotes reveal a fundamental disagreement over the definition of science. But how is science to be defined? John Rennie wrote: "A central tenet of modern science is methodological naturalism—it seeks to explain the universe purely in terms of observed or testable natural mechanisms."³²

Does the entire physical universe run purely in terms of observed or testable natural mechanisms? In other words, does methodological naturalism describe how the universe works *exclusively* or does it only describe how the universe works *usually*? To claim that methodological naturalism describes how the universe works *exclusively* would require knowledge of the cause of every physical event for the entire history of the universe. Since such knowledge is lacking, methodological naturalism is only a presupposition, which can never be proven.

Both the intelligent design advocate and the methodological naturalist have a minimalist position from which neither will retreat ...

Are these two minimalist positions incompatible? No!

Classically, methodological naturalism differentiated science from technology. In engineering and the applied sciences, scientific data and the scientific method are intelligently used to produce an idea or a product, which would not have occurred naturally. God's activity in the physical world would not be naturalistic but would constitute a supernatural technology. A miracle is the antithesis of a testable natural mechanism. Thus, methodological naturalism describes how the universe runs apart from intelligent input, whether human's or God's.

Natural science requires a reasonable working definition. Alvin Plantinga wrote:

There is dispute as to whether science by its very nature requires methodological naturalism, and there is also dispute as to whether science has a nature. But as commonly practiced, science does seem to be associated with methodological naturalism.³⁴

Methodological naturalism describes how the universe *usually* works and provides the foundation for scientific experimentation. As such, methodological naturalism is a most reasonable definition of natural science, that science which excludes all intelligent input.

If data reasonably approximate the expectations of methodological naturalism, an enterprise can be included within natural science. If the data are highly irrational under the confines of methodological naturalism, the enterprise should be excluded from natural science.

Methodological naturalism excludes intelligent design from natural science. Intelligent design is supernatural applied science and, more specifically, supernatural genetic engineering and supernatural biotechnology. No scientific theory of intelligent design exists. Intelligent design should be promoted for what it really is—a rational explanation for real biological origins and as that explanation which best conforms to the scientific data concerning biological origins.

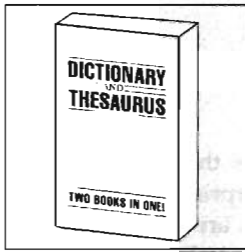
Both the intelligent design advocate and the methodological naturalist have a minimalist position from which neither will retreat. The minimalist position for the intelligent design advocate is that intelligent design is the causal agency of real physical events and real biological origins. Intelligent design is a legitimate component of real biology and, as such, must be included in a public school biology curriculum when biological origins are being taught. The minimalist position for the methodological naturalist is that intelligent design is a supernatural intelligent process, not a natural process. Intelligent design is the antithesis of methodological naturalism and must be excluded from a science curriculum.

Are these two minimalist positions incompatible? No! Stephen Meyer alluded to a possible synthesis when he wrote: "This essay has argued that, whatever its classification, the design hypothesis does constitute a better explanation than its materialistic or naturalistic rivals for the origin of specified biological information."³⁵ Here he treats intelligent design as a hypothesis rather than a scientific theory and opens the possibility of reclassifying intelligent design into something other than science.

Biology: Origins and Systems

The apparent incompatibility of these minimalist positions has to do with the definition of biology. Biology has been misclassified. Scientists classified biology as a natural science. From the smallest grade schools to the greatest universities, biology has been placed among the sciences. We have come to believe, *a priori*, that biology is a part of science. Biology is not a natural science in its *totality*. It needs to be freed from the box created by the natural sciences and by our thinking. Biology has a natural science component and an origins component. A biology curriculum is scientific when it addresses biological systems. A biology curriculum is not scientific when it addresses biological origins.

The biology teacher has two hats: when teaching biological systems, the teacher wears a "scientific" hat;



Biology is not a natural science in its totality. ... Biology has a natural science component and an origins component. A biology curriculum is scientific when it addresses biological systems. A biology curriculum is not scientific when it addresses biological origins.

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Needed: A New Vocabulary for Understanding Evolution

when teaching biological origins, a “non-scientific biological origins” hat. Naturalistic microevolution is scientific and would be included in the curriculum on biological systems. The naturalistic evolution of the first cell, naturalistic macroevolution, intelligent design, and progressive creation are explanations of biological origins and would be included in the curriculum on “nonscientific biological origins.”

But, are not both the naturalistic evolution of the first cell and naturalistic macroevolution scientific? No, for both are highly irrational scientific hypotheses.³⁶ Intelligent design and progressive creation are not scientific, because they are the product of supernatural intelligent design and assembly—the antithesis of methodological naturalism. None of the four should be taught in a science class. They could and should be taught in the biological origins component of a biology class. They must all be taught, or none should be taught. Never should one or two be taught to the exclusion of the others.

The division of biology into a scientific component and a nonscientific component should be welcome in public education. It defuses the litigation issue. The biology curriculum would be divided into a scientific component concerning biological systems and into a nonscientific component concerning biological origins. The honest biology teacher would make it clear to her students which hat she is wearing and would conduct the teaching and discussion accordingly. Further, the relationship between naturalis-

tic macroevolution and intelligent design is not one of science vs. religion, but, rather, one of science vs. technology.

Since biological origins are not scientific, they do not belong to the scientist but to the public at large. You do not need to be a scientist to make an intelligent decision about origins. Scientists may generate numbers and provide data, but they must not control the debate. Being a scientist may actually be detrimental, for a scientist is inclined to drag biological origins back into methodological naturalism.

Punctuated Equilibrium and Scientific Theory

The late Stephen Gould stated:

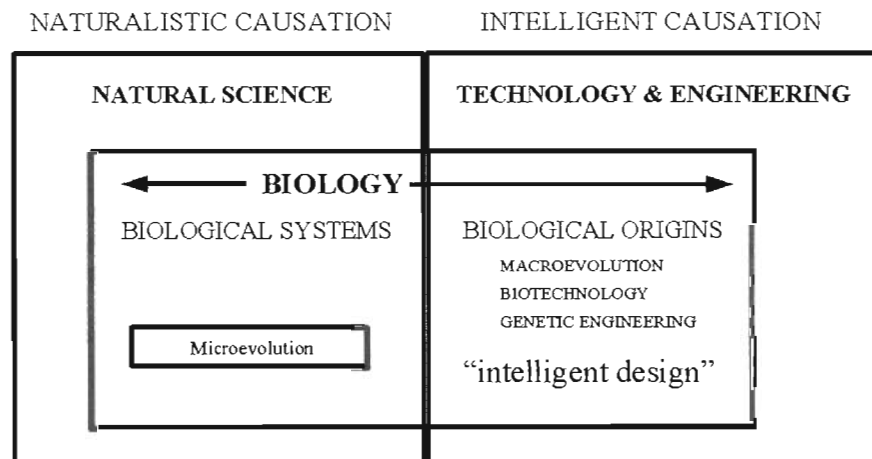
The theory of punctuated equilibrium attempts to explain the macroevolutionary role of species and speciation as expressed in geological time.³⁷

As a central proposition, punctuated equilibrium holds that the great majority of species, as evidenced by their anatomical and geographical histories in the fossil record, originate in geological moments (punctuations) and then persist in stasis throughout their long durations ... in the domain of macroevolution.³⁸

The *scientific* theory of punctuated equilibrium has four fatal flaws.

1. Punctuated equilibrium is the product of a historical science,³⁹ which relies on obser-

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ventions, not experimentation. As such, the “theory” of punctuated equilibrium fails to meet the criteria for a *scientific* theory. It constitutes, at best, a scientific hypothesis.

2. Data consistent with punctuated equilibrium do not exist for the large majority of species. Gould wrote that the data usually constitute an “unresolvable transition,”⁴⁰ a “missing record,”⁴¹ or “rare stratigraphic situations.”⁴² Punctuated equilibrium, as it applies to most species, is an *ad hoc* hypothesis.

3. Punctuated equilibrium does not reveal causative agency. As noted, fossils do not and cannot reveal the cause of the alteration in DNA, which preceded the change in fossil morphology. Gould recognized this when he wrote: “Therefore, and especially, punctuated equilibrium provides no insight into the old and contentious issue of saltational or macromutational speciation.”⁴³ However, the number of tries available to macroevolution is totally insufficient to consider naturalistic causation as the basis for the fossil record.

4. Punctuated equilibrium is based on circular reasoning, for the foundation of punctuated equilibrium is Darwinian genetic change,⁴⁴ which is synonymous with naturalistic causation, and *standard* evolutionary views.⁴⁵ Thus, punctuated equilibrium is true because naturalistic macroevolution is true, and naturalistic macroevolution is true because punctuated equilibrium is true.

The *scientific* theory of punctuated equilibrium should be given a decent burial alongside the geocentric solar system.

Robust Formational Economy Principle and Causation

The Robust Formational Economy Principle (RFEP) is the concept that the universe came into existence with the built-in potential or “blueprint” to generate life as we know it. It begs the question as to which causal agency brought the universe into existence.

Many scientists accept a RFEP of naturalistic origin. Some theists accept a RFEP of supernatural origin. Though the two are naturalistic in their outworking, they are antithetical in their origin and in their potential. The supernatural generation of a RFEP universe results in a “loaded” universe, which is physical, though of supernatural origin. Scientists can never determine if our universe is “loaded,” since the “load” would be supernaturally obscure.⁴⁶

In a supernatural RFEP, macroevolution follows a supernatural “blueprint.” A lowly bacterium lying in a shallow body of water could be penetrated in an orderly fashion by a million high energy waves, each originating from a different galaxy. Each high energy wave could energize and transform a segment of DNA such that, after the millionth wave passed, the bacterium is left with a segment of DNA, which codes for all the components of a propulsive flagellum.

Conceptually, macroevolution by a naturalistic RFEP, macroevolution by a supernatural RFEP, macroevolution by intelligent design, and progressive creation could each produce the exact same DNA molecule. Such a DNA molecule would not retain any residual, which would provide a clue as to its mechanism of origin. Also, God’s intelligent design is present in the generation of the supernatural “blueprint” of RFEP, in intelligent design, and in progressive creation. The presence of intelligent design does not differentiate between them. The scientific method cannot differentiate between the various possible mechanisms of origin for any particular DNA molecule.

Practical Applications

This new vocabulary provides the foundation for a new understanding of evolution, especially as it pertains to biological origins. As noted previously, comparative studies of DNA, proteins, homologous structures, and fossils fail to reveal causative agency. The same is true of phylogenetic trees and Haeckel’s embryos. Peppered moths and Darwin’s finches are examples of naturalistic microevolution and have no relevance to naturalistic macroevolution or to biological origins.

Genetic engineering involves altering existent DNA and is microevolution by the intelligent design of scientists. Laboratory induced changes in HOX genes is microevolution no matter how bizarre the resulting creature.

This new vocabulary provides the foundation for reevaluating educational requirements. The Commonwealth of Pennsylvania has an *Academic Standards for Science and Technology*. This standard for teaching science includes the requirement, “Analyze the theory of evolution—Examine human history by describing the progression from early hominids to modern humans.”⁴⁷ This requirement contradicts known facts: No *scientific* theory of evolution exists; the mechanisms for the assembly of cellular pathways in the biological origin of modern humans are not known; no data exist concerning causative agency; and the evolution of *Homo sapiens* from a common ancestor with the chimpanzee is not a naturalistic event.

Requiring students to describe “the progression from early hominids to modern humans” has nothing to do with science and everything to do with the promotion of a godless world view. It should be removed from the Commonwealth of Pennsylvania’s *Academic Standards for Science and Technology*.

In conclusion, the new vocabulary radically alters one’s understanding of evolution, biology, and science. It becomes a grid through which data are filtered anew, and it provides a far more accurate understanding of biological origins. ☞

Notes

- ¹Charles Darwin, *The Origin of Species*, Modern Library ed. (New York: The Modern Library, 1993), 612.
- ²Ernst Mayr, *What Evolution Is* (New York: Basic Books, 2001), 287.
- ³John Rennie, "15 Answers to Creationist Nonsense," *Scientific American* (July 2002): 80.
- ⁴Mayr, *What Evolution Is*, 48.
- ⁵R. Lewin, "Evolutionary Theory Under Fire," *Science* 10 (1980): 883.
- ⁶Matthew 22:21.
- ⁷Ernst Mayr, "Darwin's Influence on Modern Thought," *Scientific American* (July 2000): 80.
- ⁸*Ibid.*, 81.
- ⁹*Ibid.*, 82.
- ¹⁰Working Group on Teaching Evolution, National Academy of Sciences, *Teaching About Evolution and the Nature of Science* (Washington, DC: National Academy Press, 1998), 6.
- ¹¹NSTA Handbook 1999–2000, National Science Teachers Association (Arlington, VA: National Science Teachers Association, 1999): 206.
- ¹²H. S. F. Cooper, Jr. "The Genome Writ Large" *Natural History* 110 (2001): 79.
- ¹³Mayr, *What Evolution Is*, 237.
- ¹⁴Julia Karow, "Reading the Book of Life," in *Understanding the Genome from the Editors of Scientific American* (New York: Warner Books, 2002), 132.
- ¹⁵H. P. Yockey, "A Calculation of the Probability of Spontaneous Biogenesis by Information Theory," *Journal of Theoretical Biology* 67 (1977): 387; and J. F. Reidhaar-Olson and R. T. Sauer, "Functionally Acceptable Substitutions in Two α -Helical Regions of λ Repressor," *Proteins: Structure, Function, and Genetics* 7 (1990): 315.
- ¹⁶Also, fewer than 1,050 proteins have existed on Earth, for a collection of 1,050 small proteins of one hundred amino acid residues could cover the entire surface of Earth to a depth of 1.5 feet every year for 3.5 billion years.
- ¹⁷National Academy of Sciences, *Teaching About Evolution and the Nature of Science*, 6.
- ¹⁸National Association of Biology Teachers, "Statement on Teaching Evolution," adopted by the Board of Directors, March 15, 1995 and revised October 1997.
- ¹⁹Committee on Science and Creationism, National Academy of Sciences, *Science and Creationism: A View from the National Academy of Sciences* (Washington, DC: National Academy Press, 1984), 9.
- ²⁰D. Guralnik, Editor in Chief, *Webster's New World Dictionary of the American Language*, 2d college ed. (New York: Simon and Schuster, 1984).
- ²¹*Ibid.*
- ²²Rennie, "15 Answers to Creationist Nonsense," 81.
- ²³Alvin Plantinga, "Creation and Evolution: A Modest Proposal," in *Darwinism, Design, and Public Education*, ed. John A. Campbell and Stephen C. Meyer (East Lansing, MI: Michigan State University Press, 2003), 514.
- ²⁴Francisco J. Ayala, "Arguing for Evolution," *Evolution in Perspective: The Science Teacher's Compendium* (Arlington, VA: NSTA Press, 2004), 1.
- ²⁵David Depew, "Intelligent Design and Irreducible Complexity: A Rejoinder," in *Darwinism, Design, and Public Education*, ed. Campbell and Meyer, 447.
- ²⁶Ernst Mayr, "Darwin's Influence on Modern Thought," *Scientific American* (July 2000): 81.
- ²⁷*Ibid.*, 80.
- ²⁸*Ibid.*, 81.
- ²⁹John A. Campbell, "Why Are We Still Debating Darwinism? Why Not Teach the Controversy?" in *Darwinism, Design, and Public Education*, ed. Campbell and Meyer, xi, xii.
- ³⁰Campbell and Meyer, *Darwinism, Design, and Public Education*, 221.
- ³¹Warren A. Nord, "Intelligent Design Theory, Religion, and the Science Curriculum," in *Darwinism, Design, and Public Education*, ed. Campbell and Meyer, 55.

³²Michael Ruse, "On Behalf of the Fool," in *Darwinism, Design, and Public Education*, ed. Campbell and Meyer, 483.

³³Rennie, "15 Answers to Creationist Nonsense," 81.

³⁴Plantinga, "Creation and Evolution: A Modest Proposal," 522.

³⁵Stephen C. Meyer, "DNA and the Origin of Life: Information, Specification, and Explanation," in *Darwinism, Design, and Public Education*, ed. Campbell and Meyer, 271.

³⁶A cell containing only ten different types of small, functional, complex, enzymatic proteins assembled from L-isomer, biological amino acids, plus a functioning genetic code, would be far too simplistic to accomplish both metabolic activity and replication. The maximum number of unique proteins or tries available for the assembly of the first cell on Earth would have been fewer than 10^{45} proteins. The mass of the water of hydration for a protein ranges between 10% and 20% of the mass of the protein. Earth contains 1.4×10^{24} grams of water. This amount of water could hydrate 1.4×10^{25} grams of protein at 10% hydration.

The mass of 10^{45} proteins, each composed of one hundred amino acid residues, is more than 1.6×10^{25} grams and would have less than a 10% hydration resulting in a thick sludge filling all bodies of water. A collection of 10^{45} proteins could form $([10^{45}]^{10})/10!$ or more than 10^{443} combinations of ten proteins. If every combination of ten proteins formed were to exist for only one second, fewer than 10^{61} combinations would exist in three billion years. The probability of assembling a specific combination of ten proteins in three billion years would be one chance in 10^{382} . No protein could be eliminated prior to assembling into every possible combination with nine other proteins. The random elimination of proteins to make way for new proteins could remove a necessary, functional protein just as readily as a nonfunctional protein. Therefore, the maximum number of unique proteins or tries available for the naturalistic assembly of the first cell on Earth was fewer than 10^{45} proteins.

The probability of naturalistically assembling an integrated, functional, complex enzyme of one hundred amino acid residues from an equimolar collection of biological amino acids is about one chance in 10^{65} per try. The probability of finding all ten functional, complex enzymes for the first cell within such a collection of 10^{45} proteins would be one chance in $([10^{20}]^{10})/10!$ or less than one chance in 10^{193} . The best overall probability of ever assembling ten integrated, functional, complex enzymes for the first cell would be the probability of finding all ten functional, complex enzymes for the first cell within a collection of 10^{45} proteins, which is less than one chance in 10^{193} , multiplied by the probability of ever assembling a specific combination of ten proteins, which is one chance in 10^{382} . The product of the two probabilities is less than one chance in 10^{575} . The naturalistic assembly of the first cell on Earth or any place else in the entire universe is an extremely irrational scientific hypothesis.

³⁷Stephen Jay Gould, *The Structure of Evolutionary Theory* (Cambridge, MA: The Belknap Press of Harvard University Press, 2002), 766.

³⁸*Ibid.*

³⁹*Ibid.*, 761.

⁴⁰*Ibid.*, 767.

⁴¹*Ibid.*, 769.

⁴²*Ibid.*

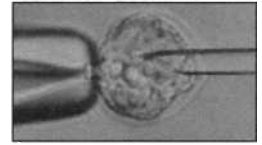
⁴³*Ibid.*, 768.

⁴⁴*Ibid.*, 769.

⁴⁵*Ibid.*

⁴⁶Fredric P. Nelson, MD, "RFE and ID Universes Are Both Supernatural," *Perspectives on Science and Christian Faith* 57, no. 1 (March 2005): 76.

⁴⁷Pennsylvania Department of Education, *Academic Standards for Science and Technology*, 22 PA Code, chap. 4, Appendix B (January 5, 2002): 13.



Human Embryonic Stem Cell Research and Christian Community Ethics: An Old Testament Investigation

Cahleen and Paul Shrier



Cahleen and Paul Shrier

This paper uses a dialogical approach to develop a Christian community ethic of human embryonic stem cell (HESC) research. The first part describes HESC research and differentiates it from other forms of stem cell research. Seven possible policy options are outlined and then used to delineate several non-Christian and Christian religious positions. After this survey familiarizes the reader with various religious arguments, the paper turns to an investigation of some Old Testament (OT) texts. The OT discussions of conception, conception and birth, and the interruption of pregnancy are each considered in their ancient Near Eastern culture. This investigation determines that both the sovereignty of God and his immanence in community determine the ancient Jewish community's attitudes toward conception and birth. Conception is always considered in the context of the community, a community which includes God as its guiding member. This paper argues that the concept of conception in community remains valid, and therefore that today embryos are also created in a community context. For us, the most appropriate community grouping is the nation. As a result, if HESC research is carried out over the objections of even a minority of community members, violence has been done to those members. In consequence, a current Christian community ethic would reject all HESC research, while recognizing the importance of other forms of stem cell research.

HESC research may be the hottest scientific research this decade or perhaps even this century. ... HESC research may one day provide a cure for debilitating injuries and diseases ...

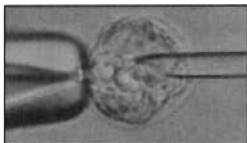
May 19, 2005 Hwang, et al. announced that they had successfully created eleven human embryonic stem cell lines by somatic cell nuclear transfer (SCNT) of nuclei from individuals with serious diseases into donor oocytes.¹ Had this research been verified, it would have been a cutting edge development because the genetic code of the stem cell lines would be identical to those of the nuclei donors so that theoretically their immune system would not reject the stem cells when they were used to treat the individuals' illnesses. Based on these and other developments in Asia, and particularly in Korea, observers suggested in May 2005 that the US was falling behind Asia in human embryonic stem cell research (HESC).²

In December 2005, it was learned that Hwang's paper was fraudulent, that he had not successfully completed this research. In response, the Korean government has

withdrawn millions of dollars of funding for HESC in Korea.

Nevertheless, as a response to national anxiety that the US was falling behind Asia in HESC research, on May 24, 2005, the US House of Representatives easily passed the Stem Cell Research Enhancement Act,

Cahleen Shrier received a Ph.D. in physiology from Loma Linda University (Loma Linda, CA). **Paul Shrier** received a Ph.D. in practical theology from Fuller Theological Seminary. Cahleen and Paul teach at Azusa Pacific University in Azusa, CA: Paul, in the practical theology department; Cahleen, in the biology department. The "promises" of embryonic stem cells caught their attention, especially because Cahleen has been diagnosed with multiple sclerosis—one of the diseases with much "hope" for a cure from stem cells. There is also great "hope" that this research will alleviate suffering from spinal cord injuries such as the one from which a family member suffers. Cahleen and Paul are LA county foster parents who currently have five children living in their home. A deep concern for both alleviating physical suffering and caring for defenseless children led them to carefully consider several scientific, ethical, social policy, and theological perspectives to develop their Christian stance toward human embryonic stem cell research. Paul can be reached at pshrier@apu.edu.



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*Stem cells
are cells
that become
human
organs and
tissues in
developing
embryos, and
maintain and
repair
human
organs and
tissues in
adults.*

authorizing research on human embryos that had been created, but not used, for *in vitro* fertilization (IVF). This bill expands research from the US federal government's previous position allowing the use of HESC lines created prior to President Bush's speech on August 9, 2001. President Bush has threatened to veto this bill. This is currently possible because the act passed by a vote of 238 to 194 in Congress, fifty-two votes short of the two-thirds majority required to overturn a veto.

As of January 2006, the bill (S. 471) has not been passed in the Senate. However, it has forty co-sponsors and is on the Senate calendar. Senator Bill Frisk has written that in its current form the bill does not include sufficient ethical and scientific oversight, prohibition of financial incentives to procure embryos, and guidelines concerning who decides whether an embryo is implanted or discarded.³ He views these omissions as shortcomings. Should this bill pass, with or without these revisions, it may only marginally improve the US competitive position in this research. Several other countries funding HESC research permit therapeutic cloning, which would still be banned by the US federal government.

While the US federal position on embryonic stem cell research remains conservative, individual state policies reveal diverse views. On November 2, 2004, California voters passed Proposition 71, authorizing the state to raise \$3 billion to support stem cell research in California—\$300 million yearly for ten years. The majority of this money will be used to support HESC research.⁴ Californians' endorsement of HESC research is currently the most visible example of a state legislative trend: Connecticut, Hawaii, Illinois, Massachusetts, Minnesota, Nebraska, Pennsylvania, and Rhode Island also have bills enacted or pending that provide funding for HESC research, including therapeutic cloning. New York, North Carolina, and Washington have bills enacted or pending that okay HESC research, but ban reproductive or therapeutic cloning. Florida will fund HESC research and does not reference therapeutic cloning in its laws.

While many states support some form of funding for HESC research, other states, including Kentucky, Louisiana, Maryland,

South Carolina, and Texas have introduced conflicting bills, reflecting ongoing debates that have not been resolved as of June 2005. Meanwhile, other states oppose HESC research. West Virginia has a bill pending that prohibits any type of cloning and HESC research. Alabama, Indiana, Kansas, Missouri, Ohio, and Tennessee have bills enacted or pending that ban reproductive or therapeutic cloning while they do not explicitly address HESC research. Finally, Virginia, Michigan, and Indiana will fund adult stem cell research as a viable alternative to HESC research.⁵ This survey of state legislation suggests that, as with other moral issues related to sexuality and reproductive rights, America is fragmented.

HESC research may be the hottest scientific research this decade or perhaps even this century. The race for results is reminiscent of the space race in the 1960s. The impetus for this race is the belief that HESC research may one day provide a cure for debilitating injuries and diseases such as quadriplegia and multiple sclerosis. Equally motivating, although perhaps less noble, is the potential for mind-boggling profits from successful applications of this research. HESC research has great healing potential and may provide major positive economic benefits to corporations, states, and even countries. Nevertheless, Americans have conflicting beliefs about this research because it requires destroying early embryos to harvest stem cells and/or creating human embryos in a laboratory. These actions raise significant ethical questions. These ethical questions are particularly pressing for Christians who believe that God is the Creator, that God created human beings in his image, and that every human is loved by God and therefore ought to be valued by other humans.

Current Status of HESC Research Policy

The Basic Science of HESC Research

Stem cells are cells that become human organs and tissues in developing embryos, and maintain and repair human organs and tissues in adults. There are several classes of stem cells. The major classes are identified in the following description of early embryonic development.

Embryonic development begins with the union of a sperm and an ovum. After union, the cell divides. These two cells then divide and become a total of four cells. The four cells each divide and this process continues until they become a solid ball of approximately sixteen cells. This is called the morula. All cells in the morula are *totipotent stem cells*. This means that they are undifferentiated (not specialized) and have the total potential to develop into extra-embryonic tissue such as the placenta as well as embryonic tissue.

The cells of the morula continue to divide and secrete fluid that accumulates in the center of the ball of cells. Approximately four to five days after conception, this hollow ball of cells is called a *blastocyst*. At this stage, the cells differentiate (specialize) into either embryonic or extra-embryonic cell types. The embryonic cells cluster together into the inner cell mass (ICM). Any one cell of the ICM can become any of the many embryonic tissues (e.g., cardiac, skeletal, lymphatic). These embryonic cells have now achieved one level of differentiation and are considered to be *pluripotent stem cells*. These cells only have partial potential. They will become embryonic, not extra-embryonic, tissue. However, they still have a lot of potential because they can become any type of embryonic tissue.

HESC research refers to research on cells harvested from the ICM. The embryos from which these cells are harvested are created by *in vitro* fertilization (IVF) or therapeutic cloning and are allowed to develop to the blastocyst stage. Proposed uses of ICM cells include research to understand human development, birth defects, cancer, and gene regulation. In addition, it is suggested that cell replacement therapy could be used to replace diseased cardiac tissue or insulin secreting cells. Many embryos initially created by IVF techniques for reproductive purposes are never implanted. Instead they remain frozen at IVF clinics. It has been proposed that HESCs could be harvested from these "left over" embryos for research purposes. Potential risks and costs of the clinical use of HESCs include possible immune rejection of tissues created from donor embryos and the need to screen for genetic errors in the donated cells (particularly for the disease that is being treated).

Immune rejection could theoretically be prevented by *therapeutic cloning*, that is, using cells created by somatic cell nuclear transfer (SCNT). This procedure takes the nucleus with its 48 required chromosomes from a somatic (nongamete) cell (e.g., skin cell) and transfers it into an ovum that has had its nucleus removed. As a consequence, the DNA comes from only one parent cell instead of having an ovum (24 chromosomes) and a sperm (24 chromosomes) unite to form the 48 chromosomes required. After transferring the nucleus to the ovum, the egg is shocked to stimulate it to divide. The ICM cells are then harvested at the blastocyst stage. When used for therapeutic cloning,

these cells have the advantage of decreasing immune rejection. The person being treated donates the nucleus. Theoretically, they will not reject their own tissue because it contains their own DNA and not that of another person. This process also has limitations; patients being treated for diseases resulting from genetic errors, juvenile diabetes, for example, will not be able to donate the nucleus from one of their own cells. Reproductive cloning also uses SCNT, complicating the political and ethical ramifications of using this procedure therapeutically.

As the embryo continues to develop past the blastocyst stage, the stem cells further differentiate, becoming *multipotent stem cells*, also known as adult stem cells. These cells have differentiated further and are designated to become fewer types of cells. For example, hematopoietic stem cells (HSC) will only become one of the types of blood cells (e.g., white blood cells, red blood cells, or platelets). There are also mesenchymal, skin, muscle, bone, and neuronal stem cells. These multipotent stem cells can potentially be obtained from stillborn or aborted fetuses, umbilical cord blood and/or within the tissues of human infants and adults.

Some ethicists and researchers believe that adult stem cells do not have the healing potential of HESC.⁶ Other researchers such as David Prentice, however, argue that the healing potential of adult cells may at least equal that of HESCs.⁷ There have been reports that multipotent stem cells can be induced to produce cell types broader than their original designation. For instance, circulating blood stem cells have reportedly been stimulated to become hepatocytes,⁸ bone marrow stem cells have been reported to develop into blood, heart,⁹ endothelium, bone, cartilage, fat, tendon, lung,¹⁰ pancreas,¹¹ liver,¹² muscle, marrow, stroma, and brain cells.¹³

Adult stem cell research currently has healing potential without controversy. HESC research requires the destruction of existing embryos or those created by controversial techniques, raising many ethical questions. The next section considers the current scientifically realistic options for HESC research and identifies the current policy positions of several countries with reference to these options.

Seven HESC Research Policy Options

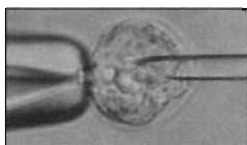
Nikolaus Knoepffler lists seven basic policy options that governments can currently adopt to regulate HESC research activity or to determine eligibility for government research funding:

Option 1 – Allow no HESC research;

Option 2 – Allow research only on stem cells harvested from existing stem cell lines;

Option 3 – Also allow research on stem cells harvested from "surplus" embryos;

Option 4 – Allow research on stem cells created by IVF for the purpose of research;



Many religious concerns expressed about the use of embryonic stem cells are identical with broader religious concerns about abortion. Because embryos are destroyed before day fourteen in order to harvest these cells, many argue that it is a different issue ... Consequently, the question of when human life begins has been the focus for most religious groups ...

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Option 5 – Allow research on stem cells harvested from embryos produced by SCNT;

Option 6 – Allow research on stem cells produced by IVF or SNCT and then genetically modified;

Option 7 – Allow research on stem cells harvested from embryos produced by SCNT into nonhuman oocytes.¹⁴

Currently, there are nations that support each of these regulatory options.¹⁵ When countries are described as supporting options 2 through 7, it also can be assumed that they accept earlier options, excluding option 1. As examples, China supports option 6 and 7; the UK, Belgium, Iraq, and India support options 4 and 5; Israel supports option 5; Japan, Australia, Canada, Denmark, Russia, and Spain all support option 3; while the US and Germany support option 2; and Austria, Ireland, and Costa Rica support option 1.

Non-Christian Religious Stances on HESC Research

LeRoy Walters conducted the research on the national policies cited above. He also considered how a variety of religious positions on HESC research influenced national policies. He made some broad, but carefully qualified, conclusions: regions most influenced by Catholicism or conservative Protestant Christianity implemented options 1 and 2; Israel's policies were consistent with a majority Jewish position; Islamic positions lead to liberal policies in Singapore and Iran, as did Hindu approaches; and Buddhist influence is mixed.

Many religious concerns expressed about the use of embryonic stem cells are identical with broader religious concerns about abortion. Because embryos are destroyed before day fourteen in order to harvest these cells, many argue that it is a different issue – the early embryo does not have the “human” status and moral position that it might have by the third month, the sixth month, or later. Consequently, the question of when human life begins has been the focus for most religious groups as they develop ethical positions.

Orthodox and Reformed Jews view the embryo “as mere water” until the fortieth

day of the embryo's development.¹⁶ After forty days, the embryo is considered to be a part of the mother and harming the embryo is prohibited except to save the mother from death or serious harm. Orthodox and Reformed Jewish groups accept option 3 because they believe it meets their moral imperative to save life, without destroying human life.¹⁷ Jewish perspectives on options 4 and 5 are mixed, reflecting different results from attempts to balance disapproval of creating embryos for research with the Jewish imperative to heal developed from Deut. 30:20.¹⁸

Islam also has various approaches to HESC research. According to Walters, the majority of Muslim legal commentators view abortion as moral through either the fortieth day or the fourth month of embryonic development. Thus ending the life of five-day-old blastocysts is not problematic. Muslim testimony before both NBAC (US National Bioethics Advisory Committee) and SBAC (Singapore Bioethics Advisory Committee) supports the use of already existing embryos for research (option 3). While views on options 4 and 5 are less clear, the Legal Committee of the Islamic Religious Council seems to support these options.

The Singapore Buddhist Federation also supported option 3 before SBAC (Singapore is 42.5% Buddhist). In London, however, Damien Keown, co-editor of the *Journal of Buddhist Ethics*, disagrees with all forms of HESC research, arguing for option 1.¹⁹ Somparn Promta concurs, saying that Buddhist writings clearly view conception as the point where human personhood begins and therefore sacrificing a life for the good of another is wrong.²⁰

For reasons similar to the Buddhist arguments against HESC research, Taoists also argue against all forms before SBAC. Taoists support research that brings healing and health to others, but not research that sacrifices any form of human life to benefit others.

The Hindu Endowments Board of Singapore accepted HESC research, including option 3, within limits. While the Hindu religious tradition firmly rejects abortion,²¹ the Hindu Endowment Board concluded that at fourteen days it is not certain that the fetus is endowed with all qualities of life.

Christian Positions on HESC Research

A variety of Christian ethical stances on HESC research exist. The most comprehensive statements are those of the Catholic Church. Their official position is that HESC research should not be undertaken. It is always wrong to destroy “early” embryos because they have the same moral status as other human beings.²² Embryos at all stages of development have the same status as other humans for the following reasons: they are made in the image of God; they have a unique genetic code;²³ human life develops continuously from conception; and inherent in the early human being is a complete human life.²⁴ Even if these assumptions are wrong, the precautionary principle warns that because it is not possible to know conclusively, we ought to err on the side of caution and not destroy any HESCs. The US Catholic Bishops have rejected HESC research in a number of communiqués.²⁵

The Eastern Orthodox Church supports option 2, arguing that human embryos should not be destroyed for research. The Orthodox Church believes science and medicine do God’s will in healing. At the same time, human beings are created body and soul at conception. Humans are in the process of *theosis*, or deification—becoming like Christ. This process begins as a zygote. The Orthodox stance also emphasizes that through this process humans enter into community with God, just as Father, Son, and Holy Spirit are community.²⁶ Thus, human embryos ought not to be destroyed no matter how powerful the healing potential is from the use of their stem cells. However, because the destruction of embryos to create existing stem cell lines has already occurred, it cannot be undone. Thus, existing HESC lines ought to be used for healing, but not for private profit.²⁷

Other Christian denominations or groups that support option 1 and/or option 2 include the Southern Baptist Convention,²⁸ the Assemblies of God and the Episcopal Church,²⁹ an ecumenical group of Protestant and Orthodox scholars before the European Group on Ethics, the National Council of Churches, and the Singapore Council of Christian Churches before SBAC.³⁰ The official statements of the Episcopal Church and the Assemblies of God emphasize that HESC research destroys a human life. The Southern Baptist Convention position statement identifies this concern, but in addition it emphasizes that children are created in the context of the family: “The biblical witness declares that children are a gift from the Lord (Ps. 127:3–5) and are to be the offspring of a husband and wife (Gen. 1:27–28; 2:24; 9:1–2).”³¹ Rather than approaching the question of cloning and HESC research from the perspective of individual rights, this statement recognizes that from a Christian perspective embryos are created in a community context.

Alternatively, the United Church of Christ supports HESC research, at least including option 3, suggesting that ethical guidelines need to be carefully developed for this

research.³² The United Methodist Church “with remorse and guilt” affirms the use of already existing IVF embryos for stem cell research, regretting that we have “acceded” to the creation of these embryos.³³ The Presbyterian Church USA also accepts option 3, using tissues from either aborted fetuses or “surplus” embryos in their 213th General Assembly.³⁴ The above survey suggests that a majority of Protestant and Catholic Churches worldwide either do not support HESC research, or lend limited support to HESC research using embryos initially created for IVF.

The religious views summarized above are concerned with healing and protecting all human persons. Most of the positions have been determined by logical attempts to determine the moral status of the early embryo. Should an early embryo have the same moral status as an already born human? If not, when does an embryo attain this status? Different conclusions have led to various ethical positions. What if the question of relationship is further developed? How, if at all, might the question of the early embryo’s relationship to God and to other humans alter ethical stances?

The Embryo in Relationship: An Old Testament Perspective

This section will evaluate Old Testament (OT) views of conception, pregnancy, interrupted pregnancy, and birth. It will particularly consider what these texts say about the developing embryo in a community context. Once this is done, some conclusions will be made concerning how relationships ought to influence our views on HESC research.

Conception, Pregnancy, Birth

Cain’s birth is the first recorded in the OT: “Now the man knew his wife Eve, and she conceived and bore Cain, saying, ‘I have produced a man with the help of the LORD’” (Gen. 4:1). Two themes are introduced in this passage: first, while Eve and Adam had sexual intercourse, it was with the help of the Lord that the child was produced; second, “conceived and bore” are either implicitly or explicitly linked in OT discussions of conception. (See, e.g., Gen. 4:1, 17; 16:11; 21:2; 29:32–33; Exod. 2:2; Judg. 13:3, 5, 7; Ruth 4:13; Job 15:35; Ps. 7:14; Isa. 33:11.) Thus conception, pregnancy, and birth are stages of one continuous process.

In the OT, conception occurs through the agency of God. Pamela Scalise writes “in narrative and poetry, God is the one who is able to give and withhold offspring.”³⁵ According to Scalise, the usual formula for reporting conception and birth does not mention the Lord’s participation. However, specific reports of the Lord as the source of conceptions that were deemed impossible, marriage blessings naming God (Gen. 24:60 and Ruth 4:11–12), and personal names indicating the Lord’s divine assistance in conception and birth “suggest that the LORD was recognized as a source of fertility in a general way, not just in the



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Opening or
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case of special individuals."³⁶ While these narratives reveal a general pattern, the stories of specific individuals also emphasize that God's conceiving activity was viewed as an outpouring of God's pleasure in a relationship with a specific person or family.

How ought we understand this claim? First, while the OT attributes to God an active role in conception, it does not present God as a fertility deity. Unlike the worship of fertility deities prevalent in the Near East culture of that time, sexual activity was not a part of worshipping Yahweh. Yahweh had no consort. Yahweh could not be manipulated by magic. Yahweh was not associated with the cycles of nature.³⁷ Instead, Yahweh is a God who blesses those with whom he has a relationship and fertility is God's primary blessing.

Fertility is God's blessing to the community, and specifically, to the "father's house." In the OT, ancient Near East families were *patrilocal*. This means that the man lived near his parents with his wife and that he inherited their lands and the relationship with their gods. There is speculation that when God called Abram to follow him and leave his "father's house" he did so to take Abram away from the obligation to maintain the household's relationship with his father's gods (Gen. 12:3). When God gave Abram these instructions, God also outlined the intimate relationship God would develop with Abram. Abram, as the *paterfamilias*, now initiated and would maintain and develop a relationship with God; his family would join this relationship. Unlike the manipulative relationships characterizing the worship of other gods in the ancient Near East, Abraham's relationship with God was intimate; God participated in family life. God's fertility blessing to Abraham occurred within this intimate relationship (Gen. 12:1-3; 15:5-6; 26:3; Exod. 32:13).

OT and NT genealogies reveal that persons never thought of themselves as individuals, but always as members of a family. The immediate extended family was the tightest unit to which a person belonged. This included the father and his wife, the father's sons and their wives and children, and all unmarried daughters and granddaughters. Archeological evidence indicates that this extended family would live in a small group of houses, ringing a common

area, on an acre or two of land. This extended family group often consisted of 50-150 individuals. Each house represented a nuclear family, but as the proximity suggests, in daily activity and law, the extended family was the primary social configuration.³⁸ God's blessing of fertility rests on the patriarch's extended family, the most intimate level of community, as well as on the husband and wife. Children are God's blessing because they develop the land and nation of Israel, provide security for their parents' old age, perform their parents' funeral rites, labor on behalf of the community, carry on family lines, and bring the family honor. Conception is the genesis of God's blessing. Infertility is a lack of blessing attributed to God closing the womb (1 Sam. 1:5; Gen. 30:2). Opening or re-opening the womb requires God's "healing" or intervention.³⁹

God's active role in conception is described by his work in the womb, intensifying God's relationship with the woman and family. Phyllis Tribble uses three narratives in Hebrew Scriptures to support her contention that even "the wombs of women belong to God."⁴⁰ First, when Abraham deceived Abimelech, saying Sarah was his sister, God protected Sarah in Abimelech's harem by informing the king of Abraham's deception and then threatening the king. God also closed the wombs of the women in Abimelech's household, re-opening them when Abraham prayed for Abimelech (Gen. 20:1-28). Second, God showed compassion on Leah, who was hated by Jacob, by opening her womb. Later, he remembered Rachel and opened her womb. God explicitly blessed both of Jacob's wives with fertility—the hated and the beloved. Third, Yahweh also closed Hannah's womb. When Hannah prayed, Yahweh remembered her and opened her womb (1 Sam. 1:1-12). In these stories God—not the wife, husband, or society—controlled and acted on the womb.

Tribble writes that the fetus does not control the womb either. However, because God's action is either fertilization, the creation of a fetus, or infertility, the absence of a fetus, it is more accurate to say the fetus or lack thereof is best understood as the concrete expression of God's action on the womb.⁴¹ God's actions are not those of a distant deity in these narratives. He protects Sarah, blesses Leah and Rachel, and interacts with Hannah as an actor or participant

in the events of the narratives. Neither are God's actions induced by magic—he makes decisions and takes initiatives, interacting intimately with the characters in these stories.

This section has argued that in the OT, God is portrayed to be both active and relationally intimate in the process of conception. God blessed Abraham in a relationship with him. This set the relational model for God's subsequent blessings of fertility. God's fertility blessings are bestowed on an extended family or community rather than the individual. Likewise, the curse of infertility impacts the whole community. Finally, the womb language of the fertility blessing denotes God's intimate involvement in this relational blessing.⁴²

Interrupted Pregnancy

Three specific OT passages consider the interruption of pregnancy. First, Lev. 21:22–23 prescribes the penalty for accidentally causing a miscarriage:

When people who are fighting injure a pregnant woman so that there is a miscarriage, and yet no further harm follows, the one responsible shall be fined what the woman's husband demands, paying as much as the judges determine. If any harm follows, then you shall give life for life, eye for eye, tooth for tooth, hand for hand (NRSV).

Some scholars argue that the Hebrew word translated "miscarriage" refers to premature birth.⁴³ The text itself, however, supports the view that this passage refers to a miscarriage; if a child was born prematurely and no further damage was suffered, then the master suffered no loss and therefore no penalty would be necessary.⁴⁴

A parallel passage in the Code of Hammurabi further supports this reading:

If a seignor struck another seignor's daughter and has caused her to have a miscarriage, he shall pay ten shekels of silver for her fetus. If that woman has died, they shall put his daughter to death.⁴⁵

Since miscarriage is likely the correct interpretation of this word, the Levitical law supports punishment for doing accidental harm to a fetus in a dispute. Therefore, harm caused to a fetus is a culpable manifestation of violence that harms relationships in a community.

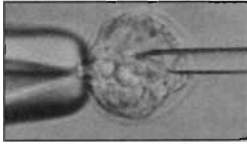
The prescribed punishment for harming an embryo is different from the punishment for harming an Israelite in Lev. 20:12–14, which specifies "a life for a life." This difference does not indicate that the fetus has a different moral status than an already born human. Instead, a fetus has a different status than a free Israelite. Consider the law immediately preceding the miscarriage law, Lev. 21:20–21. It states that a person who kills his slave with blows is punished if the slave dies immediately. He is not punished if the slave dies a day or two later. The punishment is not

specified, but the wording indicates that it is not capital punishment. Thus, in Leviticus, slaves and fetuses have at least equal value; the culprit is penalized with similar severity for either killing a slave intentionally or killing a fetus accidentally. Since all would now agree that slaves have equal moral status to other already born humans, a parallel reading of the laws concerning the fetus suggests they have equal moral status to already born humans. Further, since the law requires punishment for killing a fetus accidentally, it is not unthinkable that "a life for a life" applies when a fetus is killed intentionally.

In the Hebrew Bible, two prophetic passages view interrupting pregnancy as a curse. Hosea proclaims God's judgment on Israel for their idolatry, particularly their worship of fertility idols (Hos. 9:10–14). He even commands the Lord, "Give them, O Lord—what will you give? Give them a miscarrying womb and dry breasts" (Hos. 9:14).⁴⁶ Krause and Tribble argue that Hos. 9:11–14 is a reversal of previous fertility blessings because the ancient couplet in this curse, "womb" and "breasts," has one other occurrence in Gen. 49:25 where Jacob bestows a fertility blessing on Joseph.⁴⁷ The blessing is reversed as a consequence of Ephraim's "corporate sterility," or corporate sin of idolatry.⁴⁸ Israel has broken its intimate relationship with God and gone to worship other gods. As a result, God's fertility blessing is withdrawn.

Humans end pregnancy as result of broken relationships with God or other humans. God always opposes human decisions to end pregnancy, especially if they are intended to benefit the offending community. Only God can interrupt pregnancy.

Hosea's shockingly violent demand for God to kill the unborn ought to be considered alongside OT texts that describe ripping open pregnant women as an act of war in the ancient Near East (2 Kings 8:12; 15:16; Amos 1:13).⁴⁹ God judged the Ammonites "because they have ripped open pregnant women in Gilead in order to enlarge their territory" (Amos 1:13). God's judgment indicates that this act of war was detestable to the Lord. Note that the purpose of the Ammonites was to enlarge their territory. It might be argued that this act was abhorrent to God because it was motivated by self-interest. The ultimate



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breakdown of neighbor relationships occurs in this case when one state inflicts violence on the women and unborn children of a neighboring state to further self-interest.

Because God judges this practice of war while Hosea entreates God to carry it out in Hos. 9:14, it can be argued that God's sovereignty over the unborn extends to determining which embryos will live or die. Further, it suggests that God is most concerned with the breaking of relationship. Was Hosea considering this war practice and perhaps entreating God to go to war with Israel on account of their idolatry? In each case, interrupted pregnancy illustrates the severity of the relationship's rupture. Humans end pregnancy as result of broken relationships with God or other humans. God always opposes human decisions to end pregnancy, especially if they are intended to benefit the offending community. Only God can interrupt pregnancy. This conclusion would be consistent with the Levitical law that punishes someone who accidentally kills a fetus, and with the OT biblical descriptions of God as the source of both fertility and infertility.

Conclusions

For research, pluripotent HESCs must be harvested from embryos that are less than fourteen days old, and likely closer to six days of age. In the US, many different conclusions have been made concerning the ethics of this research. This is illustrated by state legislation that ranges from encouraging adult stem cell research and simultaneously legislating against all HESC research to encouraging HESC research from IVF and therapeutic cloning. Internationally, each of the seven policy options listed earlier has been enacted by one or more nations. Both state and national policies have been influenced to varying degrees by the religious beliefs of citizens. Generally, religious and secular stances taken vis-à-vis HESC research are based on answers to some variation of the question, "When does life begin?"

The OT passages considered above re-contextualize the questions of whether human embryos ought to be destroyed, and/or whether human embryos ought to be created expressly for the purpose of being destroyed in order to harvest stem cells. These texts shift our focus from the rights of

individuals to the rights and obligations of a unique religious community where God is universally sovereign over conception, pregnancy, birth, and death. In this context, God is the primary source of conception; indeed, we may go so far as to say a woman's womb is the property of God. Conception, birth, and pregnancy are God's blessing on the extended family and the entire community. These are all continuous stages of one blessing. Since God is the giver of this gift, only God can interrupt a pregnancy once it has begun. God condemns persons or groups that intrude and harm the unborn child. These passages suggest that God particularly condemns ending the life of an unborn infant when the harm is done to benefit the perpetrators. Finally harming embryos always results from broken community relationships and always causes further harm to the community. Consequently, a community of God or kingdom of God ethic rejects any actions—including harvesting HESCs from embryos—that interrupts conception, pregnancy, and birth in the community of God.

Stanley Hauerwas' arguments against abortion in *A Community of Character* directly relate to this ethic. He writes that we have inverted the key questions: "Note that the question is not, 'Is the fetus a human being with a right to life?' but 'How should a Christian regard and care for the fetus as a child?'"⁵⁰ He contends further:

People contemplating abortion do not ask if the fetus has a right to life, or when does life begin, or even if abortion is right or wrong. Rather, the decision seems to turn primarily on the quality of the relationship (or lack of relationship) between the couple.⁵¹

Hauerwas' observations suggest that questions of when life begin may be asked by societies to justify actions that have already been chosen as a result of broken relationships.

Hauerwas makes his arguments in the context of abortion. They are relevant to this study because HESC research requires the death of the embryo. We must still ask, "How should a Christian regard and care for a fetus as a child?" This is true for every fetus. There are not two classes of fetuses; one class that is composed of children and another that is composed of tissue for research and possibly future treatments.

Some argue that because excess IVF embryos are created outside the womb, and because they are unwanted, they become specialized human tissues that can be acceptably destroyed and used to create cures for diseases. *In vitro* fertilization, however, is a technology created to heal infertility for couples that desire children. These children have communities around them. Since these embryos are children with communities, Christians need to again ask, "What kind of people do we need to be to artificially create and care for embryos as children?"

Our Christian community tradition of almost 2,000 years overwhelming supports a view that human embryos should not be destroyed.⁵² Some readers will argue that we live in a new, scientific age that makes this specific strand of tradition irrelevant for considering HESC research. Instead, they state that we ought to base our arguments on recent scientific discoveries of the process of embryonic development, on bioethical judgments determining the moral status of embryos and on calculations of the utilitarian tradeoffs between the destruction of early embryos and the great hope that HESC research presents for alleviating human suffering.

Hauerwas addresses this position as well. He argues that Christian social ethic positions cannot be abstracted from Scripture and Christian tradition without losing their foundational logic, coherence, and power. Instead, Christian ethical positions ought to be presented to our broader society in their original context, even when society rejects Scripture and Christian tradition. The Gospel foundation is unifying and freeing, breaking down "false barriers" between people. We regard the other, including embryos, as fellow members of God's kingdom. We do not use people to further our ends, even noble ends.⁵³ By necessity, if the Bible breaks down "false" barriers when we share its ethic with others, then it will sometimes raise barriers between Christians and others who follow "narrow" belief systems that "create 'the world'" that contrasts with God's kingdom.⁵⁴

The church must proclaim God's truth in the broader society and invite all to follow as disciples of Christ. A kingdom of God ethic argues that HESC research should not be done until and if stem cells can be obtained without harming human embryos. When HESC research that destroys embryos is done, it usurps the authority of God, destroys God's blessing, and harms the community of God. ¶

Notes

¹Woo Suk Hwang, Sung Il Roh, Byeong Chun Lee, Sung Keun Kang, Dae Kee Kwon, Sue Kim, Sun Jong Kim, Sun Woo Park, Hee Sun Kwon, Chang Kyu Lee, Jung Bok Lee, Jin Mee Kim, Curie Ahn, Sun Ha Paek, Sang Sik Chang, Jung Jin Koo, Hyun Soo Yoon, Jung Hye Hwang, Youn Young Hwang, Ye Soo Park, Sun Kyung Oh, Hee Sun Kim, Jong Hyuk Park, Shin Yong Moon 5, Gerald Schatten,

"Patient-Specific Embryonic Stem Cells Derived from Human SCNT Blastocysts," *Science* 308, no. 5729 (17 June 2005): 1777-83.

²Victoria Griffin, "US Falling Behind in Stem Cell Research," *London Financial Times*, May 27, 2005; Clive Cookson, "An Asian Triumph for Therapeutic Cloning," *London Financial Times*, May 20, 2005.

³"Frist Comments on Stem Cell Research" July 25, 2005: http://frist.senate.gov/index.cfm?FuseAction=Speeches.Detail&Speech_id=257

⁴"Californians to Vote on 3 bln USD Stem Cell Research Funding on Tuesday," *London Financial Times*, October 31, 2004.

⁵Genetics Legislation Database, "National Conference of State Legislatures: www.ncsl.org/programs/health/genetics/geneticsDB.cfm

⁶Nikolaus Knoepffler, "Stem Cell Research: An Ethical Evaluation of Policy Options," *Kennedy Institute of Ethics Journal* 14, no. 1 (March 2004): 55-74, 57.

⁷www.bioethics.gov/transcripts/july03/session3.html; and Alfonso Gomez-Lobo, "On the Ethical Evaluation of Stem Cell Research: Remarks on the Paper by N. Knoepffler," *Kennedy Institute of Ethics Journal* 14, no. 1 (March 2004): 75-80.

⁸H. C. Fiegel, et al., "Liver-Specific Gene Expression in Cultured Human Hematopoietic Stem Cells," *Stem Cells* 21 (January 2003): 98-104; and Lagasse, et al., "Purified Hematopoietic Stem Cells Can Differentiate into Hepatocytes *in Vivo*," *Nature Medicine* 6 (November 2000): 1229-34.

⁹D. Orlic, et al., "Bone Marrow Cells Regenerate Infarcted Myocardium," *Nature* 410 (April 5, 2001): 701-5.

¹⁰D. N. Kotton, et al., "Bone Marrow-Derived Cells as Progenitors of Lung Alveolar Epithelium," *Development* 128 (December 2001): 5181-8.

¹¹D. Hess, et al., "Bone Marrow-Derived Stem Cells Initiate Pancreatic Regeneration," *Nature Biotechnology* 21 (July 2003): 763-70.

¹²N. Theise, et al., "Liver from Bone Marrow in Humans," *Hepatology* 32 (July 2000): 11-6; and M. Alison, et al., "Cell Differentiation: Hepatocytes from Non-hepatic Adult Stem Cells," *Nature* 406 (July 2000): 257.

¹³www.bioethics.gov/background/prentice_paper.html

¹⁴Knoepffler, "Stem Cell Research," 56-7.

¹⁵See LeRoy Walters' survey of national policies in "Human Embryonic Stem Cell Research: An Intercultural Perspective," *Kennedy Institute of Ethics Journal* 14, no. 1 (March 2004): 3-38.

¹⁶Tendler, Zoloth, Jewish Law.

¹⁷Statements by the Union of Orthodox Jewish Congregations of America (www.ou.org/public/statements/2001/nate34.htm), and a major Reformed Jewish organization, the Union of American Hebrew Congregations ("Reform Jewish Leaders Urge Bush to Promote Embryonic Stem Cell Research," <http://rac.org/PrintItem/index.cfm?id=727&type=Articles>) accepts Option 3.

¹⁸The Commission on Social Action of Reformed Judaism (CSA) supports therapeutic cloning because it meets the Jewish imperative, found in Deut. 30:20, to save human life. Further, "Our tradition requires that we use all available knowledge to heal the ill, when one who delays in doing so, it is as if he has shed blood," *Shulchan Arukh Yore De'ah* 336:1, <http://rac.org/PrintItem/index.cfm?id=483&type=Articles>. Alternatively, a recent article in *Jewish Law* argues that since Rabbinic authorities had to carefully weigh alternative rights before accepting HESC research on already existing embryos, they are unlikely to approve of the creation of embryos specifically for their destruction. Daniel Eisenberg, "Stem Cell Research in Jewish Law," *Jewish Law*, www.jlaw.com/Articles/stemcellres.html.

¹⁹Walters, 2004 survey of national policies, 22-3.

²⁰He outlines the Buddhist distinction between suicide and euthanasia — the first is acceptable although undesirable while the second is always wrong because it lacks consent. Since killing an embryo lacks consent also, destroying an embryo is always ethically wrong. Because destroying an embryo for HESC research may provide direct health benefits to others, Promta then considers the idea of one person sacrificing her life for the life of another. Again, life donation is only ethical with informed consent. Thus HESC research is again wrong. Somparn Promta, "Law and Morality: The Buddhist Perspective," *The Chulalongkorn Journal of Buddhist*

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Studies 5 (May–December 1998): 3–57; and Somparn Promta, *ASEAN-EU LEMLIFE Project*, www.stc.arts.chula.ac.th/Workshop_papers.pdf+somporn+promta&hl=en&ie=UTF-8.

²¹"In the prestigious Dharma Sastras and in other major writings, Hindus are told never to practice abortion even in the case of an illegitimate child. Abortion is presented as a heinous crime and is classified as one of the *mahapatakas* (atrocious acts), subjected to severe penances and punishments" in Daniel C. Maguire, *Sacred Choices: The Right to Contraception and Abortion in Ten World Religions* (Minneapolis, MN: Fortress Press 2001), 50.

²²Knoepffler, "Stem Cell Research," 57.

²³Gomez-Lobo defends this view even when considering that twinning is possible:

It follows from the foregoing that those human beings who are twins begin their existence during the reprogramming of the blastomere outside of the morula or during the reprogramming of the two parts of the morula. Those of us who are not twins begin our existence during the original fertilization. No arbitrary dividing point is necessary in either case (Gomez-Lobo, "On the Ethical Evaluation of Stem Cell Research," 79).

²⁴Johannes Paul II, *Evangelium Vitae*, 4th ed. (Bonn, Germany: 1995).

²⁵"Statement on the Report by the Presidents Council on Bioethics, Reproduction and Responsibility: The Regulation of New Biotechnologies" (April 1, 2004): www.usccb.org/prolife/issues/bioethic/embryo/keelerstmt.htm; www.usccb.org/comun/archives/2001/01-142.htm; and www.usccb.org/prolife/issues/bioethic/embryo/embryapp.htm.

²⁶N. V. Harrison, "Human Community as an Image of the Holy Trinity," *St. Vladimir's Theological Quarterly* 46, no. 4 (2002): 347–64.

²⁷Demetrios Demopoulos, *Testimony in Ethical Issues in Human Stem Cell Research*, Vol. III of *Religious Perspectives*, National Bioethics Advisory Committee (Rockville, MD: NBAC, 2000), B-3–B-4.

²⁸SBC news press release, "First-Person: The Wisdom of the Costa Rican Resolution," Tuesday, Nov 16, 2004, [www.sbc.net/redirect.asp?url=http://www.bpnews/Southern Baptist Convention, "On Human Cloning,"](http://www.sbc.net/redirect.asp?url=http://www.bpnews/Southern%20Baptist%20Convention/On%20Human%20Cloning) June 2001, www.sbc.net/resolutions/amResolution.asp?ID=572; and Southern Baptist Convention, "Resolution on Human and Embryonic Stem Cell Research," June 1999, www.sbc.net/resolutions/amResolution.asp?ID=620.

²⁹General Convention of the Episcopal Church, Resolution 2000-D091 "Referring a Resolution on Stem Cell Research Using Human Embryos," www.episcopalarchives.org/cgi-bin/acts_new/acts_resolution.pl?resolution=2000-D091.

³⁰Singapore, BAC 2002, G-3-66, G-3-69.

³¹Southern Baptist Conference, "On Human Cloning."

³²United Church of Christ Resolution, www.ucc.org/synod/resolutions/res30.htm.

³³Christian Social Action: "The Ethics of Embryonic Stem Cell Research," 11/16/2004, www.umc-gbcs.org/getinvolved/viewarticle.php?csa_articleId=188; United Methodist press release, "Board Responds to News of Cloning in South Korea," February 18, 2004, Statement of Jim Winkler, General Secretary of the General Board of Church and Society of the United Methodist Church, www.umc-gbcs.org/news/viewnews.php?newsId=690.

³⁴www.pcusa.org/ga213/business/13comrep1.htm.

³⁵Pamela Scalise, "I Have Produced a Man with the Lord': God as Provider of Offspring in Old Testament Theology," *Review and Expositor* 91, no. 4 (Fall 1994): 577–88, 577.

³⁶*Ibid.*, 582.

³⁷*Ibid.*, 577–78.

³⁸Gordon J. Wenham, "Family in the Pentateuch," in *Family in the Bible: Exploring Customs, Culture, and Context*, ed. Richard S. Hess and M. Daniel Carroll (Grand Rapids, MI: Baker Academic, 2003), 21–4.

³⁹"Healing comes in answer to prayer (Rebecca, Leah, Hannah), or as a gracious surprise (Sarah, Rachel, Samson's mother)" in Scalise, "I Have Produced a Man with the Lord," 582.

⁴⁰Phyllis Trible, *God and the Rhetoric of Sexuality* (Philadelphia, PA: Fortress Press, 1978), 34.

⁴¹*Ibid.*, 34–5.

⁴²Some scholars argue that a lack of scientific understanding led ancient Israel, like its surrounding tribes and cultures, to ascribe to God a central role in fertility because it was essential to the survival of clans and cultures. High rates of infant mortality, a short expected life span, and a small workforce relative to labor intensive subsistence farming all reinforced the need for fertile women to bear as many children as possible. See Jon L. Berquist, *Controlling Corporeality: The Body and the Household in Ancient Israel* (Piscataway, NJ: Rutgers University Press, 2002), particularly chapter 2, "Sexuality and Fertility," 51–79. Berquist argues that the genealogies in Israel's "Primary History," Genesis through 2 Kings, place kinship and therefore sexual reproduction at the core of the narrative structure. He considers the sexual laws of Israel to be evidence of attempts to maximize fertility in ancient Israel, "a society with severe problems maintaining population levels" (p. 62). He cites legal examples including prohibitions against prostitution (Lev. 19:29), homosexuality (Lev. 20:13), and incest, particularly where it involves younger males and older females, (p. 73) as well as laxer ritual cleansing regulations for emissions of semen during sexual intercourse (p. 59). Nationalism and fertility concerns also motivate the sexual rhetoric inherent in many narratives. Consider Abraham's sexual discipline contrasted by Lot's sexual intercourse with his daughters (p. 55) or God's displeasure with Onan's disregard for the maintenance of his people by spilling his semen instead of impregnating his sister-in-law (p. 68, Gen. 38:6–10). Following this train of thought, Berquist argues that the importance of fertility leads religious texts to view both infertility and fertility as divine work (pp. 74–5). Such a conclusion, common in the history of religions school of thought, views all human religious descriptions of God's attributes and actions as reflections of human needs rather than divine revelation. For Christians, however, a more balanced conclusion might be that Scriptures describe how God was involved in Israel's fertility because it was a central concern of life for Israel.

⁴³It literally means "her child going out." As a result of this term's ambiguity some scholars argue that verse 22 signifies premature birth while verse 23 details consequences if either the mother or child sustain further harm. Others, however, argue that verse 22 sets the penalty for the loss of the fetus and verse 23 for additional harm to the mother. John I. Durham, *Exodus WBC* vol. 3 (Waco TX: Word Biblical Publishers, 1987), 324.

⁴⁴Cornelius Houtman, *Exodus*, vol. 3 of *Historical Commentary of the Old Testament* (Leuven: Peeters, 2000) 164–5.

⁴⁵"Talion," *The Torah: A Modern Commentary*, ed. W. Gunther Plaut (New York: Union of American Hebrew Congregations, 1981), 572.

⁴⁶Some scholars argue that Hosea in this passage asks for infertility as a compassionate alternative to the judgments of infertility, abandonment, and infanticide decreed in verses 11–13. Deborah Krause, "A Blessing Cursed: The Prophet's Prayer for Barren Womb and Dry Breasts in Hosea 9" in *Reading Between the Texts: Intertextuality and the Hebrew Bible*, ed. Danna Nolan Fewell (Louisville, KY: Westminster John Knox Press, 1992), 191–202, 193.

⁴⁷Trible, *God and the Rhetoric of Sexuality*, 61; Krause, "A Blessing Cursed," 195, 197.

⁴⁸Trible, *God and the Rhetoric of Sexuality*, 62; Krause, "A Blessing Cursed," 197–9.

⁴⁹"Harah," *Theological Dictionary of the Old Testament* (TDOT), vol. 3.

⁵⁰Stanley Hauerwas, *A Community of Character* (Notre Dame, IN: University of Notre Dame Press, 1981), 198.

⁵¹*Ibid.*, 199.

⁵²See, for example, Darrel W. Amundsen, *Medicine, Society, and Faith in the Ancient and Medieval Worlds* (Baltimore, MD: John Hopkins University Press, 1996), 63, 100–1, 199–200, 268–71; and John Connery, *Abortion: The Development of the Roman Catholic Perspective* (Chicago, IL: Loyola University Press, 1977).

⁵³Hauerwas, *A Community of Character*, 51.

⁵⁴*Ibid.*

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Fred Van Dyke

Today ...
students in a
conservation
biology class
will be taught
that the
Judeo-Christian
Stewardship
Ethic is
[a major
contributor to
the solution
of the ecologic
crisis].

Fred Van Dyke is professor of biology at Wheaton College (Illinois) where he directs the Environmental Studies Program. Fred earned his Ph.D. in Environmental and Forest Biology from the State University of New York-Syracuse. A former wildlife biologist with the Montana Department of Fish, Wildlife, and Parks, he also has served as a consultant to the National Park Service and the US Forest Service. Fred has authored numerous articles and book chapters on wildlife ecology and environmental ethics, and the books *Conservation Biology: Foundations, Concepts, Applications* and *A Workbook in Conservation Biology: Solving Practical Problems in Conservation*, published by McGraw Hill, and *Redeeming Creation: The Biblical Basis of Environmental Stewardship*, published by InterVarsity Press. Fred enjoys cycling and running 5ks, and managed to finish seventh among sixty-one men in his age group in Wheaton's 2005 "Run for the Animals 5k," a race that benefits the local zoo. He can be reached at fred.g.vandyke@wheaton.edu

Article

Cultural Transformation and Conservation: Growth, Influence, and Challenges for the Judeo-Christian Stewardship Environmental Ethic

Cultural Transformation and Conservation: Growth, Influence, and Challenges for the Judeo-Christian Stewardship Environmental Ethic

Fred Van Dyke

In a period of less than thirty years, the Judeo-Christian tradition was transformed from being perceived by scientific and popular culture as the cause of the ecologic crisis to being viewed as a major contributor to its solution. The increasing attention and respect given to the Judeo-Christian environmental stewardship ethic is in large part a result of careful scholarship and effective activism in environmental ethics and conservation by the Christian community. In this article, I examine the specific events and processes that led to this transformation, what this transformation represents, and the work yet required to complete it. The present challenges for Christians active in environmental stewardship are to transform the current understanding of the purpose of conservation, the value of what is conserved, and the role of the human presence in environmental management.

In a widely used text on conservation biology published in 1994, environmental ethicist J. Baird Callicott wrote:

The Judeo-Christian Stewardship Environmental Ethic is especially elegant and powerful. It also exquisitely matches the requirements of conservation biology. The Judeo-Christian Stewardship Environmental Ethic confers objective value on nature in the clearest and most unambiguous of ways: by divine decree.¹

Callicott is referring to the text of Genesis 1, where six times in the first twenty-five

verses, God looks at what he has made and calls it good, all before humankind appears.

Somewhere today in a state college or university in the United States, or elsewhere, students in a conservation biology class will be taught that the Judeo-Christian Stewardship Ethic is "especially elegant and powerful" in its articulation of the intrinsic value of nature, one that "exquisitely matches the requirements of conservation biology."

Recent history suggests that people have been inclined to believe exactly the opposite, an inclination captured in the words of the late UCLA historian Lynn White, Jr.:

Christianity ... not only established a dualism of man and nature but also insisted that it is God's will that man exploit nature for his proper ends.²

Hence we shall continue to have a worsening ecologic crisis until we reject the Christian axiom that nature has no reason for existence save to serve man.³

These words are part of that infamous essay, *The Historical Roots of Our Ecologic Crisis*, published in *Science* in 1967. White's conclusion was that the historical roots of our ecologic

crisis originated in the Judeo-Christian understanding of the human relationship to nature. In this view, according to White, "no item in the physical creation had any purpose save to serve man's purposes."⁴

[In 1967] White's conclusion was that the historical roots of our ecologic crisis originated in the Judeo-Christian understanding of the human relationship to nature. ... White proposed that a new ethical path was needed because of moral deficiency in Judeo-Christian teaching about the environment.

White's essay was part of an overall trend in the late 1960s and early 1970s to discover single "root" causes for the environmental crisis, with other such efforts variously blaming common property institutions⁵ or capitalism and colonialism.⁶ None of these explanations proved sustainable under intellectual scrutiny, but White's thesis proved the most popular, and enjoyed a vigorous and extended life in popular environmental circles long after it had been discredited in academic ones.⁷ One of the most influential articles of its generation, White's essay was quoted often, with and without acknowledgment, by scholars in every conceivable field, its thesis repeated, simplified, amplified, extended, or even blatantly distorted, but never ignored.⁸ Part of its success was that it told secular academics what they wanted to hear, that religious traditions in general, and Christianity in particular, were contemptible mythologies, justifiably despised. Another element was its plasticity. As religious scholar Thomas Sieger Derr described it: "It is almost magically adaptable, serving historians, ecologists, drop-outs, religion haters, social planners, commune dwellers, and more, giving to each what he wants in his or her own situation."⁹

But, that point admitted, we must not overlook the fundamental nature of White's criticism. White's charge is not that Christians at various times and places have not done what they ought to have done in regard to the care of the Earth. Rather White's charges are fundamentally a *moral attack* on Christian tradition itself. White is not claiming that Christians have failed to live up to a Christian ethic, but that the ethic itself was inadequate. Thus, White pro-

posed that a new ethical path was needed *because of moral deficiency in Judeo-Christian teaching about the environment*. This distinction is important. *Historical Roots* was a call to throw off an inferior ethical authority and adopt an ethical approach that was "higher and better." This is an effective strategy for changing the direction of cultural currents. Using this technique, the objector asserts that the traditional standard itself is morally corrupt, that precisely *because* people obeyed traditional ethical authority they were destined to create moral evil. Because White held up the Judeo-Christian tradition as *morally inferior* to other ethical systems, he opened the door for those systems to be developed as legitimate intellectual and moral alternatives. Arguably this may not have been what White intended, but it is what he helped to achieve. Although other scholars, both Christian and secular, joined in White's criticisms of Christian faith and specific Christian doctrines, their critiques came after White had created the breach, not before.¹⁰

The question of interest today is, how, in a span of less than thirty years (1967–1994), did we travel from White's conclusion, that Christianity is the cause of the ecologic crisis, a conclusion popularly accepted by "everybody" in respectable intellectual circles in its time, to Callicott's conclusion, today taught in conservation biology classes around the world, that Christianity provides an ethic of conservation that is "elegant and powerful" that "exquisitely" matches the requirements of conservation biology and establishes the intrinsic value of nature in the most unambiguous of ways?

Environmental philosopher Max Oelschlaeger acknowledged the profound influence of Lynn White's essay in the formation of his own view of the environmental crisis and its cause. He wrote:

For most of my adult life, I believed, as many environmentalists do, that religion was the primary cause of the ecologic crisis. I also assumed that various experts had solutions to the environmental malaise. I was a true believer ... I lost that faith by bits and pieces ... by discovering the roots of my prejudice against religion. That bias grew out of my reading of Lynn White's famous essay blaming Judeo-Christianity for the environmental crisis.¹¹

From this point, Oelschlaeger goes on to describe how his viewpoint radically changed, until, he now admits: "The church may be, in fact, our last best chance. My conjecture is this: there are no solutions for the systemic causes of ecocrisis, at least in democratic societies, apart from religious narrative."¹²

Similarly, in a published apology to Bartholomew I, Patriarch of the Orthodox Church, Carl Pope, President of the Sierra Club, speaking of his own generation of environmentalists, acknowledged:



*White's essay
disparaged
the Christian
tradition
sufficiently
to open
the door for
consideration of
alternatives to
the Judeo-
Christian
tradition
in all matters
environmental.
... Specifically,
White's attack
on Christianity
provided
occasion
for the
defense of
Christianity
on issues of
environmental
stewardship.*

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We sought to transform society, but ignored the fact that when Americans want to express something wiser and better than they are as individuals, by and large they gather to pray. We acted as if we could save life on Earth without the same institutions through which we save ourselves.¹³

Speaking directly of the influence of White's essay in creating hostility between Christianity and conservation, Pope confessed:

Too many environmentalists considered the case closed. We became as narrow-minded as any religious zealot, and proceeded to glorify creation and smite those who would sin against it on our own, without regard for the faith community.¹⁴

How did we get from the words of White to the words of Oelschlaeger? How did we move from the Sierra Club's antagonism to its apology? How did Christianity change from being the *cause* of the environmental crisis to becoming the *solution* to it? I want to explain how this transformation occurred, and then suggest a path by which it might continue.

Historical Roots and the Beginnings of Cultural Transformation

White's essay disparaged the Christian tradition sufficiently to open the door for consideration of alternatives to the Judeo-Christian tradition in all matters environmental. But it could not do this without, at the same time, making religion in general, and Christianity in particular, an ecological issue. Specifically, White's *attack* on Christianity provided occasion for the *defense* of Christianity on issues of environmental stewardship. *Historical Roots* created *relevance* for Christian interaction with the environment that had not previously existed. It was, in fact, the spark that ignited the developmental fire of the modern Judeo-Christian environmental stewardship ethic, the one that Callicott and others now recognize as "especially elegant and powerful." But first, its elegance and power had to be expressed. That expression was developed through three phases.

Following the publication of *Historical Roots*, Christian scholars in general, and Reformed evangelical Christian scholars in particular, began a sustained intellectual response to White's work. In doing so, they not only refuted White's accusations, but also created a body of scholarship demonstrating that environmental stewardship was rooted in biblical teaching and doctrine.¹⁵ Among the first to make use of such scholarship were professors at Christian colleges. As Christian academics began to incorporate these resources into their teaching, they also began to use them to shape new courses, and then, entire curricula in environmental studies, which led to the development of programs, majors, centers, and institutes dedicated to environmental stewardship. Today thirty-six of the 105 schools of the Council for Christian Colleges and Universities have majors, programs, or concentrations in environmental study. One has a graduate program. Sixty are participating colleges with the Au Sable Institute, a Christian institute of environmental studies, itself a product of this intellectual heritage. Three colleges even have separate institutes with some type of environmental mission associated with their campus.

This academic and educational response did what colleges and universities naturally do. It produced graduates, trained in science and driven by a Christian ethic, facing an urgent need. Such graduates soon became activists. Thus, by the 1980s, the Christian community had begun to enter an "activist" stage in environmental stewardship, in which initiatives in more professionally-directed environmental education and advocacy were being advanced by the Christian community.

In 1981 Dordt College established its Agricultural Stewardship Center, an institute to train future farmers in environmental conservation in the context of day-to-day life on the family farm. Two years earlier, in 1979, Cal DeWitt of the University of Wisconsin-Madison initiated, as director of the Au Sable Institute of Environmental Studies, a curriculum of advanced scientific and professional courses to support the study and practice of environmental stewardship as an expression of Christian vocation. It was a visionary initiative that would ultimately lead to Au Sable's development as an educational

institution with an explicitly Christian vision of environmental conservation serving over one hundred colleges and thousands of students on five campuses on three continents. The following year a small trust fund was established by Christians in the United Kingdom as a charity to support an obscure conservation field station in Portugal, a mustard seed that would grow to become the modern-day A Rocha, an international organization of Christians in conservation now active in fifteen countries and influential in several international conservation organizations.¹⁶

This academic and educational response ... produced graduates, trained in science and driven by a Christian ethic, facing an urgent need. Such graduates soon became activists. Thus, by the 1980s, ... initiatives in more professionally-directed environmental education and advocacy were being advanced by the Christian community.

A Rocha's work was exemplary but not unique. The 1980s saw the birth of numerous Christian organizations with explicitly environmental missions, most of which continue their work to this day. Such developments in the Christian community continued and expanded into the 90s, sometimes merging conservation education and activism in remarkably creative ways. In 1998, Greenville College (Illinois) dedicated the Zahniser Institute of Environmental Studies. Named for one of its own alumni, Howard Zahniser, for many years editor of *The Living Wilderness* and one of the principal advocates and architects of The Wilderness Act of 1964, the Zahniser Institute's stated mission is, in part, "... to promote the preservation of unique and wild places; to facilitate the integration of an ethic of environmental stewardship into the conservative moral constructs of our society; and to use muscle, sinew, will, and spirit to restore Nature." Through the Institute, an environmental consulting firm is run by Greenville faculty and students as a co-curricular program. Starting with local consulting efforts in wetland restoration in Illinois, Zahniser has expanded its work

to Missouri and Kansas, and now includes prairie, forest, and mined land restoration efforts.

As these and other efforts became established they have evolved into a third phase of Christian response, the emergence of active Christian engagement in research and management with existing scientific agencies to provide technical and scientific service in pursuit of environmental conservation. Some of these efforts have been carried on by older organizations, such as A Rocha, which is now involved in the conservation and management of forty-two species worldwide. Others have been pursued in entirely new ways, or by entirely new programs, such as the Global Stewardship Initiative, funded by the Pew Charitable Trust, which provided funds for advanced technical support, such as GIS systems, for teaching environmental and conservation studies at Christian colleges. Among evangelical colleges, Taylor University has developed a graduate research program in environmental studies. From 1995–1999, Northwestern College (Iowa) established a cooperative partnership in research and management with the US Fish and Wildlife Service through its Cooperative Cost Share and Nongame Bird Research Programs¹⁷ and, in 2000, with the Natural Resource Conservation Service through that agency's Conservation Reserve Program.¹⁸ From 1995–1998, persistent lobbying efforts by TargetEarth, the Evangelical Environmental Network, and other Christian environmental organizations were instrumental in derailing repeated attempts to amend and weaken the Endangered Species Act in a politically conservative, Republican-controlled Congress.¹⁹

Such efforts represent the ongoing process of cultural transformation in conservation in and through the Christian community, and I am concerned here with exploring how such transformation might continue. To answer that question, we must ask, and answer, another. Is Christianity really *necessary* and *essential* to the work of conservation, or is it just a nice "add on" to involve Christians in what "real" conservationists are doing already, and will continue to do when the church has lost interest? To provide an answer, I will divide that question into three parts. First, how does Christian faith transform the *purpose* of conservation? Second, how does Christian faith transform the *value* of what is conserved? Third, how does Christian faith transform the *role* of the human conservationist, and of the entire human presence in the conservation of the world's biodiversity and environmental resources?

The Problem of Purpose: What Is Conservation For?

Although not always recognized, the most fundamental problem plaguing conservation today is the problem of purpose, a problem captured with eloquent brevity by Herman Daly in his classic essay, *The Lurking Inconsis-*



*Although
not always
recognized,
the most
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today is
the problem of
purpose ...
One would
think that
practicing
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would have
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They
certainly
need one.
But sadly,
most do not.*

Article

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tency.²⁰ Here Daly noted that the work of conservation, with its emphasis on normative goals, ends, and values, encourages the public to inquire, as they witness millions of dollars spent on behalf of endangered species, degraded ecosystems, and rare habitats, what is the *purpose* of conservation? Although this problem is now receiving attention by scholars in environmental ethics,²¹ their work so far has had little influence on the day-to-day thought and practice of the professional conservation community. One would think that practicing conservationists would have a ready answer to questions of purpose. They certainly need one. But sadly, most do not.

The question is often framed in economic terms (Why are we spending all this money on this species of turtle, sea grass, or sand worm?), and economists have stepped forward to argue for conserving biodiversity on economic grounds via techniques of contingent valuation. One of the most common methods of contingent valuation is the "willingness to pay" approach, in which individuals are asked "how much would you be willing to pay to save species X." Responses are aggregated to generate an economic measure of the "value" of the species, an economic metric for a nonmarket entity.

There are multiple problems with this approach, including many technical ones that are best left to debates among the economists themselves.²² We will consider here only the ethical problem, what could be called "the problem of purpose." The contingent valuation approach equates purpose with preference. The value of an endangered species is no more than one is willing to pay to express his or her own environmental taste for birds, fish, spiders, butterflies, mammals, reptiles, clams, plants, or bacteria, and those who are willing to pay the most are those who get to have their preferences satisfied. This approach assumes that the only value in preserving biodiversity or ecological integrity is usefulness or attractiveness to humans, or more specifically, to the extent that the existence value of a species satisfies human preference. Determining environmental policies to satisfy the preferences of those who are willing to pay the most for them maximizes aggregate net economic benefit as a consequence of maximizing human welfare (preference satisfac-

tion). The net benefit is, in turn, measured as the amount people are willing to pay for those resources. This amounts to saying, as environmental ethicist Mark Sagoff put it, "that resources should go to those willing to pay the most for them because they are willing to pay the most for those resources."²³

Encumbered by such logic, contingent valuation creates an ethical distortion in two dimensions. First, the intrinsic value of the entity to be conserved is conflated with personal benefit to those doing the conserving, i.e., humans. Second, preference satisfaction becomes conservation's moral compass. Ironically, this is usually not the ethical orientation of most respondents. When a respondent is asked, "How much would you pay to save species X?" she does not answer by calculating the economic *benefit* of the endangered species *to her*. Instead, she assigns a relative estimate of *value*, that is, she makes a judgment regarding *moral worth and ethical obligation* to the preservation of the particular species, and a level of sacrifice she is prepared to make to fulfill that obligation. The tragedy of contingent valuation is the confusion it makes between value and benefit. And in doing so, it asserts that the purpose of conservation is the satisfaction of human preference as the means to benefit maximization.

If economists sometimes confuse the issue, conservation biologists are not always able to locate it. Some would drop the whole project, affirming the sentiments of biologist Dennis Murphy, who asserted that "Conservation biology only exists because biological information is needed to guide policy decision making."²⁴ If that view is correct, all questions of value and purpose in conservation are terminated. Although most conservation biologists might shrink from Murphy's bluntness, many still wish the question of purpose would disappear because they believe that purpose is illusory, even if they are reluctant to admit it. Conservation biologists give public testimony to the media and to the Congress that we should, among other things, save endangered species. When their audience asks, "What for?" conservation biologists speak about maintaining ecosystem integrity, or fulfilling our encoded genetic love of life,²⁵ or increasing local or global biodiversity.²⁶ But these statements of *description*, not *reason*, and do not

answer the question being asked. What appears to be "purpose" is really only an expression of genes, hormones, climate, or evolutionary history in general. The problem with such an explanation, however credible it may look in a textbook to undergraduates, is that it does not explain what we actually observe in the world or what we ourselves experience. In our life as human beings, and in our observation of all kinds of living things, particularly higher animals, we experience ourselves or observe other living things acting in a self-determining manner. That is, we experience and observe the pursuit of *purposes*. Interestingly, contemporary environmental ethicists, if not many biologists, have come to believe that purposes are important, even foundational, to environmental ethics. A fundamental premise of modern environmental ethics is that living things in a natural environment have *ends of their own, and these ends are not our ends*.²⁷ The psalmist perceived this when he wrote: "The high mountains are for the wild goats, the cliffs a refuge for the rock badgers" (Ps. 104:18). In what sense are mountains *for* goats and cliffs *for* rock badgers? In exactly the same sense that Pelican Island, America's first national wildlife refuge, is *for* pelicans. And President Theodore Roosevelt said so, designating the sanctuary, in the words of his executive order, as "a preserve and breeding ground *for* native birds" (emphasis mine).

The goal of conservation ... is to enhance the welfare of ... creatures for the purpose of protecting their life, liberty, and interests, precisely because their existence is of value independent of our benefit from it.

All of these places are *for* these creatures in the sense that they permit them the freedom to pursue their own good, their own ends. These ends, provisioned by God, and, in the United States, protected by federal law in particular cases, are ends that can be frustrated by humans. Thus, other living creatures can be deprived, by us, of those things that serve their interests and purposes. Therefore, living things in natural environments can be treated as *moral subjects* that merit ethical consideration because they have definable interests (i.e., purposes) that can be frustrated by human action. For conservation to be conservation, it must affirm that the purposes which nonhuman

creatures pursue are, first, *real*, and second, that they are *good*. That is, the purpose of their conservation is not the satisfaction of human preference, and the value of a species' existence is not based on the benefit that humans might derive from it. Such premises have become statutory in the United States. The US Endangered Species Act (ESA) of 1973, for example, protects the existence of listed endangered species, as well as their habitat, regardless of their economic value and benefit. This amounts to asserting, as environmental historian Joseph Petulla put it, that "a listed nonhuman resident of the United States is guaranteed, in a special sense, life and liberty."²⁸ Petulla's intellectual concept has become legal reality. In 1978 in *Palila v. Hawaii Department of Land and Natural Resources*, the palila (*Psittirostra bairdii*), a small, yellow-headed, stubby-billed native Hawaiian bird, was the listed plaintiff in a judicial hearing over its own conservation, ably represented through lawyers retained by the Sierra Club and Hawaiian Audubon Society.²⁹ If we affirm the statute and the rights it gives the palila and other species, we must conclude that the goal of conservation it expresses is to enhance the welfare of these creatures *for the purpose of protecting their life, liberty, and interests*, precisely because their existence is of value independent of our benefit from it.

The ESA demands that humans behave altruistically toward other species, but legal coercion is not enough. To pursue and sustain such altruism in conservation, one must have a rational foundation to support it. Is protecting species a *virtue* (because we *ought* to love and protect other species)? Is protecting species an *obligation to be discharged* (then, to what or to whom do we owe this service)? Is protecting species an act of preserving something *intrinsically valuable* (then from what source is such value conferred)? Answers to any of these questions could lead to a compelling rationale to save species, but they receive relatively little attention in current professional conservation literature. The failure to engage such questions effectively reveals the present confusion of modern conservation, and the lack of answers, its moral ambivalence. In such deafening ethical silence, the purpose of stewardship defaults to the satisfaction of human preference. Such environmental "morality" leads to the perception of humans as "users" of nature who interact with it by pursuing "satisfaction" from the "services" which nature provides. Sadly, but predictably, many studies reveal that, as human "users" of environmental entities grow more accustomed to environmental degradation, they can enjoy the "services" of such entities with no loss of satisfaction.³⁰

Although modern environmental assessments, such as the United Nations' Millennium Ecosystem Assessment (MA), attempt to evaluate the actual condition of ecosystems and all possible and potential dimensions of "value" they contain, such assessments still categorize all entities within the ecosystem as some form of "service," integrated and related to the axiom of human well-being.³¹ Such



*We perceive
the first
purpose of
stewardship,
to fill
the world
with "good"
things, such
that humans
ought
to support and,
to the extent
possible,
aid the divine
blessing
by ensuring
that the world
is "full"
of the good,
nonhuman life
God has
created,
and which
he intended
to multiply
on the Earth.*

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definition and methodology reveal that increased analytical skill does not necessarily alter fundamental philosophical perspectives. Even in our most sophisticated and global assessments of the environment, preference satisfaction through "using" nature remains a dominant concept.

Preference-driven assessment creates the ethical tragedy of, as Daly puts it, "the reduction of value to taste."³² If no better answer can be offered, then the public must be satisfied with this one, and do the best it can to figure out what its tastes in conservation are. But such an answer leaves the conservation enterprise with neither moral ideal nor moral direction, without which it cannot endure. As the last thirty years have seen the transformation of our culture's perception of Christian stewardship in conservation, future years must see Christians act as transforming agents in articulating a conservation purpose that creates a compelling moral motive for action. We should begin with the most fundamental question. What are *God's purposes* for his created order?

What Are God's Purposes for Creation?

Our first insight into God's purposes for his creation are found early in his revelation to us. "Be fruitful and multiply ..." I suspect that when you read these words, you are culturally conditioned to complete them with the words of Gen. 1:28 "and fill the Earth, and subdue it." But I am quoting from an earlier verse, Gen. 1:22. "God blessed *them* saying, 'Be fruitful and multiply, and fill the waters in the seas, and let birds multiply on the Earth.'" Before the blessing of fruitfulness is spoken to men and women, it is first spoken to fish and birds, and its blessing extends to all of nonhuman life. And rightly so, because God sees and admires what he has made and calls it "good" (Gen. 1:1-25). Thus we understand that God's first stated objective in creation is to bless the life he has made that it may make more life. Therefore, we perceive the first purpose of stewardship, *to fill the world with "good" things*, such that humans ought to support and, to the extent possible, aid the divine blessing by ensuring that the world is "full" of the good, nonhuman life God has created, and which he intended to multiply on the Earth.

A second purpose of stewardship can be discovered in the book of Job. God says to Job regarding the monster Leviathan,

The sword that reaches him cannot avail, nor the spear, the dart, or the javelin. He regards iron as straw, bronze as rotten wood. The arrow cannot make him flee, slingstones are turned into stubble for him ... Nothing on Earth is like him, one made without fear. He looks on everything that is high; He is king over all the sons of pride (Job 41:26-28, 33-34).

Job asked God for an explanation of his suffering. God praised his creature, Leviathan. Did God miss the question? No. In his answer, God repeatedly hurls back the question, "Where were *you* ..." when I performed all my mighty acts of creation? God's cross-examination of Job takes him from an imaginary world centered on Job to a real world that is not—a world that existed long before Job, that does not know Job, and that is filled with magnificent creatures which have no regard for Job. As theologian Oliver O'Donovan puts it:

Job must learn not to think of nature only in relation to his own wants, but to see the irrelevance of those wants to the vast universe of nature ... He has no claim to a stable and well-balanced ecosystem in the face of a nature so diverse in its teleologies, so indifferent to human concerns.³³

But God rejoices in that world. He calls Leviathan and Behemoth "the first of the ways of God" (Job 40:19). It is not because they satisfy "user satisfaction," but because they do not. Indeed, they have no regard for human preferences and provide no human satisfaction of any kind ("Will you play with him as a bird, or will you bind him for your maidens?" Job 41:5). Instead they frustrate human purpose. They humble the proud anthropocentrism of human culture.

God cared deeply for Job, but his therapy for Job's sorrows began by forcing Job to see the world differently. Leviathan and Behemoth are not valuable because they satisfy revealed human preferences. In fact, they do the opposite. They frustrate human preference and thwart the human will to dominate and control all things for its own ends. When we understand God's pleasure in these crea-

tures, and his revealed purposes for them, we also understand the second great purpose of stewardship—to adopt a more humble view of ourselves in the greatness of God’s creation, and, enabled by this perspective, to share God’s pleasure in the things he has made that are no use to us, as well as in all the things that sustain our life and health.

If we were to press God with the question, “why did you make Leviathan?” we would find an answer in the words of Psalm 104. “O Lord how many are your works! In wisdom you have made them all: the earth is full of your possessions. There is the sea great and broad, in which are swarms without number (just as God blessed them to be), animals both small and great. There the ships move along, and Leviathan, *which you have formed to sport in it*” (Ps. 104:24–26). In other words, if we believe the theology of the psalmist, the reason God made Leviathan was so that Leviathan might “enjoy himself” in God’s ocean. The same purpose for all creatures echoes through the psalm. “The high mountains are *for* the wild goats, the cliffs are a refuge *for* the rock badgers ... They all wait for you to give them their food in due season” (Ps. 104:18, 27). Here is revealed a third purpose of stewardship—to protect and preserve the provision that God has made *for* the individual and unique “good” of every creature.

The Transformation of Value

If Christians are to continue as transformative agents of conservation culture, they must not only transform the *purpose* of conservation, but also the *value* of what is conserved. I will not attempt to capture every possible way of thinking about or categorizing environmental entities and values, much less the complexity of ethical systems that support them. For example, in his pioneering work on human attitudes toward wildlife, Stephen Kellert identified seven different categories of wildlife “values” (naturalistic, ecological, moral, scientific, aesthetic, utilitarian, and cultural) perceived by humans based on responses to detailed questionnaires about attitudes toward wildlife.³⁴ However, what Kellert referred to as categories of “values” are actually categories of psychological response. That is, Kellert’s categories are not categories of norms that organize ideas about what is “right” or “wrong” with respect to the entity (in this case, wild animals), but rather categories of reactions humans display or experience in contact with or in thinking about animals.

Similarly, “systemic” approaches such as Millennium Ecosystem Assessment attempt to consider all “values” of environmental entities at the ecosystem level to determine the total value of an eco- system’s goods and services for human welfare. Although commendably comprehensive and technologically sophisticated, confusion results when economists fail to understand that such methodology is designed for *environmental assessment*, not *ethical analysis*. All “values” are perceived as “services” that satisfy

human needs. For example, “spiritual and aesthetic values” of ecosystems, which are really recognitions by humans of values imputed to environmental entities from other sources, are categorized as “cultural ecosystem services.” This orientation repeats the classic error of conflating values and benefits.³⁵ “Benefits” are things that promote (human) well-being and “services” are things that contribute to the welfare of others. “Values,” in contrast, are bases for an estimation of the worth, and may have little to do with a creature’s contribution to human well-being or welfare. Systemic assessment methodologies are unable to distinguish the difference between what people *value because of services it provides for them* and what people *believe is valuable for moral and ethical reasons*.³⁶ Thus, they cannot provide *ethical categories* regarding the environment. They are not to be faulted for this. That would misunderstand their role as an assessment tool. But environmental assessment is not ethical assessment. We must begin the transformation of value in conservation with a new set of tools.

Categories of values [can be] organized around how [they] are affected by human perception, how they are realized or appreciated by humans, and how they ultimately influence human decision-making and environmental management.

Modern systems of environmental ethics address more than value. Such systems attempt to determine correct environmental behavior by evaluating the consequences of our actions (consequentialist ethics), the fulfillment of moral obligations or duties through actions that affirm an independent truth or “goodness” (deontological ethics), the preservation of interdependent associations of species and their functions in their appropriate place (ecocentric ethics), or the effect of our actions on our relationship to nature and our own moral development (“relational self” and virtue-based ethics).³⁷ But, with due respect to the nuance and complexity of multiple and various ethical paradigms, the actual categories of *values* invoked in such systems are often considerably simpler, especially when organized around how such values are affected by human perception, how they are realized or appreciated by humans, and how they ultimately influence human decision-making and environmental management.



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Consider a basic “value trichotomy” (Fig. 1). Environmental entities that satisfy our preferences and needs have *instrumental* value, which we obtain by use or, in some cases, non-use. If non-use, we retain their value by having the *option* of using them later, or the *possibility* that such options may exist, something ethicists and economists refer to as *quasi-option value*, a category that is invoked every time you hear someone say “we must save the rainforests *today* because *tomorrow* we may discover yet another plant compound that we can use to treat human disease.” Humans value created things *aesthetically* if they possess qualities that we admire, appreciate, or enjoy. Small wonder that the symbol for the World Wildlife Fund is a panda and not a flatworm. But humans value those things *intrinsically* that they judge to possess value *in their own right*, especially value that is conferred upon them from a transcendent source. Thus, this simple trichotomy, although not providing nor intending to provide a comprehensive examination of all possible ethical categories, does offer a framework for identifying *functional value categories* needed for thinking about environmental entities and the human response to them. Identifying these categories is useful in predicting the behavior of environmental agencies toward the environment, and in understanding the underlying intent of many environmental laws.

In the United States and elsewhere, environmental management agencies are guided

by long-held and historically revered missions, missions which hold a particular perspective on the “value” associated with managed environmental entities. Agency cultures grow up and develop around such missions, and agency behavior reflects an organizational understanding of the mission transmitted through agency culture and practice. For example, if the value of environmental entities is viewed as *instrumental*, then the purpose of conservation is to satisfy human needs and preferences (“well-being”), and natural objects must be viewed as “resources.” Their value is realized through their use, and the ideal management goal is maximum sustainable use in perpetuity.

Following the maxim of their most famous director, Gifford Pinchot, who believed that natural resources should serve “the greatest good for the greatest number for the longest time,”³⁸ the US Forest Service came to define its primary management objective as maximum sustainable yield for the five core “resources” on US national forests, which are, as a Forest Service colleague once reminded me in his best Elmer Fudd voice, “wood, watuh, wange, wildwife, and wecweation.” That the Forest Service has tended to historically emphasize wood, with its explicit markets and pricing, and under-emphasize “wecweation,” with its less well-defined valuations, is testimony to the power of instrumental value to shape agency behavior and management action.

Implications of Environmental Value Categories

Instrumental

- Natural objects are resources of goods and services for human well-being
- Value is realized through use
- Management goal → maximum sustainable use through harvest

Aesthetic

- Natural objects are loci of admirable qualities or traits
- Value is realized through perception
- Management goal → maximize aesthetic perception through education and training

Intrinsic

- Natural objects are “good” in their own right
- Value is realized through fulfilling moral obligation toward object
- Management goal → maximize well-being of object through provision and protection

Fig. 1. Some implications of different environmental value categories and their effects on perception, value realization, and management of environmental entities.

In contrast, if natural objects are valued aesthetically, value is realized through perception, and the ideal management goal is to maximize our perception of these qualities through interpretive education and training. The US National Park Service was founded upon a Congressional mandate to preserve the *scenery* of US national parks *for the enjoyment of their visitors*, a mission with a strong aesthetic orientation targeted toward human appreciation. What kinds of people does the Park Service employ in this task? We call them "rangers," but the Park Service calls them "interpreters" and their job is to increase the appreciative abilities of visitors to better apprehend the aesthetic qualities, and scientific processes, present in the park's landscape.

In contrast to instrumental and aesthetic values, *intrinsic value* is realized not through human use, nor human perception, but through human *response*, the fulfillment of moral obligation to the environmental entity. If intrinsic value drives management decision-making, then management actions aim to maximize the well-being and continuance of the entity through acts of provision and protection. Today management agencies which were historically driven by instrumental values (the Forest Service) or aesthetic values (the National Park Service) are increasingly affected by legislative mandates, such as the ESA, or policy directives for "ecosystem management," which assume the intrinsic value of things like rare species or functional ecosystems. Such mandates are derived through public debate and deliberation, not economic assessment, and more likely to support *values* held as national or religious ideals, rather than as "ecosystem goods and services" supplied for human welfare.

One of the great questions of modern environmental ethics is: "Are environmental entities morally considerable?"³⁹ Viewed instrumentally and aesthetically, the answer is "no." If the environment is valued only in these ways, then it is an *arena of ethical decision-making*, but it can never be an *object of ethical concern*. But in the Judeo-Christian tradition, the nonhuman world is not only "good," it is explicitly treated as a *moral subject*.

Then God spoke to Moses at Mount Sinai, saying, Speak to the sons of Israel and say to them, when you come into the land which I shall give you, then the land shall have a Sabbath to the Lord. Six years you shall sow your field, and six years shall you prune your vineyard and gather its crop, but during the seventh year, the land shall have a Sabbath rest, a Sabbath to the Lord (Lev. 25:1-4).

Note the structure of the sentence. God does not say, "The sons of Israel are to cease from cultivating the land every seventh year." Rather, what God says is "The land shall have ..." In God's view, the land is not the *object* of the Sabbath, it is the *subject* of the Sabbath, and it is primarily the land, not the people, which receives this "rest" from God. Thus, God treats the land as a moral subject and the

Sabbath as its legal "right," from which it is to receive due benefit. This view that God treats the nonhuman world with moral consideration is manifested in the history of God's dealings with Israel. Second Chronicles 36 closes the book on the story of the kingdom of Judah, ending with these words:

Those who had escaped from the sword he (Nebuchadnezzar) carried away to Babylon, and they were servants to him and to his sons until the rule of the kingdom of Persia *to fulfill the word of the Lord by the mouth of Jeremiah, until the land had enjoyed its Sabbaths. All the days of its desolation it kept Sabbath until seventy years were complete* (2 Chron. 36:20-21, emphasis mine).

In Judeo-Christian tradition, environmental values matter. When the land was deprived of its right to Sabbath, God restored its Sabbaths by direct intervention. The people who failed to give the land its rest were deported, and did not return *until the land had enjoyed its Sabbaths*. To transform the value of what is conserved in the culture of conservation, Christians must affirm that nature is to be treated as a moral subject. It is not to be perceived simply as a source of "ecosystem services," but as a creation of God whose rights must not be withheld from it, a view that is derived from the intrinsic value that God bestowed upon it when he called it good, manifested when he provided it with rest, protected it under his law, and punished its abusers with deportation.

Environmental Stewardship as Reconciliation

Finally, and perhaps most importantly, Christians in conservation work toward the *transformation of the human presence*, and thus must engage the final, and perhaps most significant question: What gives human beings the right to be *the environmental managers of creation and the agents of its conservation*? At first glance, the question might seem silly. If human beings do not act as agents of conservation, what other species would? As Aldo Leopold noted in his eulogy to the last passenger pigeon: "Had the funeral been ours, the pigeons would have hardly mourned us. In this fact ... lies objective evidence of our superiority over beasts."⁴⁰ Today many assert that humans have no such superiority, and no right at all to "manage" other species. From this perspective, humanity is viewed, in the words of conservationist Max Nicholson, as "earth's worst pest,"⁴¹ and one the world would be better off without. It is a view manifested in groups like EarthFirst, which claim there should be no "management" at all.

If *Homo sapiens* is but one of the millions of species-specific products of natural selection, such objection is justified. Humans could make no special claim to "manage" other species, nor bear any obligation for their welfare. Indeed, natural selection directs us to further no



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ends but our ends, no genes but our genes, no progeny but our progeny. Yet, as human beings, we seem surprisingly disinclined to follow natural selection's guidance. We try to put beached whales back in the ocean, clean up oiled sea otters, and mend injuries to wounded wildlife. We see animals in trouble on the evening news and are moved with pity. We think that someone should help them. Why should humans display such "irrational" feelings and behaviors? What strange, non-adaptive combination of compassion and obligation toward other species comes so "naturally" to us?

The Lord God planted a garden toward the east, in Eden, and there he placed the man whom he had formed ... Then the Lord God took the man and put him into the Garden of Eden to cultivate it and to keep it (Gen. 2:8, 15).

The verbs rendered in this verse as "cultivate" and "keep" are, in most other passages, translated as "serve" and "protect."⁴² They are usually encountered in Scripture as expressions describing service to God, especially as vocation, not as agricultural tasks, and are almost always used in sentences where the subject is a priest or a priestly functionary.⁴³ To the original audience who read the words of Gen. 2:15, they, being culturally informed, would understand that, in Eden, God had created a "sacred space" and installed the man as its priest.

As Old Testament scholar John Walton has noted, in these ancient cultures, a priest charged with the care of a sacred space had three primary duties. First, he was to see that the sacred space was kept pure, not defiled or polluted in any way, physically or spiritually. Second, he was to establish, within that space, a regular and frequent pattern of worship. Third, he was to monitor the needs of the inhabitants of the sacred space, to ensure that, while they continued in his care, they would lack nothing needful.⁴⁴ Thus, the human presence begins its career on Earth as a presence of priestly service to the world. A correct understanding of Gen. 2:15 not only brings clarity to the nature of human obligation, but also reveals, in a way that secular environmental philosophies cannot, to whom the obligation is discharged. The citizens of the sacred space benefit from our service and protection, but our work is an offering to God, not to them.

The sacred space of Eden was destroyed by human sin. As a result, our current situation is changed. Both human and non-human creation stand in need of reconciliation to God. Paul tells us that this is a reconciliation God is determined to achieve.

For by him all things were created, both in the heavens and on Earth, visible and invisible ... all things have been created through him and for him. He is before all things, and in him all things hold together ... For it was the Father's good pleasure for all the fullness to dwell in him and through him to reconcile all things to himself having made peace through the blood of his cross (Col. 1:16-17, 19-20).

Paul's Colossian doxology describes the cosmic nature and consequences of Christ's lordship, common themes throughout Paul's epistles (Rom. 5:12-21, Rom. 8:19-23, 1 Cor. 8:6, Eph. 1:18-23, Phil. 2:6-11).⁴⁵ What the Colossian doxology makes more explicit than other texts is that the reconciliation achieved through the death and resurrection of Christ affects every created thing. The recurring Greek phrase *ta panta*, translated in English as "all things," remains the same throughout the doxology. Thus, Paul asserts, first, that Jesus Christ created *ta panta* (Col. 1:16). Second, Jesus Christ sustains *ta panta* (or, in more literal Greek, "in him all things consisted" Col. 1:17). Third, the *ta panta* that Jesus created and sustains are the very same *ta panta* that he reconciles "through the blood of his cross" (Col. 1:20).

Christians have shown a historic tendency to separate the doctrines of creation and redemption. Paul links them by making Christ the agent of both. Evangelical theology, in particular, has tended to describe the effects of the atonement in personal terms that achieve reconciliation between God and human beings. Paul describes the atonement's effects in cosmic terms that achieve reconciliation between God and the entire created order. He elevates it to being the means through which Christ redeems the cosmos that he has created.⁴⁶

To understand this view of atonement, we must appreciate that nonhuman creation, like its human counterpart, also shares the *need* of redemption, although perhaps in a more derivative way, from the curses,

sorrow, and frustration to which it is subjected because of human sinfulness (Gen. 3:17, Hos. 4:1–3, Rom. 8:18–22). Paul’s word to the Colossians restates this truth in Christocentric terms. Jesus Christ created all things, Jesus Christ sustains all things. And the same things, the same *ta panta*, that Jesus Christ created and sustains are the very same “all things” that he reconciles to himself through his blood, shed on the cross. This reconciliation is not something that happens “naturally,” or something that necessarily “evolves” out of the creation’s own intrinsic properties. Paul is referring to a historic, space-time *intervention* by God into the world, precisely to *save* it from the path it was *naturally* following. Likewise, we must understand that there is an interventionist dimension of genuine stewardship when it is properly understood as a ministry of reconciliation, not merely a program of preservation.

The Future of Christian Environmental Stewardship

Although a variety of ethical positions vie for attention on matters of the environment,⁴⁷ it is the ethics of ecocentrism, the view that environmental value resides in the integrity and function of natural communities and ecosystems, that today dominates modern scientific conservation biology, while, at the level of environmental activism and popular support, the Judeo-Christian environmental stewardship ethic is increasingly emerging as its primary ethical rival.⁴⁸ In the conservation ethic of ecocentrism, value lies in the whole and its functions. It follows that the purpose of stewardship is to *preserve* the integrity and stability of the natural world by removing those human effects which separate and disintegrate natural communities. Thus follows the moral maxim of Aldo Leopold’s Land Ethic, *a thing is right when it tends to preserve the integrity, beauty, and harmony of the biotic community. It is wrong when it tends otherwise.*⁴⁹ In management and conservation, an ecocentric approach focuses on the state of the community or ecosystem, and attempts to achieve a desired state of function through various combinations of management, regulation, and education.

In the Judeo-Christian tradition, the purpose of stewardship is to *reconcile* the human and nonhuman creation on Earth to a productive, beneficent, and loving relation-

ship with God and with one another (Fig. 2). God in human flesh is the agent of that reconciliation, and those humans who are his disciples are to work with him to bring it about. *In that day I will make a covenant for them with the beasts of the field, the birds of the sky, and the creeping things of the ground, and I will abolish the bow, the sword, and war from the land and will make them lie down in safety...Then you will know the Lord* (Hos. 2:18, 20). Such an approach, although concerned with the state of natural systems and their components, perceives the fundamental problem very differently than ecocentrism. Here, the problem to be solved is fundamental *antagonism* between the human community and the natural creation, an antagonism that is rooted, in humans, in a hostile relationship toward God and his intentions for both the human and nonhuman world. Further, although both human and nonhuman creation are loved and valued by God, humans are considered more valuable (Matt. 6:26), and their reconciliation must come first, because the reconciliation of nonhuman nature depends upon it (Hos. 2:18–23, Rom. 8:19–22).

The importance of the reconciliation concept, as expressed theologically in Paul’s Colossian doxology, helps to explain the sensitivity to the human community that is manifest in many examples of Christian environmental stewardship, but is often absent in ecocentric approaches. Perhaps no example displays that contrast more clearly than the work of environmental conflict resolution by Susan Drake Emmerich, former US Department of State Delegate to the United Nations Environmental Programme. In her doctoral research, Emmerich examined the role of faith-based approaches to environmental conflict resolution in a community of commercial fishers (watermen) on Chesapeake Bay’s Tangier Island, many of whom were evangelical Christians.⁵⁰ Here, in the late 1980s and early 1990s, conflicts between conservationists, especially between the Chesapeake Bay Foundation (CBF), a regional conservation NGO, and watermen had reached an impasse. CBF had followed the traditional conservation approaches of combining more environmental education with advocacy for more restrictive harvest regulations. Far from solving the problem, this strategy escalated the conflict beyond verbal disagreement to acts of property damage, arson, and death threats.

Some Comparisons of Ecocentrism and Judeo-Christian Stewardship	
Ethical System	Fundamental Task to Be Accomplished/Problem to Be Solved
Ecocentrism	Preserve functional and compositional integrity of ecosystems (the land) because functional ecosystems are good
Judeo-Christian Stewardship	<i>Original task:</i> Manifest God’s will and care to created order through human action because God is good <i>Contemporary problem:</i> Reconcile human and nonhuman creation to God because God is good

Fig. 2. Some comparisons of the fundamental tasks of stewardship as perceived by ecocentrism and Judeo-Christian stewardship.



The Christian conviction that both humanity and nature are objects of God's redemptive plan and purpose (Rom. 8:18–22) generates conservation strategies inclusive of human need. Such approaches perceive the fundamental conservation problem to be an estrangement between God, humanity, and nature, and the solution to be one that reconciles human beings to their natural surroundings ...

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Emmerich began her efforts on Tangier Island by recognizing the legitimacy of local churches as the primary decision-making institutions of the Tangier community, an approach CBF had never considered. She also began by centering her concerns on the human community rather than the catch species. Emmerich came to realize that the watermen's first concern was the threat to their existing way of life, a threat they perceived to originate from restrictive harvest regulations and insensitive conservation organizations like CBF.⁵¹ The lack of cooperation and outright hostility watermen displayed toward environmental regulations and the "environmental ethic" advanced by government agencies and the CBF was a reflection of their view that these entities had no regard for their way of life, a way of life which watermen wanted to preserve.

Working and speaking in the churches to establish a faith-based environmental ethic, Emmerich's efforts led to the development of the "Waterman's Covenant," a pledge written by watermen binding its signers to respect conservation laws as an expression of obedience to biblical commands and principles of stewardship. The Covenant was not the product of long committee meetings and public debates. It arose out of a spontaneous response by watermen resulting from a new awareness of their sins against God and his creation. Explaining her firsthand experience at a local church service, Emmerich said:

I preached on biblical environmental stewardship and loving one's neighbor. At that service, fifty-eight watermen bowed down in tears and asked God to forgive them for breaking fishery laws. They then committed themselves to a Stewardship Covenant ... Watermen in their seventies and eighties, an age when habits tend to be fixed, began bringing their rubbish back to the island, rather than dumping everything overboard. Many apologized to fellow-Tangiermen working for the Chesapeake Bay Foundation, for their animosity over the years. Individuals spoke emotionally in church of their conviction of sin after throwing metal cans overboard or taking undersized crabs. Government officials, scientists, and environmentalists, all of whom had experienced difficulty in instituting change of any sort, have been

stunned by the dramatic change in the people of Tangier.⁵²

Acting from the same theological insights as Emmerich, A Rocha's emphasis on developing embedded indigenous conservation efforts among local (usually poor) communities and the Zahniser Institute's stress on service to local community and government are manifestations of this same theological understanding. The Christian conviction that both humanity and nature are objects of God's redemptive plan and purpose (Rom. 8:18–22) generates conservation strategies inclusive of human need. Such approaches perceive the fundamental conservation problem to be an estrangement between God, humanity, and nature, and the solution to be one that reconciles human beings to their natural surroundings, not one that merely supplies "education" or regulatory constraint.

This understanding of stewardship incorporates some of the perspectives of the emerging science of restoration ecology, at least in redefining the human role toward nature. Pioneer restorationist W. R. Jordan, when speaking of human use of prescribed fire to restore tallgrass prairie, explained:

The need of the prairie for fire demonstrates its dependence on us, and so liberates us from our position as naturalists or observers of the community into a role of real citizenship.⁵³

Restoration is an important and tangible side, the human-nature side, of understanding and practicing stewardship as a ministry of reconciliation. In restoration, we are not to view nature as something that must be protected and preserved *from* human presence, but something which has been created to benefit from constructive human care and, at times, intervention. As environmental philosopher Fredrick Turner said: "Potentially, at least, human civilization can be the restorer, propagator, and even creator of natural diversity, as well as its protector and preserver."⁵⁴

Although Turner and Jordan speak in a secular context, their words capture a portion of the truth required for a correct understanding of Christian environmental stewardship as a ministry of reconciliation. The restorationists also reveal the fallacies inherent in animism, or in any other alternatives that produce the enchantment (or, in

modern culture, the re-enchantment) of nature. As Thomas Sieger Derr notes: "When nature was considered sacred, it was as much feared as loved. Biblical thought removes the fear while leaving the love intact."⁵⁵ Thus, the task of "stewardship" is not to re-enchant nature, to placate imaginary spirits present in real created things, nor is it to preserve some particular "state" of nature. Stewardship is an interventionist vocation. It cannot be otherwise. We dare not commit the fallacy, which is both scientific and ethical, that "nature is always right" in whatever condition we find it. Nevertheless, we approach the required interventions of stewardship with humility, seeking to determine the pattern that such intervention should take, the way in which humans should be involved in it, and the proper end it should serve. Understanding the particulars of intervention in specific time-place contexts requires diligent scientific study and technical skill, but, as a ministry of reconciliation, it is guided by the determination to work toward God's revealed purposes for nature, which are redemption (Rom. 8:18–22), reconciliation (Col. 1:15–20), and restoration (Rev. 21:1–4).

Humans have not only physical needs, but moral ones, and their moral capacities and potentials are not developed simply by receiving the material benefits of stewardship that manifest themselves as healthy air, clean water, and abundant food. Vital as these are, it is the actual acts and processes of being a steward that shape human character to become more like the Lord they serve. Because God is interested not only in the outcomes of stewardship, but also in the moral development of the stewards who perform this work, modern Christian environmental ethics also has rightly begun to recognize the importance of virtue-based ethics in conservation. Our ability to serve and protect the creation, and to achieve God's intended reconciliation and redemption for it, is not only a matter of scientific and technical expertise, or even solely a matter of understanding our duties and obligations, important as they are. It is also an expression of the kind of people we are to be and become.

Bouma-Prediger, in his classic paper, "Creation Care and Character: The Nature and Necessity of Ecological Virtues" develops seven "virtue couplets" of stewardship based on biblical motifs that reveal the nature of the created order and our intended relationship to it. These ecological virtues are respect and receptivity, self restraint and frugality, humility and honesty, wisdom and hope, patience and serenity, benevolence and love, and justice and courage.⁵⁶ Although economist Christopher Barrett has noted that social norms often sustain such ecological virtues in many societies,⁵⁷ it takes more than social norms to produce them, and the kind of moral choices and character required for genuine environmental stewardship is more likely to lead one to become the object of social and professional censure rather than the recipient of endorsement and reward.⁵⁸ To persist in practice, such virtues

must be ultimately supported by transcendent value and authority that is more than accepted social behavior. The necessity of appropriate virtue-centered orientation in understanding stewardship as a ministry of reconciliation stems from the reality of that transcendent source, and from the knowledge that the creation, for all its beauty, complexity, and self-renewing capacities, is not its own steward. Humans are its steward. And because they must reflect the image of God to the created order in their rule and will, human virtue matters.

The necessity of appropriate virtue-centered orientation in understanding stewardship as a ministry of reconciliation stems from the reality of that transcendent source, and from the knowledge that the creation ... is not its own steward. Humans are its steward. And because they must reflect the image of God to the created order in their rule and will, human virtue matters.

Lynn White, Jr. called Christianity "the most anthropocentric religion the world has ever seen."⁵⁹ In an unintended way he was right, for God chose to achieve reconciliation through incarnation. He determined that the reconciling agent would bear human form and flesh, and that the humans who followed in his ministry would come to bear his likeness. If the historical roots of our ecologic crisis are anthropocentric, its future solution is even more so. The human presence is *essential* to the purpose of stewardship, not only as a loving caretaker carrying out the will of God to and for the creation that he loves, but as an image-bearer of Christ, active in the work of reconciling a fallen world to God in preparation for its final restoration and, in that work, becoming conformed to the image of Christ. The acts of stewardship have eternal significance when they are united to the ultimate purposes of God for his creation. They are not simply "what we have to do," and being stewards is not simply what we merely become as part of a "natural" process of our social evolution. Acts of stewardship are acts of moral significance because they



Acts of stewardship are acts of moral significance because they are acts that fulfill moral obligations toward the intrinsic value of what God has created. By such fulfillment, our character is shaped and changed as we also shape and change the Earth toward the ends God has in view. This ... is the ultimate environmental transformation.

Article

Cultural Transformation and Conservation: Growth, Influence, and Challenges for the Judeo-Christian Stewardship Environmental Ethic

are acts that fulfill moral obligations toward the intrinsic value of what God has created. By such fulfillment, our character is shaped and changed as we also shape and change the Earth toward the ends God has in view. This mutual and simultaneous reshaping of humanity and nature toward the plan and purpose of God is the ultimate environmental transformation.

In a single generation, Christians have changed the perception of the Judeo-Christian tradition in conservation from being the cause of the ecologic crisis to a solution to it. Now, to complete what has begun, Christians must transform the *value* of what is conserved, from what is of instrumental value to us to what is of intrinsic value to God. Further, Christians must transform the *presence* of the human species from being a cancer on creation to being a priest of God's sacred space. And, finally, Christians must transform the *purpose* of conservation from the satisfaction of preference, or even the preservation of environmental systems, to the *reconciliation* of human and nonhuman creation to God.

The task of stewardship, in Judeo-Christian understanding, is not to restore or preserve some particular "state" of nature. It is rather to work with God as cooperators in his purposes for nature, which are the purposes of redemption (Rom. 8:18-22), reconciliation (Col. 1:15-20), and restoration (Rev. 21:1-4). Let our efforts be directed to further these ends, and thus transform conservation's culture to affirm the purposes that bring dignity, coherence, and significance to its work. ☞

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through the instruction I received in their courses that I was privileged to take in the fall semester of 2004. Roman J. Miller and three anonymous reviewers provided suggestions on the submitted version of the manuscript.

Notes

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- ¹⁰For example, Robert B. Fowler provides a lengthy examination of both Christian and secular critics of Christianity on environmental matters in his chapter on "The Argument Over Christianity," (58-75) in his book *The Greening of Protestant Thought* (Chapel Hill, NC: University of North Carolina Press, 1995), but Fowler fails to note the significance of the fact that all his sources are "post-White," and many explicitly draw upon White's essay as a basis for their own attacks.
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- ¹²*Ibid.*, 5.
- ¹³Carl Pope, "Reaching Beyond Ourselves: It's Time to Recognize Our Allies in the Faith Community," *Sierra Magazine* 83 (November/December 1998): 14-15, 14.
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- ¹⁵Some of the best early responses include Francis A. Schaeffer, *Pollution and the Death of Man* (Wheaton, IL: Tyndale House, 1969); Richard T. Wright, "Responsibility for the Ecologic Crisis," *BioScience* 20 (1970): 851-3; Joseph Sittler, *Essays on Nature and Grace* (Philadelphia: Fortress Press, 1972); Paulos Gregorios, *The Human Presence: An Orthodox View of Nature* (Geneva: World Council of Churches, 1978); Loren Wilkinson, ed., *Earthkeeping: Christian Stewardship of Natural Resources* (Grand Rapids, MI: Eerdmans, 1980). A comprehensive bibliography of hundreds of scholarly sources defending and articulating a positive understanding of Judeo-Christian environmental stewardship has been prepared by Joseph K. Sheldon in *Rediscovery of Creation: A Bibliographic Study of the Church's*

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³⁵Sagoff, "Environmental Economics and the Conflation of Value and Benefit."

³⁶Ibid.

³⁷Northcutt, *The Environment and Christian Ethics*.

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³⁹Although framing the query in their own unique styles, this is the primary organizing question of Leopold, Nash, and Rolston, among others.

⁴⁰Leopold, *A Sand County Almanac*, 117.

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⁴²For more detailed studies of translation and context, see Fred Van Dyke, David C. Mahan, Joseph K. Sheldon, and Raymond H. Brand, *Redeeming Creation: The Biblical Basis for Environmental Stewardship* (Downers Grove, IL: InterVarsity Press, 1996), 96; Steven Bouma-Prediger, *For the Beauty of the Earth: A Christian Vision for Creation Care* (Grand Rapids, MI: Baker Academic, 2001), 74;

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⁴⁷Bryan G. Norton, *Toward Unity Among Environmentalists*.

⁴⁸Van Dyke, *Conservation Biology*, 65-6.

⁴⁹Leopold, *A Sand County Almanac*, 262.

⁵⁰Susan D. Emmerich, "Faith-based Stewardship and Resolution of Environmental Conflict: An Ethnography of an Action Research Case of Tangier Island Watermen in the Chesapeake Bay" (Ph.D. diss., University of Wisconsin, 2003).

⁵¹Susan D. Emmerich, "The Declaration in Practice: Missionary Earth-keeping," in *The Care of Creation: Focusing Concern and Action*, ed. R. J. Berry (Downers Grove, IL: InterVarsity Press, 2000), 147-54.

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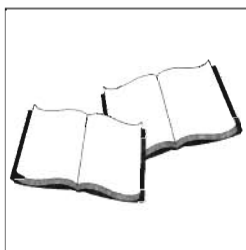
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Communication

Reading God's Two Books

Reading God's Two Books

George L. Murphy



George L. Murphy

*My purpose ...
is ... to ask
some questions
about [the two
books concept],
point out its
limitations, and
suggest some
cautions about
its use.*

The metaphor of God's "two books" has often been used in discussions about the possibility of knowledge of God.¹ The idea is that there are two sources for such knowledge, the book of God's works—nature—and the book of God's words—the Bible. There is a natural knowledge of God which can be gained from observation of, and thought about, created things, and there is a revealed knowledge that comes from special disclosures of God in history. These can lead, in turn, to natural theology and theology based upon revelation, and one then needs to ask about the relationships between these two theologies. (It should be noted that I do not speak about "revealed theology." Distinctively Christian theology is not revealed, but is faithful reflection upon the content of revelation and—if one allows the concept—natural knowledge of God.)

My concern here is not with the historical development of the two books concept in the Jewish and Christian traditions. We may note the reflections of the medieval Jewish philosopher Judah Halevi on the universe as *sefer*, text.² A statement of the concept in Francis Bacon's *Advancement of Learning* is of special interest because it is one of the quotations which Darwin included on the reverse of the fly-leaf of *The Origin of Species*:

To conclude therefore, let no man upon a weak conceit of sobriety or an ill-applied moderation think or maintain, that a man can search too far, or be too well studied in the book of God's

word, or in the book of God's works, divinity or philosophy; but rather let men endeavor an endless progress or proficience in both.³

The metaphor of the two books is not generally found as a separate item in theological dictionaries or encyclopedias, and is often used in whole or in part simply as a phrase to introduce science-theology discussions. A recent book with the title *God's Two Books* does not examine the metaphor in any detail.⁴ R. J. Berry's Gifford lectures, *God's Book of Works*, do have some material on the history of the concept.⁵

I have often been critical of ways in which natural theology has been used in the science-theology dialogue.⁶ My purpose here, however, is not simply to reject the two books concept. It is rather to ask some questions about it, point out its limitations, and suggest some cautions about its use.

We first need to ask how appropriate "book" language is in this context. It is clear that its use for nature is metaphorical: We do not literally "read" the world. But what about special revelation? The meaning here seems at first to be straightforward: God's "other book" is the Bible. In support of this idea, one might appeal to Psalm 19, one of the classic texts used to argue for a twofold revelation. Here a statement about the proclamation of the glory of God by the heavens continues with verses praising the law, precepts, etc. of YHWH.

We need to be careful, however. God's fundamental revelation is his actions in the history of Israel which culminate in the life, death, and resurrection of Jesus of Nazareth. As part of those actions, God inspired prophets and apostles to *proclaim*—before they wrote—God's will and point to Christ as its fullest expression. The Bible is the authoritative written witness to that revelation and the basis for its transmission.

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This is not to deny that the Bible can properly be called revelation insofar as it testifies to that historical revelation. But Christians are not to believe that the Bible is God's ultimate revelation, as Muslims believe the Qur'an to be. God's ultimate revelation is not the written Word, important as that is, but the Word made flesh, Jesus Christ.

Let us grant for the sake of argument that we can speak legitimately of God's two books. We then need to pose a question that is not asked often enough: "In what order are we to read these books?" It is often assumed that we can begin with the book of nature, but that assumption needs to be challenged.

Does it matter? Very much so. If I can cite an example from my own experience, I would refer to the way I first read Isaac Asimov's famous science fiction *Foundation* trilogy.⁷ Simply through the vicissitudes of finding the separate volumes, I read them backward: *Second Foundation*, then *Foundation and Empire*, and finally the first volume of the set, *Foundation*. It was somewhat confusing. I could figure out the basic story line but some things made little sense. I did not know some of the events that were referred to and when some names were mentioned, I would wonder, "Who are these people?" And this was in spite of the fact that in the second and third volumes the author had provided brief prologues to summarize the story line up to that point. Things would have been clearer to me if I had started at the beginning.

Nancey Murphy has, I think, described the situation well in some comments on Owen Gingerich's use of the two books metaphor. She is commenting here on a paper in which he deals, *inter alia*, with design arguments based on anthropic principles.

Gingerich uses the metaphor of the two books, the Book of Scripture and the Book of Nature, both pointing to God. However, it seems clear to me, based on the considerations I have raised here, that these books ought not to be read independently of one another. In fact, the Book of Nature ought to be read as a sequel to the Bible. As with the sequel to a novel, it is important to read the first volume to find out about the characters. Or to drop the metaphor, we get our hypothesis of design from revelation. Discoveries like the fine tuning come along later, and their strength as evidence lies in confirming an already-existing hypothesis that already has other confirmation from other realms of experience. Without revelation, we would be at a loss to know what we mean by designer in such arguments.⁸

In our case, the proper reading order is even more important than it is if you are trying to decide whether to see the sequel to a movie before you have seen the original film. If you are a reasonably intelligent person, you can probably understand at least the basic plot of the second movie without knowing the first. And most importantly,

if you are a reasonably intelligent person, there is nothing inherent in you to distort your understanding of the film. That is not the case theologically because of the basic problem of human sin.

In what order are we to read these books? ... We should begin with the knowledge of God revealed in the history of Israel which culminates in Christ. Then we know that the creator, the author of the book of nature, is to be identified with the crucified and risen Christ, and we can read the book of God's works in that light.

In the traditions of the Reformation, it has been widely agreed that sin has had some effect on the image of God in humanity, but the extent to which it has been lost, distorted, or obscured has been debated. The issue does not have to be posed in terms of the *imago dei*. The basic aspect of original sin is that all people are from birth "unable to have true fear of God or true faith in God" as the Augsburg Confession puts it.⁹ And if we are in rebellion against God, we do not *want* to know God.

This is the point of Rom. 1:18-31, which is sometimes offered as an argument for natural theology. However, this is to misunderstand Paul's purpose here. The text speaks of the availability of a natural knowledge of God but warns about the way in which it is misused. What Paul says is that the natural world offers material from which God's "eternal power and divine nature" (NRSV) could be known, but that people uniformly refuse to know God and instead construct idols. The problem, in other words, is bad natural theology.

That indictment does not apply only to pagans before the advent of Christ. It is true of *all* people who try to develop an understanding of God from nature alone, apart from God's historical revelation. The result is not just the types of idols Paul speaks of in Romans—"images resembling a mortal human being or birds or four-footed animals or reptiles." There are more subtle and sophisticated idols that are palmed off as the true God—the



Communication

Reading God's Two Books

*If we begin
by reading
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as first of all
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Jesus Christ,
we know that
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willing to share
in the suffering
and perishability
of the world.
Knowing that,
we can see
the suffering
and extinction
of the
evolutionary
process
as the sign of
the cross
placed on
creation.*

Supreme Philosopher, the Cosmic Emperor, the Uncompromising Moralist, or the Intelligent Designer. While each of these images expresses something true about God, an overemphasis on any one of them results in an understanding of God which is quite different from the knowledge of God revealed in Jesus Christ.

To avoid this error, we should *begin* with the knowledge of God revealed in the history of Israel which culminates in Christ. Then we know that the creator, the author of the book of nature, is to be identified with the crucified and risen Christ, and we can read the book of God's works in that light. Metaphors of God as philosopher, ruler, moral teacher, or designer then have to be adapted to this revelation.

We can put this in another way. Nature understood as text tells us about—nature. That, of course, is the basic idea of the natural sciences: We come to understand the universe by reflection on the way it really is. In the same way, reading any book tells us about the story that author gives us. But reading a book does not necessarily tell us anything about the book's *author*. As the poet and critic Ezra Pound said, "You can spot the bad critic when he starts by discussing the poet and not the poem."¹⁰

This is the basis of Karl Barth's criticism of the *analogia entis*, the "analogy of being," which is at the root of the idea of natural theology independent of revelation. There simply is no reason to think that there must be such an analogy—that creation must in some way resemble the creator. It is quite another matter, once we know the creator, to look for evidence of his creative activity in the world.

Part of the confusion here arises because of our tendency to look at order, beauty, and other things in the world that are attractive to us as key aspects of nature that tell us something about its author. When we do that, we are actually smuggling in ideas about God from somewhere else. How do we know *a priori* that God is a God of beauty and love and not one of ugliness and hate in whose creation the beautiful elements that appeal to us are not mere accidents?

What does natural selection—what Stephen Gould called the "messy relentless

slaughter" of evolution¹¹—tell us about the creator? If we read the book of nature first, we might reasonably conclude that what is behind the evolutionary process is a cruel and ruthless God. If we begin by reading the Bible, and read it as first of all a witness to Jesus Christ, we know that God has been willing to share in the suffering and perishability of the world. Knowing that, we can see the suffering and extinction of the evolutionary process as the sign of the cross placed on creation.¹²

So where do we finally end up on the connection between natural theology and theology based upon revelation? I have previously described four possible ways of understanding the proper relationship.¹³

1. The Classical view, in which natural theology provides a foundation upon which distinctively Christian theology—that based upon revelation—can build.
2. The Enlightenment view, according to which the natural knowledge of God is all we really need. This would be very difficult if not impossible for a Christian to hold consistently, since the book of nature as commonly understood simply does not tell us about salvation through Jesus Christ.
3. The Barthian *Nein!*, which rejects natural theology.
4. The Dependent view, in which knowledge of the natural world is able to tell us something about God when placed in the context of revelation. Some writers would refer to this approach as a "theology of nature" rather than a "natural theology."

The Classical approach means reading God's books in the wrong order—or at least in an awkward order—and thus runs the risk of bringing misconceptions and prejudices to our interpretation of God's revelation in Christ. Certainly many theologians and parts of the Christian church have taken this approach, but it is risky. It carries the danger that we will become so intrigued with the book of God's works that we will not bother to move on to the book of God's Word, and thus slide into an Enlightenment position. Even if this does not happen, it is likely that this approach will introduce philosophical assumptions that relativize the importance of the core Christian beliefs in the Incarnation and the Trinity.

That in fact happened to a significant degree during the eighteenth and nineteenth centuries, and Barth's view, the denial of natural theology, was in part a reaction to that. But while his negative view of natural theology is understandable in its historical context, it is clearly incomplete. It would mean finally that the natural world is of no importance for theology. The essence of Barth's position is the rejection of natural theology as an independent enterprise. The necessary positive completion of this position is accomplished, as Thomas Torrance has argued, by seeing natural theology as *dependent* upon revelation for its validity. In other words, natural theology must be a part of distinctively Christian theology.¹⁴

While science as an investigation of the natural world can be done without any religious presuppositions at all, it can only tell us something of value for theology if it is viewed in the light of revelation. To return to the book metaphor, we can learn about nature simply by reading the book of nature. But that book will tell us something about its author only if we have first read the Bible and understood its witness to Jesus Christ. ☿

Notes

¹This paper is a revised version of one presented at the 2004 annual meeting of the American Scientific Affiliation, Trinity Western University, Langley BC, Canada.

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³Francis Bacon, *The Advancement of Learning*, ed. William Aldis Wright, 5th ed. (Oxford: Clarendon, 1926), 10. Darwin's citation differs from this in minor ways.

⁴Kenneth J. Howell, *God's Two Books* (Notre Dame, IN: University of Notre Dame, 2002).

⁵R.J. Berry, *God's Book of Works* (New York: T & T Clark, 2003), 32–4.

⁶E.g., George L. Murphy, "'Chiasmic Cosmology' and 'The Same Old Story': Two Lutheran Approaches to Natural Theology" in *Facets of Faith & Science* 4, ed. Jitse M. van der Meer (Lanham MD: University Press of America, 1996), 131–42.

⁷Isaac Asimov, *The Foundation Trilogy* (Garden City, NY: Doubleday, 1951).

⁸Nancey Murphy in Murray Rae, Hilary Regan, and John Stenhouse, eds., *Science and Theology* (Grand Rapids, MI: Eerdmans, 1994), 69–70.

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¹⁰Ezra Pound, *ABC of Reading* (London: Routledge, 1934), 71.

¹¹Stephen Jay Gould, "Darwin and Paley Meet the Invisible Hand," *Natural History* (November 1990): 8.

¹²George L. Murphy, *The Cosmos in the Light of the Cross* (Harrisburg, PA: Trinity Press International, 2003).

¹³*Ibid.*, Chapter 2.

¹⁴Thomas F. Torrance, *Reality and Scientific Theology* (Edinburgh: Scottish Academic, 1985).



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Communication

*John Wesley's Survey of the Wisdom of God in Creation:
A Methodological Inquiry*

John Wesley's *Survey of the Wisdom of God in Creation: A Methodological Inquiry*

Laura Bartels Felleman



Laura Bartels Felleman

This communication considers methodological arguments within the history of science that could help current researchers avoid previous errors committed in the study of [John Wesley's Survey of the Wisdom of God in Creation].

As founder of the Methodist Church, John Wesley (1703–1791) is primarily known for his work as an evangelist and church organizer. Wesley was also a prolific publisher, however, who produced religious literature designed to edify Christians as well as educate them on a variety of topics. One of these publications was a multi-volume natural philosophy text that discussed subjects now dispersed throughout diverse fields such as human physiology, biology, astronomy, and botany. First published in 1763, the *Survey of the Wisdom of God in Creation, Or a Compendium of Natural Philosophy* was written for a general audience and marketed by Wesley's preachers to Methodist Societies throughout Britain. After Wesley's death new editions of the *Survey* reflecting recent discoveries or updated theories continued to be produced by denominational publishing houses. The last edition was published in 1842.

The addition of the *Survey* to the Wesley Center for Applied Theology website (wesley.nnu.edu) and the tentative plan to re-publish the *Survey* as part of the Wesley Works series of Abingdon Press (United Methodist Publishing House) suggest there is a renewed interest in this long out-of-print publication. The last time the *Survey* attracted scholarly attention, however, the results were less than commendable. This communication considers methodological arguments within the history of science that could help current researchers avoid previous errors committed in the study of this text.

The absence of a sound methodology and the weaknesses that result are evident in the works that make up this cautionary tale of those who sought to show the compatibility of theories of evolution with Wesley's natural philosophy. William H. Mills' *John Wesley an Evolutionist* was one of the first to compare Wesley's *Survey* with Charles Darwin's theory of evolution. In this speech, delivered in 1893 to the Chit-Chat Club of San Francisco, Mills stated that his intention was to introduce his listeners to John Wesley's *Survey of the Wisdom of God in Creation*. By this time, the work was out of print and difficult to obtain, and Mills reasonably assumed none of his listeners were aware of its contents.

Mills did not cover all of the subjects touched on in the *Survey*; he only referenced the passages related to what he called the "development theory of creation." This theory argues that there was one act of creation and that current creatures developed from these first creatures. Mills identified Charles Bonnet, "a distinguished naturalist of Geneva," as one of Wesley's sources but most of the speech dwells upon Wesley's supposed agreement with proponents of evolution like Darwin, John Fiske, and Thomas Huxley.¹

In 1924 Frank Collier published a pamphlet entitled *Back to Wesley*. Collier had discovered the Mills speech while doing research at the Library of Congress, and this find motivated him to search for this long-lost work of Wesley in order to learn more about the Methodist founder's interest in science. In *Back to Wesley*, Collier again and again insisted that Wesley believed the "essential idea of evolution" which Collier identified as "gradual, orderly, and progressive change." Collier acknowledged that Wesley got this idea from Bonnet and that it is not the same as the theory of organic evo-

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lution, but Collier seemed to find it important that Wesley did accept some form of evolutionary theory.²

Arguments [by Mills and Collier] try to show Wesley's consistency with Darwin's theory of evolution even while acknowledging Wesley's source was Bonnet and not Darwin.

A year later an article written by Charles Hargitt appeared in *Zion's Herald* entitled "John Wesley—Evolutionist." Hargitt confessed that his choice of title was deliberate; he intended to highlight for Methodists and non-Methodists alike Wesley's views on evolution. The article briefly touches on Wesley's appreciation and publication of Bonnet's *Contemplation de la Nature* and concludes that the theory of evolution as it was known in Wesley's time was "cordially accepted" by him. The article ends with the quote, "Let not your heart be troubled: ye believe in God."³

Apparently, there were still a few troubled hearts out there two years later in 1927, because Hargitt published another article on the subject of John Wesley and evolution, this time in the *Methodist Review*. His stated purpose in "John Wesley and Science" was to clear up two points of confusion that had been raised about Wesley's familiarity with the science of his day. First, Hargitt quoted a passage from Wesley's *Survey* to show that Wesley did esteem the Copernican system. Second, Hargitt cited Bonnet as the source for a passage in the *Survey* that seems to anticipate Darwin's theory of evolution. Hargitt stated that it is significant that Wesley quoted from Bonnet's writings on evolution but Hargitt did not explain why he thought this to be of significance.⁴

William C. S. Pellowe also published an article in the 1927 *Methodist Review* detailing the reasons why he thought Wesley would have, at the very least, studied the theory of evolution (if he had lived long enough to see *The Origin of Species* published). Pellowe reached this conclusion based on such things as Wesley's reading of scientific literature, the experiments he conducted and the information he gathered on natural phenomena, and his use of science to counter the disquisitions of astrologers. Pellowe wrote during a period that he described as a time of conflict between conservatives and liberals, and he held up Wesley as an example of a Christian who adhered to carefully reasoned religious convictions that took into account the latest developments in science. Pellowe did not go so

far as to suggest Wesley would have accepted the theory of evolution, but he did conclude that Wesley would have thoroughly considered the issue in order to have an informed opinion on the matter. This approach to science and religion is the one Pellowe recommended all Methodists follow.⁵

In 1928 the longest treatment arguing for Wesley's positive view of science appeared. Collier's book *John Wesley Among the Scientists* has one chapter devoted to a comparison of Wesley's view of evolution with that of Darwin. The rest of the book, however, argues that Wesley's understanding of science was the same as some of Collier's contemporaries. Statements about the philosophy of science made by such men as Borden Bowne, William James, Robert Andrews Millikan, Karl Pearson, and Edwin Slosson are liberally quoted. Collier concluded that Wesley's attitude toward science was essentially the same as these late nineteenth- and early twentieth-century writers.⁶

Hargitt's articles [depict Wesley] as a Christian leader who "cordially accepted" new scientific theories.

These interpretations of the *Survey* exhibit the fallacies in logic Quentin Skinner warned against in his essay "Meaning and Understanding in the History of Ideas." First, Skinner points out the anachronism of searching for "doctrines" in texts that could not possibly be commenting upon yet-to-be-published theories.⁷ The speech by Mills and the early Collier piece would be examples of this "mythology of doctrine." Both arguments try to show Wesley's consistency with Darwin's theory of evolution even while acknowledging Wesley's source was Bonnet and not Darwin. Comparisons such as these, which purport to explain how the history of an idea or doctrine unfolded, minimize the discontinuity between Bonnet's theory of a static, spatial evolution of life forms up the Chain of Being and Darwin's theory of a dynamic, temporal evolution of life forms across eons.

Skinner also critiques historical narratives that organize a writer's ideas according to one over-arching theme.⁸ This is one form of the "mythology of coherence" and an example of this fallacy can be found in Hargitt's articles where Wesley is depicted as a Christian leader who "cordially accepted" new scientific theories. This coherent picture of Wesley is easily refuted if one considers the first published review of the *Survey of the Wisdom of God*. In this letter to the editor of the *London Magazine*, Wesley is criticized for rejecting the latest theories in astronomy.⁹



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Wesley's response was that he did not find these theories convincing and could not subscribe to them with full confidence.¹⁰ This correspondence shows that Wesley was not as receptive to every scientific theory proposed during his lifetime as is implied in Hargitt's articles.

The next fallacy identified by Skinner, "mythology of prolepsis," occurs whenever a work is used to address a contemporary problem without first considering the original intentions of the author in producing the work.¹¹ The use of Wesley in the controversy between the liberals and conservatives of Pellowe's Methodism exhibits this tendency. The article does little to contribute to our understanding of Wesley's purposes for writing the *Survey*.¹²

Collier's book, *John Wesley among the Scientists*, is one type of the "mythology of parochialism," the final fallacy Skinner seeks to characterize in his article. By detailing this bent in academic writing, he alerts the investigator to the danger "that the historian may conceptualize an argument in such a way that its alien elements are dissolved into an apparent but misleading familiarity."¹³ Collier's tendency to read Wesley's arguments as precursors to modern philosophies of science does just this by obscuring the significance of Wesley's writings for his own time in order to emphasize a supposed similarity to that of Collier.

Because Skinner argues for a methodology that seeks first to discover the past rhetorical intention of a historical document rather than solely focusing on a text's relevance for today, his historiography has been called heuristic.¹⁴ I would agree that the "Meaning and Understanding" essay suggests that the first task of the scholarly researcher is to try to discover the context out of which a document arose. Once a text is situated within a particular genre, debate, or convention, the past rhetorical strategy it served is more readily apparent and less likely to be conflated with the commitments, values, and issues of the interpreter's day. The benefit of such a historical method is its propensity to reduce the anachronisms and logical fallacies in one's reading of a past author.

Skinner's approach, which emphasizes the particularities and historically contingent

elements of a text's argument instead of the generalization and abstraction of the history of an idea, was influential for Andrew Cunningham. A historian of science at Cambridge University, Cunningham has written extensively about the identity of natural philosophy.¹⁵ The debate generated by Cunningham's scholarship offers a helpful introduction to scholars seeking to locate the *Survey* within the broader context of the natural philosophy genre.

From Skinner and others, Cunningham took the idea of the importance of studying the particular "terms and categories" of Natural Philosophers.¹⁶ In Cunningham's opinion, such a practice is important in order to avoid the "present-centredness" of much that was being written about the history of science.¹⁷ This fallacy, much like the mythology of parochialism, occurs whenever a historian concludes that an idea discussed in a text seems familiar and is in fact similar to a current theory with the only difference being that the idea is in an early stage of development. Cunningham suggests that the remedy for this fallacy is to focus on the original intentions of the author, and that by doing so historians can avoid reading their own present priorities and values into the work.

Through his research, Cunningham has determined that the original intention (or role) of natural philosophy and its identity were "intimately bound up" with one another.¹⁸ Natural philosophy was about God's creation and God's attributes.¹⁹ This was its identity. It was produced with the intention of fighting atheism.²⁰ That was the role it played in the broader society. Cunningham distinguishes this identity and role from that of modern science (a view of the world which does not implicitly see the natural order as the creation of God and definitely does not see its work as serving to refute atheism). As the study of the natural world became more secularized and less and less about a divine creation, science began to replace natural philosophy between 1760 and 1848, according to Cunningham.²¹ By focusing on the intention behind the writings of natural philosophers, Cunningham tries to avoid conflating these works with arguments made by the scientists of his time.

Edward Grant, another historian of science, has challenged the discontinuity in

Pellowe wrote during a period that he described as a time of conflict between conservatives and liberals, and he held up Wesley as an example of a Christian who adhered to carefully reasoned religious convictions that took into account the latest developments in science.

Cunningham's characterizations of natural philosophy and science. Grant wants to show the continuity between the two by citing examples of the way science builds upon the findings of natural philosophy. His methodology focuses on the arguments presented in the texts rather than on the contexts addressed by these writings. Grant refutes Cunningham's claims by analyzing the works of natural philosophers from the thirteenth and fourteenth centuries. These writings contain little by way of reference to God, he concludes, but they do demonstrate a scientific method that is consistent with that of modern science.²²

Cunningham suggests that [historians] focus on the original intentions of the author, and that by doing so historians can avoid reading their own present priorities and values into the work.

Unlike Grant, who criticizes Cunningham's methodology for being too contextual, Peter Dear asks Cunningham to put even more emphasis upon context. Equating natural philosophy with "An Identity" is akin to essentialism in Dear's opinion and does not explain the varieties of natural philosophy found between the thirteenth and eighteenth centuries.²³ A focus on context would highlight the different types of natural philosophies and offer a historical explanation for these differences.

In Cunningham's earlier arguments, he has demonstrated his awareness that there were various types of natural philosophy produced in different communities. He attributes this diversity to the differing religious commitments, from Catholic to Arian, of those who wrote such works. The arguments look different because God is conceived differently in various Christian traditions, but this does not change the identity and intention of natural philosophy for Cunningham.²⁴ The Dominicans wrote to counter the spread of Catharism while the Franciscans produced texts which aided spiritual practices, but both were types of natural philosophy because they both were about God and God's creation.²⁵

In light of this recent scholarship on natural philosophy, the anachronism of cataloging Wesley's *Survey of the Wisdom of God in Creation: Or, a Compendium of Natural Philosophy* under a heading like "John Wesley and Science" should be obvious. Scholars who wish to use the *Survey* as an example of the relationship between faith and science will first have to locate this text within the literary genre of

natural philosophy, show how this subject differs from current conceptions of science, detail Wesley's contribution to eighteenth-century natural philosophy, and only then propose the relevance this text holds for today.

My research indicates that Cunningham's characterization of natural philosophy is an apt description of John Wesley's *Survey* in all but one respect. This work is about God's creation and God's attributes. It views the natural order through the eyes of faith and sees in the various components of creation worldly examples that can be used to illuminate the divine characteristics of God. Natural philosophy, according to the Preface to the *Survey*, should serve one purpose: "to display the invisible things of God, his power, wisdom, and goodness."²⁶

This characterization of God as powerful, wise, and good is evident throughout the *Survey* as can be found in the conclusion to volume one:

His Power appears in the whole Frame of Creation, and his Wisdom in every Part of it. His Independence is pointed out in the inexhaustible Variety of Beasts, Birds, Fishes, and Insects: And his Goodness, in taking care of every one of these, opening his hand, and filling all things living with plenteousness.²⁷

The same theme can be found in a section on the elements of earth, fire, air, and water:

Herein we read the characters of his Power, which is invariably obeyed; of his Wisdom, which has abundantly provided for everything, and of his tender kindness toward Man for whom he has provided Services equally various and infallible.²⁸

In this case, God's power is in part the ability to manipulate these four elements. This power is displayed in the creation of humanity for nothing less could have taken earth, fire, air and water, mixed them together and formed out of this combination so many different body parts of various shapes, textures, and sizes.²⁹

God's wisdom is displayed in the structure of the human body. Wisdom, in this instance, refers to the brilliant way God has situated the various body parts, protected them from injury, and proportioned them in relation to the rest of creation. God's design wisely positions the vital organs where they will be most secure. The heart is in the center of the body, cushioned by the lungs, and protected by muscles, ribs, and skin. The brain is protected by the "iron helmet" of the skull and covered by two membranes that provide further security. Prudently, God has doubled up certain body parts in order to ensure that if one is damaged there is still a backup. Finally, all these parts are proportioned in such a way that humanity is not too small in relation to the rest of creation, nor so large that the bounty of the earth is not able to sustain both humankind and the rest of the creatures.³⁰



Wesley's writings present difficult challenges to his interpreters. His ready use of the work of others, incorporated without credit and often edited to fit his purposes, could easily lead one to attribute to Wesley an idea that does not originate with him and or to miss-assume his total alliance with a source.

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In some instances, the term wisdom signifies God's abilities as a mechanic *par excellant* as is the case when the design of the human hand is praised. The hand bones are "so fitly joined together," the hand muscles "so wonderfully provided," and the hand's ability to make "so many different Motions," all leads to the conclusion that "the Hand alone gives us an abundant argument of the admirable Wisdom of God."³¹

While a large portion of the *Survey* refers to the wonder of the human creation, other instances of God's power, wisdom, and goodness are also given. For example, the movement of fish from the sea upstream by way of rivers reveals a God who "conducts them with so much Care and Goodness."³² Even the metals and minerals of the Earth are included in this survey of God's goodness and wisdom: "Since all these things are to Us, not only a noble Spectacle, bright with the display of our Creator's Wisdom, but likewise an inestimable Gift, rich with the Eminations of his Goodness."³³ Wisdom in this case once again signifies praise for God's shrewd design, so wisely placing materials like flint, clay, stones, and iron in the Earth where they can be mined underground without disturbing all the activity going on above. Goodness in this example does not suggest God shows kindness toward minerals, but that the provision of minerals is an illustration of the way God takes care of humanity's needs.

The birds also have a place in this survey. A series of rhetorical questions are posed in the section on birds that all ask the question Who? Who taught the birds to build nests of so many various kinds? Who taught them they would need to sit on their eggs in order to incubate them? Who taught them to carry food and water in their gullets as nourishment for their young? The answer to each question is, of course, God but the ultimate purpose of this instruction serves humanity:

Rather is it not thy Design, by all these Wonders, to call us to Thyself? To make us sensible of thy Wisdom, and fill us with Confidence in thy Bounty, who watchest so carefully over those inconsiderable Creatures, two of which are sold for a farthing?³⁴

Given that this work is called *A Survey of the Wisdom of God in Creation*, the number of

references to God's wisdom, as opposed to other attributes, comes as no surprise. The growth of trees is lifted up as an example of the Creator's wisdom.³⁵ Again, it is the design of trees, the way they put down a root system, which shows God is wise. The design of insects, especially the spider's ability to release threads, is also pointed to as an example of God's wisdom.³⁶ In addition, the movement of the Earth and of the Heavens is a sign of the wisdom of the Creator.³⁷

This focus on God's wisdom, power, and goodness is consistent with the identity of natural philosophy Cunningham discovered in his survey of the genre. The one difference between Wesley's natural philosophy and those analyzed by Cunningham would be that Wesley edited out references to atheism in his compilation. Wesley included sections from the natural philosophies of John Ray, William Derham, and Matthew Hale in his *Survey*, but, unlike their works, the *Survey* does not contain any refutations of atheism.³⁸ Cunningham's contention that natural philosophy was produced with the intention of fighting atheism does not describe or explain the content of the *Survey*.

Unlike Grant, I found a simple reading of this text was not adequate for uncovering this significant difference. Since Wesley's *Survey* is a compilation of other works on natural philosophy, an intertextual reading comparing Wesley with the sources he edited was necessary. This is the only way to determine the uniqueness of the rhetorical strategy Wesley demonstrated in this text and the consistency with which he employed it.

There are many methodological options available to researchers of Wesley's writings and depending on the purpose of the researcher's use of Wesley there will be differing measures of critical success to recommend one or another. That having been said, it may be the particular ethical role of a historian to raise a warning across disciplines that Wesley's writings present difficult challenges to his interpreters. His ready use of the work of others, incorporated without credit and often edited to fit his purposes, could easily lead one to attribute to Wesley an idea that does not in fact originate with him and or to miss-assume his total alliance with a source. Also, the many editions of the *Survey* produced after his death do not indi-

cate which sections were original to Wesley and which were added by a later editor.³⁹ The only way to avoid the embarrassment of misattribution is to become familiar with Wesley's reading list, research the footnotes he does not provide, and compare later editions with those Wesley edited.

A re-examination of the *Survey of the Wisdom of God* is advisable for those who wish to understand the impact Wesley's readings in natural philosophy had on his theology, or anyone trying to situate the *Survey* within the genre of British natural philosophy, or scholars interested in studying the impact such writings had on the general public's grasp of natural science. Let us hope these scholarly endeavors contribute to our perception of the contingencies that made this historical text possible and do not send us into another round of exchanges between the creationists and evolutionists within Wesleyan and Methodist circles where both sides in the debate claim Wesley as their forbearer. ☞

Acknowledgment

I would like to thank Quentin Skinner, Regius Professor of Modern History, Cambridge University, for his generous response to an early version of this communication.

Notes

- ¹William H. Mills, *John Wesley—An Evolutionist* (San Francisco, CA: privately printed, 1893).
- ²Frank Wilbur Collier, *Back to Wesley* (New York: Methodist Book Concern, 1924). Collier was Director of Research at American University and later joined the Department of Philosophy.
- ³Charles W. Hargitt, "John Wesley—Evolutionist," *Zion's Herald* (1925): 1061–88. Hargitt was Professor of Zoology at Syracuse University.
- ⁴Charles W. Hargitt, "John Wesley and Science: A Challenge from the Eighteenth Century," *Methodist Review* 110 (1927): 383–93.
- ⁵William C. S. Pellowe, "Wesley's Use of Science," *Methodist Review* May (1927): 394–404. Pellowe was a Methodist Episcopal minister in Detroit, Michigan.
- ⁶Frank Wilbur Collier, *John Wesley among the Scientists* (New York: Abingdon Press, 1928).
- ⁷Quentin Skinner, "Meaning and Understanding in the History of Ideas," *History and Theory* 8, no. 1 (1969): 7, 8. Skinner is the Regius Professor of Modern History, Cambridge University.
- ⁸Skinner, 16.
- ⁹"Philosophaster," "To Mr. John Wesley," *The London Magazine: Or, The Gentleman's Monthly Intelligencer* (November 1764): 570–3.
- ¹⁰John Wesley, *The Letters of the Rev. John Wesley, A. M.*, ed. John Telford (London: The Epworth Press, 1931), 4: 281–5.
- ¹¹Skinner, 22.
- ¹²Skinner, 24.
- ¹³Skinner, 27.
- ¹⁴Kari Palonen, *Quentin Skinner: History, Politics, Rhetoric* (Cambridge: Polity Press, 2003), 21–3.
- ¹⁵Andrew Cunningham and Perry Williams, "De-Centring the 'Big Picture': The Origins of Modern Science and the Modern Origins of Science," *British Journal for the History of Science* 26 (1993): 419; and Andrew Cunningham, "Getting the Game Right: Some Plain Words on the Identity and Invention of Science," *Studies in History and Philosophy of Science* 19, no. 3 (1988): 367, note 1.
- ¹⁶Cunningham and Williams, "De-Centring the 'Big Picture,'" 419.

- ¹⁷Cunningham, "Getting the Game Right," 367.
- ¹⁸Cunningham, "The Identity of Natural Philosophy. A Response to Edward Grant," *Early Science and Medicine* 5, no. 3 (2000): 264.
- ¹⁹Andrew Cunningham, "How the *Principia* Got Its Name; or, Taking Natural Philosophy Seriously," *History of Science* 29 (1991): 381, 388; and —, "A Reply to Peter Dear's 'Religion, Science and Natural Philosophy: Thoughts on Cunningham's Thesis,'" *Studies in History and Philosophy of Science* 32, no. 2 (2001): 390.
- ²⁰Cunningham, "How the *Principia* Got Its Name," 383.
- ²¹Cunningham and Williams, "De-Centring the 'Big Picture,'" 418, 424.
- ²²Edward Grant, "God, Science, and Natural Philosophy in the Late Middle Ages," in *Between Demonstration and Imagination: Essays in the History of Science and Philosophy Presented to John D. North*, ed. Lodi Nauta and Arjo Vanderjagt (Leiden: Brill, 1999). Dr. Grant is Professor Emeritus of History and History of Science, Indiana University, Bloomington.
- ²³Peter Dear, "Religion, Science and Natural Philosophy: Thoughts on Cunningham's Thesis," *Studies in History and Philosophy of Science* 32, no. 2 (2001): 379; and Peter Dear, "Reply to Andrew Cunningham," *Studies in History and Philosophy of Science* 32, no. 2 (2001): 393–5. Dr. Dear is Professor of History/Science and Technology Studies, Cornell University.
- ²⁴Cunningham, "How the *Principia* Got Its Name," 385, 389; and Cunningham, "A Reply to Peter Dear," 389.
- ²⁵Andrew Cunningham and Roger French, *Before Science: The Invention of the Friars' Natural Philosophy* (Aldershot: Scolar, 1996); and Cunningham, "The Identity of Natural Philosophy," 265.
- ²⁶John Wesley, *A Survey of the Wisdom of God in the Creation: Or a Compendium of Natural Philosophy* (Bristol: printed by William Pine, 1763), 1: iii.
- ²⁷*Survey* (1763) 1: 285.
- ²⁸*Survey* (1763) 1: 228, sec. 9.
- ²⁹*Survey* (1763) 1: 93, sec. 14.
- ³⁰*Survey* (1763) 1: 54, sec. 50.
- ³¹*Survey* (1763) 1: 50–1, sec. 45.
- ³²*Survey* (1763) 1: 170, sec. 9.
- ³³*Survey* (1763) 2: 50, sec. 9.
- ³⁴*Survey* (1763) 1: 149, sec. 9.
- ³⁵*Survey* (1763) 1: 280, sec. 8.
- ³⁶*Survey* (1763) 1: 180, sec. 1.
- ³⁷*Survey* (1763) 2: 150, sec. 11.
- ³⁸Laura Bartels Felleman, "The Evidence of Things Not Seen: John Wesley's Use of Natural Philosophy," (PhD Diss., Drew University, 2004). In Chapter Two, I discuss possible reasons for Wesley's deletion of atheism from his compilation of natural philosophies.
- ³⁹For example, Robert Mudie mentioned in the Preface to each volume in his editions of the *Survey* (1836, 1840, 1842) that he had revised Wesley's work to reflect developments in chemistry, biology, botany, and natural science. He did not indicate in the body of the text where his editions differ from that of Wesley. *A Compendium of Natural Philosophy Being A Survey of the Wisdom of God in the Creation; by John Wesley, A.M. A new edition, revised, corrected and adapted to the Present State of Science, by Robert Mudie* (London: Printed for Thomas Tegg and Son, 1836), 1: vii–xii, 2: v–viii, and 3: iii–vi.

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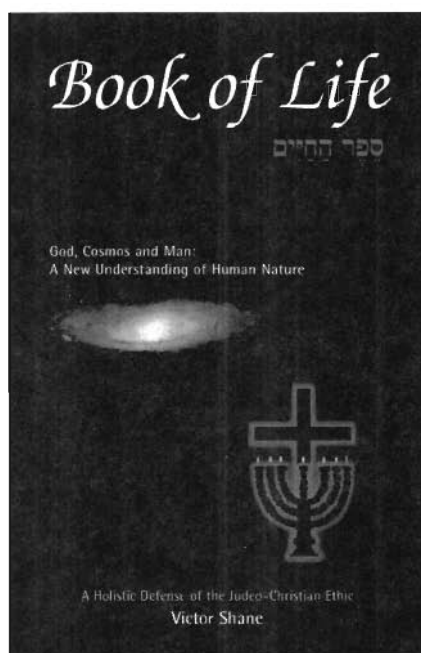


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ENVIRONMENT

THE ENCYCLOPEDIA OF RELIGION AND NATURE by Bron R. Taylor, ed. New York: The Continuum International Publishing Group, 2005. Two volumes; 1817 pages. Hardcover; \$450.00. ISBN: 1843711389.

The question which animated *The Encyclopedia of Religion and Nature (ERN)* is: "What are the relationships between human beings, their diverse religions, and the Earth's living systems?" The question is addressed by 518 writers who come from many regions of the world. *ERN* contains a lengthy introduction, bibliography, background to *ERN*, reader's guide, contributor list, and 50-page index. The idea for *ERN* originated in 1997 when Jeffrey Kaplan suggested it to Bron R. Taylor, the editor, at an American Academy of Religion meeting in San Francisco.

ERN is arranged alphabetically by topic with each article being followed by a bibliography. Some topics may surprise such as "Dogs in the Abrahamic Traditions," "Dogs in the Islamic Tradition," and "Rainbow Serpent." Others are more traditional such as "Crop Circles," "Pantheism," and "Ecology and Religion." Entries also include people such as Cesar Chavez, Jane Goodall, and Gottfried Leibniz.

For readers who wonder why some topics are included and others excluded, the editor responds that most of the missing topics were initially pursued but without success. The editor was unable to find writers in parts of Africa. In addition, says Taylor, no encyclopedia can be comprehensive so the "better test of an encyclopedia's efficacy is its success at demarcating the territory to be covered and analyzing carefully a representative sample of the phenomena in question" (p. xxvii).

This is a fine production and provides an excellent resource to those concerned not only about ecology and the environment but also their religious interface. The reader will learn from *ERN* that there is an organization for Religious Campaign for Forest Conservation, that Dorothee Soelle was a German Lutheran environmentalist who was anti-capitalist, anti-nuclear, and anti-war, and muti is a group of practices connected with medicinal use of plants and animals. Many other fascinating facts and insights will enlighten the reader.

If you cannot afford *ERN*, perhaps you could recommend it to your library. It is a valuable resource which should be available in college and university libraries; professional ecologists may desire their own copy. The publisher was offering a discount for early purchase; perhaps other book sites will offer *ERN* at a reduced price, also.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.



FAITH & SCIENCE

SCIENCE AND THE BIBLE: Evidence-Based Christian Belief by Ted Burge. Philadelphia, PA: Templeton Foundation Press, 2005. 184 pages, bibliography, index. Paperback; \$16.95. ISBN: 1932031936.

An emeritus professor of physics of the University of London, Burge was Dean of the Faculty of Science there from 1982 to 1986. In preparation for ministry, he read theology at Lincoln College, Oxford, graduating in 1953. A year later, however, he became convinced that his calling was to physics. Burge is a member of the Anglican Church in the Diocese of Gloucester and is the author of several books on private and public prayer.

The goal of his book is to argue the case that modern scientific knowledge does not conflict with core Christian beliefs. The first four chapters (49 pages) discuss biblical evidences, the next six chapters (35 pages) treat physical, geological and biological evolution, concluding with an up-to-date creation story (chapter 10) which may be worth the price of the book all by itself. Chapters 11 through 18, (95 pages) return to the Bible and philosophical issues, miracles, personhood, prayer, etc. Two brief mathematical appendices on radiocarbon dating and the ages of rocks conclude the volume.

The book has three significant problems. First, Burge has tried to include far too much material. As a result, many topics receive only a sentence or two, where several pages might well be employed to explore all the complexities. Second, he takes only one view of many contentious issues, "This is the way it is and therefore ..." Third, both of these flaws are exacerbated by the lack of notes. The bibliography is short—only three pages, and is of little help in this regard.

In sum, I cannot recommend this book for a personal library. But if you find it in a public library, be sure to read chapter 10!

Reviewed by John W. Burgeson, Rico Community Church, Rico, CO 81332.

THE BEAST IN SHEEP'S CLOTHING: Exposing the Lies of Godless Human Science by David Michael Lindsey. Gretna, LA: Pelican Publishing Company, 2005. 400 pages, notes, bibliography, index. Hardcover; \$24.95. ISBN: 1589802888.

A better subtitle for this volume might read: "A Discussion of errors made by non-Christians." Lindsey, who holds undergraduate degrees in both biology and chemistry, claims that the second beast of Revelation is "godless science." He addresses four topics: the story of philosophy, evolution, psychology, and evidence for the divinity of Jesus. A Catholic fundamentalist, he is fond of the pejorative adjective (the "degenerate" Diogenes, the "quack" Mesmer, the "fairy tale" of evolution, etc.) and this tone distracts one who is trying to understand and evaluate his claims.

Chapter 1, on philosophy, gives a sweeping overview of almost every philosopher of note (for some reason he

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did not mention Pascal), separating the “good guys” from the “godless.” The “godless” are almost always characterized by moral failings. Their motivation is always that “they hate God.”

Chapter 2, “Darwinian Evolution, a Fairy Tale for Unbelievers,” points out “eight fallacies.” In order, these are: (1) Life originated all by itself for no purpose; (2) Mutations are good; (3) Life’s only purpose is replication; (4) Those who produce the most offspring are the most fit; (5) Given enough time, anything is possible; (6) Ontogeny recapitulates phylogeny; (7) Homologous features prove common origin; and (8) The fossil record proves evolution. Lindsey, despite his science degrees, does not appear to understand the proper use of the word “prove.” To his credit, he accepts long ages of the earth and universe and gives the young earth creationist movement no credence.

Chapter 3, on psychology, is one long *ad hominem* argument against Freud, Jung, and Joseph Campbell. Behaviorism, also, along with its advocates, comes under his sharp pen. For example, Lindsey writes, commenting on Freud’s death: “It is just and right that Freud should die of oral cancer because ... so many malignant lies against God came out of his mouth” (p. 245). Among his claims is that “... Freudian Psychoanalysis is the dominant secular religion within the profession of mental health today” (p. 245). However, the basis for that claim is a 1974 citation.

Chapter 4, “Evidence that Demands a Verdict,” is the most interesting, for it gives insight into the fundamentalist Catholic world view. Lindsey makes many claims here, such as, demon possession is real. He thinks that most persons demon-possessed fully consent and thus show no outward signs, that there are scientifically verified cases of possession and exorcisms, that observed attributes of the possessed include speaking in unknown languages, tremendous body strength, foul odors, knowing secrets, levitation, and so forth. He “proves” that the devil exists by pointing to coincidences, the events of 9/11/2001 (911 is an emergency phone number), the first workable PC, the Apple, priced at \$666.66 (I note here that the Apple was preceded by the IBM 5100, a much more likely candidate for the first such machine). Other such numerics are discussed, but he makes his strongest claims for “... the many prophecies and warnings of the Blessed Virgin Mary” (p. 290). In particular, he claims that the 1,846 prophecies in La Salette, France, and the 1,917 prophecies in Fatima, Portugal, have been 100% accurate.

After a discussion of biblical evidences, he claims that dead persons have been raised many times, with “documented evidence” that these miracles actually happened. He claims there are many Christians who have died yet their bodies have not decayed. His list of these (p. 308) totals over seventy persons, the latest, Charles Makhlouf, dying in 1898. He claims the scientific sureness of sacred stigmata, for miracles involving the Eucharist, one as recently as 1991, when a communion host began to bleed. Finally, he presents the Turin shroud, claiming scientific evidences to its authenticity. He also claims that ESP and other paranormal events are real and can be scientifically “proven.”

What will I do with this book, which presents data and arguments for which I find little credence? I shall keep it—next to the books of Duane Gish and Henry Morris.

I recommend it only to those who have an interest in other belief systems.

Reviewed by John W. Burgeson, Rico Community Church, Rico, CO 81332.



HISTORY OF SCIENCE

VICTORY AND VEXATION IN SCIENCE: Einstein, Bohr, Heisenberg, and Others by Gerald Holton. Cambridge, MA: Harvard University Press, 2005. 229 pages, index. Hardcover; \$35.00. ISBN: 0674015193.

Holton is a member of the physics and history of science departments at Harvard. He has written extensively on the history of physics and is probably best known as an Einstein scholar. In the 1960s, he helped develop the *Project Physics Course* and more recently coauthored the textbooks *Physics, the Human Adventure* with S. G. Brush and *Understanding Physics* with D. Cassidy and J. Rutherford.

Holton’s most recent book is a collection of fourteen essays based on earlier publications and presentations. As described in the preface, the emphasis of many chapters is on “the larger contexts within which a specific research result is obtained, above all the context of personal interactions that can lead either to success or disagreement, to victory or vexation.” Most of the chapters are about historical topics (four of those are related to Einstein). The last four chapters are about current issues, but those are also placed in historical context. There are occasional cross-references between chapters, but the essays are mostly self-contained.

In Chapter 10, Holton reviews his approach to the history of science, which he calls “thematic analysis.” He explains how he moved away from early influences toward positivism by what was called the “Vienna Circle in Exile.” Although scientists usually only discuss the phenomenological and analytical components of their work when presenting it publicly, their presuppositions can be important in the private phase of their work. Holton has used this third component to better understand the work of many scientists. He claims that modern scientists have been committed to a relatively small number of “themata,” concepts such as simplicity, causality, and reductionism. Since many of these commitments do not change, Holton believes that science advances through evolution rather than by revolution.

The essays on the history of science contain insightful chemical analysis. The passages about Holton’s interaction with many of the important figures are the most interesting. For example, he describes how he worked with Helen Dukas, who served as Einstein’s secretary for twenty-seven years, to archive Einstein’s papers after his death. It was an encounter between Holton and Heisenberg that led him to study the interactions between Einstein and Heisenberg over quantum mechanics. Holton also knew B. F. Skinner, P. W. Bridgman (his doctoral advisor), and Paul Tillich as colleagues at Harvard and worked with I. I. Rabi on the Project Physics Course.

There is just one chapter where Holton misses the mark. His strong criticism of Michael Frayn’s play *Copenhagen* is misguided. Somehow he missed that the main

theme of the play is uncertainty, especially about people's motives. Instead, he seems to think that Frayn endorsed Heisenberg's version of what happened during his 1941 meeting with Bohr.

The four essays on current issues offer some interesting perspectives. Holton's discussion of a justification for basic research is a good start. He calls for a concentration of resources in areas that are likely to serve national needs, but he does not discuss the difficulty and politics of deciding what those areas are. Holton explores the roots of the postmodern "war on science" by studying two historical incidents of Romantic revolts against science. An essay based on how different perceptions of what is good science affect the careers of women in science is thought-provoking. For example, research by Holton and his colleagues found that women tend to place more value on comprehensiveness and to have fewer publications. Finally, Holton advocates teaching science in a way that makes connections with other fields, which is an approach that he used in his own textbooks.

Victory and Vexation in Science provides some revealing glimpses into the work of several scientists. Anyone who reads this book will be impressed by the breadth of Holton's research. The only drawback of this breadth is that it resulted in a book that lacks a sharp focus.

Reviewed by Alan J. DeWeerd, Associate Professor of Physics, University of Redlands, Redlands, CA 92373.

MAIMONIDES by Sherwin B. Nuland. New York: Schocken Books, 2005. 234 pages, appendix, chronology, bibliographic notes. Hardcover; \$19.95. ISBN: 0805242007.

Nuland is a clinical professor of surgery at Yale University. He is the author of nine previous books, including *How We Die: Reflections on Life's Final Chapter*, which spent thirty-four weeks on the *New York Times* best-seller list and won the National Book Award.

Moses Maimonides (1138–1204) was arguably the greatest rabbi since Gamaliel, the teacher of the apostle Paul. The Maimon family (Maimonides is the Grecianized form of the name) lived in Spain, until Moses was thirteen years old. His father, Rabbi Abraham Maimon, moved the family to Morocco when a new Muslim dynasty less friendly to Jews conquered Spain. There Maimonides began to write a variety of apologetical and theological works. In 1168, after a dangerous escape from Morocco, the Maimon family settled in Egypt. There Maimonides, already well-known and respected for his learning amongst the Jews of the Mediterranean world, acquired even greater stature through the works for which he is most noted, viz, a *Commentary on the Mishnah*, the *Mishneh Torah*, and *The Guide for the Perplexed*. In mid-life he became a noted physician, rising to the position of court physician to the Sultan in Cairo. In later life he wrote several medical treatises. Moses Maimonides died in Egypt at the age of 66.

I chose to review this book hoping to learn more of Maimonides' efforts to reconcile his faith, Talmudic Judaism, and science in his day, the science of Aristotle as known in Arabic translation. While Nuland's writing is direct and clear, I was disappointed to find that he had very little to say about *The Guide to the Perplexed*, where

Maimonides deals with scientific issues. It is perhaps only natural that a Jewish physician like Nuland would emphasize Maimonides' contributions to Jewish thought and to medicine; still, I would have appreciated more on Maimonides the man of faith interacting with the challenges of science.

This book might be a good preliminary read for anyone intending to read *The Guide for the Perplexed*. In itself, the book has little or nothing to offer the Christian dealing with the same intellectual difficulties Maimonides faced.

Reviewed by Robert Rogland, science teacher, Covenant High School, Tacoma, WA 98405.

THE CHURCH AND GALILEO by Ernan McMullin, ed. Notre Dame, IN: University of Notre Dame Press, 2005. 391 pages, bibliography, index. Hardcover: \$60.00; paperback: \$30.00. ISBN: 0268034834 (cloth); 0268034842 (paper).

The Church and Galileo is a collection of thirteen papers from a major conference on Galileo and the Church held at Notre Dame University in April 2002. The editor, Ernan McMullin, is John Cardinal O'Hara Professor Emeritus of Philosophy at the University of Notre Dame. McMullin is widely acknowledged to be the dean of Galileo scholars in the United States.

The book is organized chronologically. Part I, *The Storm Gathers*, contains two essays laying out the Church's developing hostility toward Copernicanism prior to the publication in 1610 of *The Starry Messenger*, Galileo's account of his telescopic discoveries. In this work, which was widely read in Italy and elsewhere in both Catholic and Protestant Europe, Galileo argued strongly that his observations were demonstrations of the truth of Copernicus's heliocentric views and a refutation of the geocentric system of Ptolemy.

Part II, *The Storm Breaks*, contains seven essays covering various aspects of the twenty-three years from the publication of *The Starry Messenger* and his trial for heresy in 1633. Part II deals with the political landscape in Italy prior to 1616, when Galileo was formally enjoined not to teach or hold to the cardinal doctrines of Copernicanism; with Galileo's efforts to show how Copernicanism could be reconciled with Scripture properly interpreted; with the details of the 1616 injunction and with Galileo's obedience or disobedience to that injunction (a matter of debate); and with his trial in 1633. Part II also offers analysis and critique of the Church's later response.

Part III, *The Aftermath*, contains four essays. One deals with Galileo's "relapse," the publication of his *Letter to the Grand Duchess Christina* (widely circulated by 1616 but not actually published), in which he argues for his view of the relationship between science and Scripture. Another essay describes censorship of astronomy in Italy, recounting the Church's two centuries-long coming to terms with Copernicanism. The last two essays deal with twentieth-century efforts by the Church to "rehabilitate" Galileo while dispelling "the Galileo myth," i.e., the Catholic Church's belief that there was no real warfare between science and religion behind the Galileo affair, only misunderstanding on both sides.

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Unless the reader has an interest in the history of science, this book is too expensive to purchase. Most of the essays will be appreciated only by those already intrigued by the Galileo affair. But if you can find *The Church and Galileo* in your library, by all means read chapter 4, "Galileo's Theological Venture," by McMullin. You will find that Galileo's attempt to reconcile the results of observation and experiment with the text of Scripture was, *mutatis mutandis*, similar to the efforts of evangelicals in science today. In the *Letter to Castelli* and, most importantly, the *Letter to the Grand Duchess Christina*, Galileo advocated two approaches toward reconciling science and Scripture when they seem to be in conflict. He maintained that sometimes Scripture speaks of natural phenomena in language accommodated to the experience and understanding of the layperson and has nothing to say about the true nature of things. Galileo affirms that, in other instances of apparent contradiction, Scripture does indeed make statements regarding the true nature of things. In such cases, provided that the results of observation and experiment are conclusive, he urges us to look beyond the conventional or easy reading of Scripture for an alternative interpretation. He sets the bar high for the latter approach, affirming that we should always accept the traditional theological interpretation unless there is a genuine demonstration that contradictory scientific propositions are true. Contemporary evangelical scientists who have wrestled with hot-button topics like the age of the earth, evolution, and cosmology will resonate with Galileo's efforts; they may even find help to resolve tensions in their own thinking.

Theologians in Galileo's day did not take kindly to being lectured on how to interpret the Bible by a professor of mathematics. Evangelicals in science today may identify with that experience, too.

Reviewed by Robert Rogland, science teacher, Covenant High School, Tacoma, WA 98405.



ORIGINS & COSMOLOGY

THE ANCESTOR'S TALE: A Pilgrimage to the Dawn of Evolution by Richard Dawkins. New York: Houghton Mifflin Company, 2004. 614 pages, notes, bibliography, index. Hardcover; \$28.00. ISBN: 0618005838.

With this book, Richard Dawkins replaces the late and lamented Stephen J. Gould. His writing is dramatic, argumentative, humorous, even poetic. He connects "wonder" to the evolutionary story in a way which inspires. His peculiar views on religion should not place an obstacle to Christians (or anyone else) from enjoying this book. Generally, he refrains from expounding his philosophy. In one instance (p. 550), he quotes Kenneth Miller (Brown University), a dedicated Christian, with approval as he finds agreement with him in their distaste for Intelligent Design Theory.

The book is an expanded "just so" story in the tradition and structure of Chaucer's *Canterbury Tales*. Dawkins describes evolution in a series of over fifty "tales," told by the farmer, the Neanderthal, the gorilla, the mouse, the Galapagos finch, the grasshopper, the sponge, and many other characters. He brilliantly conceived this book as a

backward trek in time, beginning with us, and including other lines of descent as we encounter them in a trip to the past.

He begins by talking about hindsight, a position often assumed by historians in which one's appetite for patterns and propensity to see the present as the inevitable result of the past sometimes blinds them to the fact of contingency—a random change in the past could have changed the present immeasurably. Dawkins argues that biological evolution has no privileged line of descent or designated end; in this, of course, he writes from his underlying non-theistic philosophy. There are those who argue differently, but this is not their story.

At some point in history, there must have existed a common ancestor of both humanity and any other species one might think of—aardvarks, for instance. Dawkins coins the word "concestor" for such beings; the oldest concestor is the ancestor of all life forms that have ever existed on Earth, present and extinct. Moreover, at some time in the past, there must be a moment when two animals of the same species existed: one of whom is the ancestor of all humans and no aardvarks; the other an ancestor of all aardvarks and no humans. Any two modern species can be substituted in the above statement; it remains true.

The book is a series of forty "rendezvous," each with a different concestor. Something special, perhaps the origin of language, happened 40,000 years ago. But *Homo sapiens'* most recent common ancestor, discussed at rendezvous 0, is earlier. The date is in controversy but is at least tens of thousands of years ago and perhaps as much as hundreds of thousands. "Adam" and "Eve" actually existed, but they probably lived many thousands of years apart!

At rendezvous one, about six million years ago, we meet concestor one, our 250,000-greats-grandparent. From the loins of this person(?) have come not only all the hominid lines (us, *Neanderthal*, *Homo Erectus*, etc.) but also chimpanzees and bonobos. What did our ancestor look like? You will have to read Dawkins (p. 102) for his answer.

Each of the rendezvous points is fascinating in its own right. From concestor two, seven million years ago, came humans, chimps, bonobos, and gorillas. From concestor 10, mice and rabbits. From concestor 18, lungfish. From concestor 31, eight hundred million years ago, the sponge. Plants at rendezvous 36; eubacteria, at 39. The unity of all life is described by a masterful storyteller. At rendezvous 17, Dawkins talks about "the tyranny of the discontinuous mind" (p. 300). Ernst Mayr blames this delusion (Plato's *Philosophical Essentialism*) as the primary reason why evolutionary understanding came so late in our history, and why the Institute of Creation Research's arguments continue to flourish in the face of so much contrary evidence.

At the close, Dawkins returns to his philosophical base. He writes:

My objection to supernatural beliefs is precisely that they miserably fail to do justice to the sublime grandeur of the real world. They are ... an impoverishment ... I suspect that many who call themselves religious would find themselves agreeing with me.

Most ASAers probably agree. Most would also comment that it is Dawkins who labors in impoverishment.

Finally, a closing note. Using reasonable assumptions, any human born today has about an 80% chance of eventually becoming a common ancestor of all humanity! Dawkin's discussion of this is priceless. Read it.

Reviewed by John W. Burgeson, Rico Community Church, Rico, CO 81332.

EVOLUTION VS. CREATIONISM: An Introduction by Eugenie C. Scott. Berkeley, CA: University of California Press, 2004. 272 pages, index. Paperback; \$19.95. ISBN: 0520246500.

Scott is a Ph.D. physical anthropologist and Executive Director of the National Center for Science Education (NCSE). She has written extensively on the evolution/creationism controversy, is a Past President of the American Association of Physical Anthropologists, and has been involved as head of NCSE since 1987 in debates, education efforts, and court cases involving different forms of creationism. This well-conceived and written text provides a comprehensive survey of contemporary evolution and the varied positions within creationism writ large.

As head of the NCSE that was founded to defend and promote evolution across the US, Scott lays her cards clearly on the table. At the same time, she seeks to fairly describe the views of scientists and others who would disagree with her own position and includes meticulous documentation for claims she makes about the views of others. She has fact-checked numerous assertions with individuals knowledgeable about the matter in question in addition to citing published literature.

Scott separates the various forms of belief that scientists and others hold regarding creation/evolution and introduces the reader to the following helpful continuum: Flat Eartherism, Geocentrism, Young Earth Creationism, Gap Creationism, Day-Age Creationism, Progressive Creationism, Evolutionary Creationism, Theistic Evolutionism, Agnostic Evolutionism, and Materialist Evolutionism. She correctly points out that one can find persons with scientific credentials within each of these "camps," though the number of such scientists grows considerably scarcer once you move past Evolutionary Creationism into Progressive Creationism. An authority on the history of the creation/evolution controversy in the US, she informs readers of the interconnections between and among spokespersons and organizations.

Scott describes and then provides refutation for assertions made by individuals opposed to some or all elements of contemporary evolutionary theory and research. Like all good scientists, she acknowledges that evolutionary theory and research will continue to change and our understandings improve over time. Many readers of *PSCF* will undoubtedly part company with Scott on certain points; however, she does a fine job showing the religiously motivated and metaphysical rationales and assumptions that lie behind some views promulgated in opposition to standard evolutionary theory. She realizes that religious beliefs are important to those who hold them and that such beliefs need not automatically conflict with contemporary understandings of the scientific community, including evolutionary biology, geology, etc.

Regardless of one's personal perspective, this book is a valuable contribution to the literature in evolution and creationism. Virtually any reader will find something of interest within its pages. It will surely raise the dander of some and bring delight to others—a quality possessed by many a good book.

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CREATION OUT OF NOTHING: A Biblical, Philosophical, and Scientific Exploration by Paul Copan and William Lane Craig. Grand Rapids, MI: Baker Academic Books, 2004. Paperback; \$19.99. ISBN: 0801027330.

This is an important book. The doctrinal belief that God created the universe out of nothing, *creatio ex nihilo*, has been held in disrepute for a long time in many theological and academic settings. Three main objections are often raised: (1) that the biblical texts do not clearly teach that God created out of nothing; (2) that this teaching was the creation of theologians in the late second century AD; and (3) that scientific study makes it difficult to believe in creation out of nothing. The great achievement of this book is that the authors give a detailed analysis of these objections and answer them.

Concerning the first objection, Copan and Craig show that the biblical writers consistently maintain an ontological distinction between God and the created universe. Genesis 1:1 refers to the totality of God's creation and must be read in an absolute sense ("in the beginning") rather than as a temporal construct ("in a beginning"), which leaves no room for pre-existing matter. God created all matter that exists, everything that is external to himself. A strong cumulative case is made for creation out of nothing. While there is no direct statement that covers the entire concept, the contingency of the created order is affirmed in passages that indicate God's creative act and God's sustaining care. "Creation out of nothing is thus taken for granted and strongly implied in the OT."

A detailed study of key New Testament passages follows, and these declare that God (through Christ) created everything, presenting a strong, if implicit, belief in creation out of nothing. Their examination is thorough, including the problem passage 2 Peter 3:5. Then they study the extra-biblical witness of the ancient Jewish writers and early Christian writers. The pre-Christian Jewish sources affirm, often explicitly, that God alone created the world by his Word, calling the created realm into existence from nothing. The evidence presented overwhelmingly answers the objection that creation out of nothing was an idea first proposed in the late second century AD. The authors then move into a detailed examination of the early Christian writers. They conclude that even if the Patristics "did not use the precise words 'creation out of nothing,' it is undeniable that the concept is in their worldview and writings."

Then Copan and Craig give a couple chapters of philosophical analysis to clear away conceptual difficulties, and offer responses to problems raised by questions about God's relationship to so-called abstract objects. My only criticism concerns one small part of their argument against

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Philip Quinn, which comes in their discussion of occasionalism. Quinn maintains that God can create one and the same individual more than once, and appeals to the doctrine of eschatological resurrection for support (p. 155). Copan and Craig's response, on this one point, seems problematic. Yet move on to chapter six, where there is an argument for the impossibility of the existence of an actual infinite. This is significant, because if there can be no actual infinite, then the universe had a beginning. But is there any empirical evidence that would confirm this argument?

Two separate lines of evidence are examined. The expansion of the universe, the standard Big Bang model, describes a universe that is not eternal in the past. They note the efforts to promote alternative models and discuss the reasons why those have not succeeded. Secondly, they note that when the so-called second law of thermodynamics is applied to the entire cosmos, the conclusion that the universe will run out of available energy is unavoidable, which points to a finite universe. But some theorists have proposed other models in an effort to avoid that conclusion. Each of these, however, have attendant difficulties. "Because these lines of evidence are independent and mutually reinforcing, the confirmation they supply for a beginning of the universe is all the stronger." Thus, "those who believe in the doctrine of *creatio ex nihilo* will not find themselves contradicted by the empirical evidence of contemporary cosmology." And so another objection is answered. While ongoing research will make us revisit the question, there is sound reason for noting that this doctrine is in accord with the physical evidence.

In conclusion, this book is a major achievement. It goes far toward rehabilitating the doctrine of *creatio ex nihilo*, and deserves a wide readership.

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PHILOSOPHY & THEOLOGY

THE MYTH OF RELIGIOUS NEUTRALITY: An Essay on the Hidden Role of Religious Belief in Theories (Revised Edition) by Roy A. Clouser. Notre Dame, IN: University of Notre Dame Press, 2005. 416 pages. Paperback; \$25.00. ISBN: 0268023662.

Most people working in the humanities are aware, perhaps painfully, that the world of academia has taken a postmodern shift in recent decades, and for many good reasons. If postmodernism goes too far, scientists often remain oblivious, continuing in the view that science is objective and neutral, and therefore unaffected by world-view or religious belief. For this reason, the new edition of *The Myth of Religious Neutrality* should be considered a welcome volume for Christians who are in the sciences and especially those who recognize the important role religion can play in science. *Myth* forcefully argues for its major thesis that scientific theorizing in all areas of academia inevitably depends on foundational religious beliefs, and the revised edition updates the arguments to reply to feedback since the original version was published.

Clouser begins the book by engaging in the foundational discussion of defining terms, such as "religion" and "theory." The main thesis begins in Chapter 2 with a care-

fully argued section, concluding that a religious belief is "a belief in something as divine per se no matter how that is further described, where 'divine per se' means having unconditionally non-dependent reality" (p. 23). A religious belief is then any belief about this non-dependent entity, or its relation to entities dependent on it (p. 24). Clouser argues that this definition seems to cover all cases of religion of which he is aware, and covers other positions not traditionally thought of as religious, such as materialism. Indeed, he argues, no system of thought can be viewed as free from something that is divine per se (pp. 29ff).

Clouser begins part II with a chapter on "What is a theory?" Central theses here are that all theorizing involves abstraction (p. 64), and that scientific theories focus on entities rather than general perspectival claims (p. 77). The abstraction, in which we rationally abstract a particular aspect or property of a thing in order to theorize about that aspect, in particular can lend itself to reductionism. In chapter 5, Clouser considers different possible relations between theories and religion, including "religious irrationalism" (p. 89), "religious rationalism" (p. 92), "religious scholasticism" (p. 98), and "the radically biblical position" (p. 84). By the latter, he means that which the biblical writers held, and indeed the one we should hold, a view which he finds in contrast to influences from the rationalist tradition. In chapter 6, he uses these categories to reveal what he calls the "mistake of fundamentalism" in how religious beliefs affect theorizing, the view that "sacred scripture ... contains inspired and thus infallibly true statements about virtually every conceivable subject matter" (p. 111). This sets the stage for a discussion of the Genesis creation story in this same chapter.

To illustrate his claims in the preceding chapters, in the first three chapters of part III, Clouser offers casebook studies in mathematics, physics, and psychology. It would probably not be surprising to most scientists that religious beliefs play a role in our theories about psychology, but here we find that physics is not immune, nor is even mathematics! In the final chapter in this section, Clouser outlines why his argumentation to this point calls for a "new beginning" in our understanding of science and religion. After making his case against reductionism, in the important part IV, Clouser lays out his positive framework for a non-reductionist approach to theorizing.

While this review is of necessity all too brief and does not really reveal the essence of the arguments, *The Myth of Religious Neutrality* has much to commend itself. If it has a weakness, it is perhaps that close attention need be paid, and hence quite some labor spent, to appreciate the arguments in many parts. But such is philosophy. Certainly philosophers will enjoy reading the revised edition, perhaps comparing their own views with Clouser's, or seeing whether he has anticipated their objections. But I particularly recommend a serious consideration of the book to scientists. Assuming Clouser is correct, we need to take his view into account not only when considering our own approach to science, but also how we discuss our science with those outside the Christian faith. Apparently religion is unavoidable when doing science, and we would be much the better for recognizing how, rather than ignoring such an important fact!

Reviewed by Donald N. Petcher, Department of Physics, Covenant College, Lookout Mountain, GA 30750.



RELIGION & BIBLICAL STUDIES

LIVING THROUGH PAIN: Psalms and the Search for Wholeness by Kristin M. Swenson. Waco, TX: Baylor University Press, 2005. 273 pages. Hardcover; \$19.95. ISBN: 1932792155.

Swenson hopes her book will induce in readers a feeling of "stepping into a steaming hot tub full of interesting people, easing aches and promising thought-provoking and engaging conversation" (p. 2). She writes that her book is not a treatise on how the Bible or medicine may cure pain. It is also not an apologetic or theodicy on the *why* of pain. It is about unwelcome pain and the efforts to mitigate or manage it (p. 3). It deals with both physical and psychological pain, because, for many people, the emotional pain accompanying physical pain can exceed it.

Swenson is assistant professor of religious studies at the School of World Studies at Virginia Commonwealth University. Her book includes nine chapters, Psalms translations, endnotes, and works cited; it is not primarily for biblical scholars or religious people. Her topic is timely because there is an increase in reported pain in the USA (p. 4). This book is more about healing than curing pain. Integrating the physical, psychological, spiritual, and social aspects of a person is important in pain relief.

Here are some salient facts about the yearly cost of pain in the USA. One hundred billion dollars is spent on pain relief; 13% of the workforce experience reduced productivity; 86 million people cannot work; pain results in 70 million visits to doctors; employer costs of nearly \$6,000 per fibromyalgia employee; and 24% of the population suffers chronic pain.

The Buddha said, "All life is suffering" and R. W. Emerson observed that "He has seen but half the universe who has never been Shewn the house of Pain." Two primary considerations with pain and suffering are the theoretical, i.e., why do they exist, and the pragmatic, what to do about them. This book deals with the latter. The author seeks, as an Old Testament scholar, to apply to pain wisdom derived from analyzing six Psalms (6, 22, 38, 69, 88, and 102): "Listening to these ancient poems may round off the cruel edge of loneliness that pain can bring" (p. 6). About two-thirds of the book is devoted to an analysis of these six Psalms. In this analysis, she rejects the idea that the Psalms have "cures hidden or encoded within the text" (p. 69). Therefore, her approach differs from the application of drugs, surgery, or physical therapy; she seeks a different avenue to deal with pain's experience and management.

Swenson shows how experience alters pain perception through this illustration. An ancient story tells of a mother whose child has died. She brings the child to a holy man and asks for medicine to restore life. The holy man sends her to find a curative mustard seed. As the woman goes from house to house, instead of finding a panacea, she finds everyone experiencing pain. In the process, her pain is healed and she helps others.

This book may be helpful to those who suffer acute or chronic pain, those who wonder how ancients thought

about pain, and those who seek to grow spiritually through pain.

Its lack of dogmatism and of pat answers is a strength which will buttress the reader against easy answers to difficult questions. The greatest philosophical question is why is there any suffering in the world. The question is not dealt with in this book, for alas, there is no answer that satisfies most sufferers. However, Swenson does an admirable job of dealing with the practical implications of how certain Psalms reflect on pain.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

ENGAGING WITH CONTEMPORARY CULTURE: Christianity, Theology and the Concrete Church by Martyn Percy. Burlington, VT: Ashgate Publishing Company, 2005. 258 pages, index. Hardcover; \$79.95. ISBN: 0754632598.

This collection of essays by Percy, the Principal of Ripon College in the UK, takes up questions about the role of the church and theology within contemporary Western culture with a particular focus on the US and Europe. Percy argues that practical theology, i.e., a critical and constructive engagement by a living religious community with human experience that reflects on its meanings and value, is fundamental to a sustained and informed interaction and ministry in and to the modern world. Through the methods of cultural studies, he seeks to explore the different meanings and interactions of churches and Christians with the varied aspects of contemporary culture. This is one of several books he has authored in this area; it demonstrates his deepening insights over time and his passion for his subject.

The first section looks at general beliefs about theology, the Church, and contemporary culture. His opening chapter is a study of the reflections of four Roman Catholic writers concerning contemporary culture in North America: Francis Buckley, Anthony Gittins, John Fuellenbach, and Nicholas Healy. A second chapter moves the inquiry to a church in Atlanta, Georgia, and considers issues about consumerism, choice, and Christianity. The third chapter takes up the Radical Orthodoxy of John Milbank, the reflexive theology of Lieven Boeve, and the socio-theology of David Martin.

The middle section of the book considers ordinary theology through case studies that focus on describing faith, theological knowledge within the pews, the concept of a mother church, transformation, liberation, vocation, and Christian formation. The final section of the book looks at issues related to theological culture and the concrete church, i.e., the church as actually lived in practice, not as theologians or others construct it in creedal formulas, doctrinal expositions, and ecclesiastical pronouncements. It includes a case study of the so-called "Toronto blessing," a sociohistorical look at reform within the Church of England, and an illuminating essay on Anglicanism as irony and comedy in the full sense of theater. A concluding chapter provides some reflections on authentic engagement.

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The book is worthwhile for those who wish to consider varied aspects of the contemporary Church as it engages with the wider culture and as it reflects or is shaped by that culture as well as when it resists that culture and its messages and values.

Reviewed by Dennis Cheek, Vice President of Education, Ewing Marion Kauffman Foundation, Kansas City, MO 64110.

PRAYERS TO AN EVOLUTIONARY GOD by William Cleary. Woodstock, VT: SkyLight Paths, 2004. 208 pages. Hardcover; \$21.99. ISBN: 1594730067.

This book is, unfortunately, what might be expected from the title. I had hoped for some sort of acknowledgment of evolution as a (or the) mechanism God used to bring about the diversity of life on earth, combined with reverence for the Christ. But that is not this book. Cleary writes:

The promise of a messiah as savior of the world was a brilliant invention of the ancient Jewish writers. To dedicate oneself to the welfare of others is a healthy human ideal for everyone—and devotees of all the Abrahamic religions are called on to be deeply messianic in their personal lives. Today we know it is not sin that any messiah must save us from, but above all from the catastrophic loss of the entire human habitat (p. 90).

The author was a Jesuit priest, but is no longer. This is not surprising as, I believe, the formal name of the Jesuits is Society of Jesus. The book is, as the title suggests, a collection of prayers written by Cleary. There are about one hundred prayers, averaging perhaps twenty lines. Each prayer is accompanied by a brief explanation. The prayers are grouped into Prayers of Listening, Questioning, Ambiguity, and Intimacy. The index gives the titles of the prayers.

Here is a sample prayer, from the section on “Prayers of Ambiguity,” selected for its brevity:

Your Joy, Your Wrath—Mystified by Good and Evil
Holy Energy and Love,

we join in your joy
over the pleasure that thrives in the hearts and bodies
of so many living creatures.

Holy Caringness and Wisdom,
we join in your wrath
over the abuse of the vulnerable in this world
and of the vulnerable earth itself.

Holy Spirit of wisdom, energy, and love,
draw us into communion with you
as we live through the mysteries of evil and good
that surround us every day.

Amen (p. 111).

Most Christians could join in this prayer. Cleary makes some telling points. Some Christians ignore the environment, do not relish the glory of God’s creation, have childish views of God, and reject the findings of science. Cleary does not do any of these, but he is influenced by questionable sources. His main influences are Diarmuid O’Murchu (author of *Evolutionary Faith: Rediscovering God in Our Great Story*, and a priest, who wrote the Afterword) and Pierre

Teilhard de Chardin (Jesuit scientist whose works were officially declared to contain “dangers” in 1962—one danger being his disbelief in original sin). Cleary rejects original sin in humans. To him, all babies are perfect at birth.

Here is a quotation from O’Murchu’s Afterword:

Destruction is thus neither an aberration nor an evil; it is an inherent dimension of the cosmic evolutionary process. Pain and destruction are not about creation existing “at a price,” nor can they be adequately explained by invoking a central tenet of Darwinian evolution like the survival of the fittest. This is a paradox that defies a one-dimensional rational explanation. Truthfully, it makes sense only in a theological and spiritual context.

A religion like Christianity, centered on the salvific death of the Christ as the ultimate solution to the predicament of suffering, misses the deeper meaning of this paradox (p. 173 of Cleary).

In this review, I criticize the intention of the author, and his main influences, rather than how well that intention is achieved. Perhaps the historic Christian faith could stand some mutation, so that ideas about quantum theory and evolution might be accommodated, but Cleary wants it to change Christianity into a new species.

Reviewed by Martin LaBar, Professor of Science emeritus, Southern Wesleyan University, Central, SC 29630.

OUR IMPROBABLE UNIVERSE: A Physicist Considers How We Got Here by Michael Mallary. New York: Thunder’s Mouth Press, 2004. 227 pages. Paperback; \$15.00. ISBN: 156858301X.

Mallary is in love with the universe, and whether you are a theist or an atheist, he thinks you should be, too. Whether God exists or not, writes Mallary, humans should cherish the improbability of life on this remarkably fecund planet. “It is astounding that we live in a universe in which particles can spontaneously organize into people and other incredible beings” (p. 2).

Mallary does not deny or affirm the existence of God. He thinks life and creation are inherently valuable; they do not need a creator to be justified (p. 178). “Whether we look to a creator or to a creative universe we see the same imperative: protect this creation and enjoy the show” (p. 205). “Over the last ten million years we have seen a fun-loving ancestral ape that lived in an African jungle evolve into fun-loving members of a world wide collective mind, economy, and ecosystem” (p. 154).

Is there a built-in bias in creation that reveals a designer’s taste? Perhaps, thinks Mallary. The artist’s signature on the canvas, the designer bias, may come from the existence of uranium which is unnecessary for the existence of a universe that evolves intelligence. Perhaps uranium exists “to allow incorrigible barbarians to eliminate themselves” (p. 15). However, Mallary does not think uranium or the complexity of creation proves the existence of the Master Watchmaker (p. 14).

Mallary espouses the view that our universe exploded from a tiny point at a moment called the Big Bang. He dis-

cusses the fourteen stepping-stones or properties in the universe essential to produce life. How did they come about? He writes:

Truly, the uncanny coincidence of all these factors seems to give the appearance of deliberate design ... But a deistic hypothesis is not the only explanation ... many scientists ... propose that this beneficent structure has been determined by a random unknowing process (p. 12).

Inflationary models hypothesize that "it is possible to imagine that at least one universe in a trillion trillion had just the right properties for life to evolve" (p. 13). The anthropic principle says the universe appears to be designed because botched universes are not observable to the inhabitants of the successful one. Based on this reasoning, a billion monkeys over a billion years might type out "to be or not to be." Theories of Everything say that a larger metauniverse has at least ten dimensions but only three spatial dimensions and one time dimension are manifested in any human's reality (p. 40).

Mallory offers a good many opinions (with accompanying rationale). For instance: (1) Many centers of intelligent life probably exist in our universe (p. 76); (2) the universe likely holds life which is advanced beyond earth's (p. 170); (3) fear of an angry god is not a sufficient reason for faking faith (p. 179); (4) the value of human life is not increased by increasing the population of the earth (p. 200); (5) humans will soon create biological life (p. 155); (6) people have instincts (pp. 110, 112. What Mallory calls instincts most psychologists call drives. Humans have no instincts).

Mallory presents many interesting observations. Among them: he thinks everything we see exploded from a ball the size of a grapefruit at nearly the speed of light around 14 billion years ago (p. 17). Galaxies in deep space are rushing away from the earth at nearly the speed of light (pp. 2, 17). The sea otter uses a pair of rocks as tools to crack open its shelled meals (p. 70). The nuclear energy in an ounce of uranium is roughly what could be obtained from burning thirty tons of coal (p. 73). The oldest evidence of life is found in rocks 3.8 billion years old (p. 77). To survive, the hummingbird must eat twice its body weight daily (p. 108). Bead necklaces became common 80,000 years ago (p. 137). The sun has a ten-billion-year life expectancy (p. 183).

I liked this book. Although readers short on knowledge of physics and contemporary views of origins may encounter occasional difficulty, overall they will be captivated by the broad sweep of hypotheses and explanations about how everything came to be. The book bristles with interesting questions and observations, and Mallory is not dogmatic about his views of them. Both theist and atheist will benefit from reading this book, and it will enhance their appreciation about the intricacies, balances, and options of creation viewpoints.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.



SOCIAL SCIENCE

HUMAN RIGHTS AND THE WORLD'S MAJOR RELIGIONS by Peter J. Haas, et al. Westport, CT: Greenwood Publishing Group, 2005. Five volumes; 1497 pages. Hardcover; \$412.50. ISBN: 0313021031.

In this set of books, one volume is written about the human rights of five major religions: Jewish, Christian, Islamic, Hindu, and Buddhist. The volumes intend to give the historic development and current status of human rights affairs in each religion. Each volume has a different author with William H. Brackney, the series editor and professor at Baylor University, contributing the one on Christianity. Included in each volume are primary sources, biographical sketches, indexes, notes, and annotated bibliographies.

The Jewish tradition concentrates on biblical and rabbinic writings and their implications for Jews, especially in Israel. The Catholic tradition covers human rights in the Catholic, Protestant, and Orthodox viewpoints with clarification of important terms and people. The Islamic tradition examines the requirements of both rights and duties in the world of Islam. The Hindu tradition contrasts human rights in Eastern and Western traditions while exploring principles and thoughts of Hinduism. The Buddhist tradition concerns itself with principles leading to decent, non-oppressive, cooperative societies where people can actualize their potentials.

These volumes are useful for the casual reader since each volume is carefully outlined and indexed to allow for quick location of specific topics. Especially interesting and potentially useful are the biographical sketches of Christian leaders in human rights. These include Dietrich Bonhoeffer, Emil Brunner, Francis of Assisi, Martin Luther King, Jr., and Desmond Tutu. I was somewhat surprised that Billy Graham, who has carried the message of tolerance and equality all over the world, was omitted. However, I was pleased to see Agnes Gonxha Bojaxhiu, better known as Mother Theresa, included. The price for this set is expensive; purchasers would most likely be libraries, teachers, or professionals.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

FROM CELLS TO SOULS—AND BEYOND: Changing Portraits of Human Nature by Malcolm Jeeves, ed. Grand Rapids, MI: Wm. B. Eerdmans Publishing Company, 2004. 266 pages, Paperback; \$29.00. ISBN: 0802809855.

"Who am I? What am I?" These enduring questions have been given new relevance and urgency by recent developments in genomics, cloning and the neurosciences that challenge the meaning of personal identity and our understanding of the biological basis of human nature. Furthermore, the advances bear a load of reductionism that is hard to avoid and also renew disagreements about body/soul and mind/body relationships.

This book addresses these issues through its goal of identifying those features that must be included in "any faithful portrait of human nature that is true both to sci-

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ence and to Scripture." It represents the work of an international, interdisciplinary team of thirteen scholars sponsored by the John Templeton Foundation. The sequence of chapters starts with genetics, neurobiology, and neuropsychology, then psychiatry and psychology, ending with philosophy, biblical studies, and theology (reversing their earlier dominance). Ample footnotes and nineteen figures are included.

There seem to be two main themes, the first of which responds to the first question above. *Who am I?* "I am a person." Person or personhood is in the title of seven of the main chapters and is discussed by most of the other authors. This is a complex and important concept the importance of which takes careful reading to grasp. Many current ethical problems turn on the issue of when we become, or cease to become, a person. Personhood develops gradually, partly in response to our environment, including our relationship with others around us. Indeed, central to any concept of personhood is an understanding of both personal relatedness (to others and to God) and personal agency (the ability to act and decide).

A second theme answers the other question. *What am I?* "I am a bio-psycho-spiritual unity." Several authors express this as "embodied spirituality." Or argue that humans *are* bodies, they do not *have* bodies; so also, they *are* souls, they do not *have* souls. They agree that there is no scientific evidence or biblical warrant for spirituality as a separate thing. This oneness of body and soul is expressed graphically in self-identity and spiritual suffering, the problems of which are experienced by Alzheimer patients. Furthermore, a continuing relationship between the dementia patients and other persons in their lives can be of great help in facilitating, remembering, and bestowing personhood. Spiritual awareness is also discussed as related to such topics as "possession," mental illness, hallucinations, and Christic visions.

The chapters on philosophy, biblical studies, and theology (though placed last) make significant contributions to the themes of personhood and unity and, furthermore, to the relevance of eschatology, the resurrection, the necessity of thinking from grace to nature and the interplay of divine sustenance, rescue, and ennoblement.

The most important part of the book is the last chapter in which Jeeves synthesizes the ideas from the other authors and carefully develops a composite portrait of human nature. On the basis of our present knowledge, how can we describe the relationship between brain and mind, or between soul and body? Jeeves suggests the phrase "an irreducible intrinsic interdependence." For the tension between the physical and the mental, neither of which can be reduced to the other, he reviews the discussions about nonreductive physicalism and then opts for "duality without dualism." These are carefully crafted phrases but not the final answer since they remain open to, and may actually stimulate, further research and careful study.

In my opinion, this book does indeed meet its goal. The team of authors was well selected and each described the current status of his area and considered the themes mentioned above. The last chapter with its integration of ideas is a special bonus. The absence of any index was frustrating, making the comparison of valuing views on a given topic quite difficult.

The book should be of interest to those in the specialties represented by the authors, particularly as a good introduction to the areas outside of their own expertise. It can be recommended to those in ethics, the humanities (including literature), and anthropology (cultural, biological, and theological). For example, I referred a journalist interested in science and religion to Eaves' chapter on twin studies. Those in ministry will find many helpful ideas. Other ASA members will find the cross-talk among those with varying points of view to be interesting.

Malcolm Jeeves, the editor, is emeritus professor of psychology at the University of St. Andrews and is the author of many scientific papers in neuropsychology as well as other books relating science and Christian beliefs. Two recent books are *Human Nature at the Millennium* (1996) and *Science, Life and Christian Belief* (with R. J. Berry, 1998). The other authors are Diogenes Allen, Warren S. Brown, Gaius Davies, Lindon Eaves, Joel Green, D. Gareth Jones, David Parkes, C. Michael Steel, Alan J. Torrance, Glenn Weaver, Michael Welker, and Philip H. Wiebe.

Reviewed by V. Elving Anderson, Emeritus Professor of Genetics, University of Minnesota, Minneapolis, MN 55455.

THE HAPPINESS HYPOTHESIS: Finding Modern Truth in Ancient Wisdom by Jonathan Haidt. New York: Basic Books, 2006. 284 pages. Paperback; \$26.00. ISBN: 0465028012.

This book on happiness joins several others written recently: *The Pursuit of Happiness* by ASA member David Myers; *Happiness Is A Serious Problem* by Dennis Prager (both books were reviewed in *PSCF*). Haidt, associate professor of psychology at the University of Virginia, has done research on morality and the moral emotions.

Martin Seligman, previous president of the American Psychology Association and founder of positive psychology, praises this book highly: "For the reader who seeks to understand happiness, my advice is: Begin with Haidt." *The Happiness Hypothesis* is about ten great ideas with a chapter devoted to each idea (the eleventh chapter is the conclusion). These ideas have come down from several world civilizations including India, China, and Mediterranean cultures. In this book, they are analyzed, along with their contemporary expressions, as to their accuracy and relevance. Endnotes and a substantial bibliography direct the reader to evidence and additional sources. Each chapter begins with quotes from such ancients as Epicurus, Buddha, Muhammad, and Heraclitus.

Unlike many self-help or how-to books, this one is based solidly on science. Empirical studies are sprinkled throughout. Haidt is active in the field of positive psychology which explores the avenues to happiness and meaning. In applying positive psychology, Haidt describes how the mind functions, how people interact, what causes happiness, how people grow and develop, and how people find meaning. Chapter 5 gives a formula for finding happiness (p. 91).

Along the way to supporting his hypothesis, Haidt includes many interesting findings. People are more likely to choose a mate, job, or hometown with a name similar to their own. The majority of people who receive a Christmas card from a person they do not know reciprocate. Bats

who regurgitate blood to share with genetically unrelated bats expect reciprocity. The brain uses 20% of consumed calories but accounts for only 2% of body weight. Humans are born “prematurely” in order for their brains to fit through the birth canal. Gossip about transgressions is ten times as prevalent as gossip about good deeds. Waitresses who mimic their customers receive larger tips. People who hold positive illusions about themselves are happier and better liked by others. A large majority of Americans rate themselves above average in virtues, skills, intelligence, driving ability, and ethics. Seventy percent of high school students rate themselves above average in leadership abilities, while only 2% rate themselves below average. Ninety-four percent of college professors think they do above average work. When husbands and wives estimate the percentage of housework each does, the total comes to 120%. The elderly who do volunteer work live healthier and longer lives.

This book has a lot of commendable features: it is interesting, witty, informative, scientifically based, relevant, readable, helpful, and religion friendly. It frequently refers to the wisdom of Buddhism, Hinduism, and Christianity, sometimes approvingly quoting Jesus or Paul. Haidt is a political liberal, semi-vegetarian, and Jewish atheist, but in this book he pushes none of these positions. Haidt supports his happiness hypothesis with the wisdom of the ages as seen through the lens of science. This results in a book which is uplifting and optimistic, something that might be expected from a psychologist who espouses positive psychology.

Reviewed by Richard Ruble, John Brown University, Siloam Springs, AR 72761.

AUTHENTIC FAKES: Religion and American Popular Culture by David Chidester. Berkeley: University of California Press, 2005. 294 pages. Paperback; \$19.95. ISBN: 0520232807.

Chidester, professor of comparative religion at the University of Cape Town, has written and lectured widely on how American popular culture counts as religion. He defines religion as “a point of entry into the meaning, power, and values at work in the production and consumption of authentic fakes in American culture” (viii). This book focuses on what is authentic. For example, while Americans consider their bodies as vehicles of religion, they also want to leave or change the body in some way, with drugs, piercing, tattooing, and other means. Chidester wants readers to pay particular attention to how individuals engage in binding, burning, moving, and handling the world around them.

There are eleven chapters in the book. The first is “Planet Hollywood,” which sets the stage and provides many of the analogies for the study, while the final chapter “Planet America,” recounts the influence of American culture on the rest of the world. In between are chapters about various kinds of American religion summarized below. The book concludes with an index and a comprehensive set of endnotes for each chapter.

- *Popular religion* is shaped to a large extent by Hollywood where consumerism dominates and utilizes religious ritual and life. Baseball is one example, and Coca-Cola is described as a “fetish” that has “inspired

a missionary fervor” (p. 41), a virtual “Cocacolonization” of the world.

- *Plastic religion* represents the cheap and ephemeral aspects: records, tapes, and CDs; the computer; and especially Tupperware, the consummate plastic community, with its own domestic sacred space represented by the Tupperware Party with its rituals and displays, symbols and myths.
- *Embodied religion* takes place through the body, with caress, shock, binding, burning, moving, and handling—all instruments of the spiritual that enable humans to deal with stress.
- *Sacrificial religion* includes the Jonestown mass murder-suicide and Ronald Reagan’s sacrificial patriotism and expenditure. These ideologies portray sacrifice, combining the elements of a world view into a “meaningful and powerful whole” (p. 103).
- *Monetary religion* refers to the dollar in various societies around the world, especially in Africa. It is also tied to the war on terrorism because Bush reflected that “money is the lifeblood of terrorist operations” (p. 130).
- *Global religion* is a dominant theme in the book, illustrated by multi-cultural companies that use images and icons in foreign countries to market their products, such as “McDonalldization” and “Disneyization.” These companies and others are instances of a global religion reflected in their symbolic and material negotiations over humans.
- *Transatlantic religion*, the interplay of Christianity and cults between America and Africa, has requirements for membership, ritual acts of sacrifice, millenarian movements, pilgrimages, and other cultural exchanges.
- *Shamanic religion* is represented in modern New Age spirituality, the Yaqui shaman don Juan Matus, the Zulu Credo Mutwa, alien visitors, and many others, often with African connections and depicted shamelessly on countless web sites.
- *Virtual religion* may often seem to be obvious fake but fraudulence may produce real effects upon people. As William James noted, religion is a way of thinking and always signifies a serious state of the mind (p. 212).

Chidester’s final chapter includes a note on the “global ambivalence toward America, combining fascination with a popular culture and repulsion from its global politics” (p. 214). Americans have visions of a manifest destiny but also live in a pluralistic society that allows differing views of what America is really like.

The strength of *Authentic Fakes* is the overview of what is perceived as religion in America, with many illustrations and examples. In America, religion shows up everywhere. Its weakness lies in the author’s unwillingness to contrast a fake religion with a real one. Is religion a continuum of beliefs with all of them, in one sense or another, fake in our popular culture?

Although the book lacks rigor in classifying religions and explaining where cults fit in, and gives outlandish weird practitioners too much space, it is an entertaining and disturbing book. If Chidester accurately reports what religion in American popular culture is like, it may not bode well for the future of authentic Christianity in America.

Reviewed by Karl J. Franklin, Training Consultant, SIL International, 7500 W. Camp Wisdom Road, Dallas, TX 75236. ☞

Letters

The Experiential Consequences of a Multiverse

I read with interest the article by Robert Mann (*PSCF* 57, no. 4 [Dec. 2005]: 302–10) on the “many universes” or “multiverse” idea that our observable universe is but a tiny region in a vast, but disconnected, larger “multiverse” that contains enormous numbers of copies of our observable universe, but with different histories and different values of the various physical constants or other properties. The multiverse idea is sometimes embraced as a means of overcoming the apparent “fine tuning” of physical laws, physical constants, and initial conditions that seems to make our universe especially suited for intelligent life. An infinity of alternative universes would imply that the “biophilic” conditions of our universe are not an indication of God’s design of the universe, but are instead a necessary consequence of the laws of probability and logic. If the number of universes is infinite, and the properties of these universes are selected at random, then the only universe which humans could observe would be one in which the properties are such that intelligent life can exist.

It seems not to have been noticed that this “observability” criterion that filters out uninhabited universes from our view and so explains why our universe seems to be “special” can be applied not just to the existence of observers in general, but also to each one of us in particular. That is, it is not only true that an uninhabited universe cannot be observed, but also that I cannot observe a universe in which I do not exist. As a small child, I was nearly killed when standing in a driveway behind a car that nearly backed over me. Only quick action by an alert bystander saved my life. Presumably, if the multiverse idea is correct, then in many of the parallel universes in which I existed, I was not so fortunate, but was killed. But since I cannot experience non-existence, the only reality I could currently experience is one in which I survived. The principle that there are infinitely many universes, with all possible variations in detail, combined with the principle that I can only observe a universe in which I exist, would seem to imply that my consciousness, which is almost identically replicated in infinitely many realities, can experience nothing other than continued existence until it becomes physically impossible for it to continue to exist in any of the infinitely many universes. That is, I will continue to experience survival through any and all dangers that are not 100% fatal, thus experiencing the longest possible age-span for a human, and, if it is not physically impossible in any universe, have my life extended as far as possible through technological breakthroughs, perhaps ultimately being transferred to an immortal computer or machine. Of course, this is true of each of us. While we observe others dying, each of them also continues to experience survival in alternate universes, and each of does as well, becoming virtual immortals, unless this is absolutely impossible according to any set of laws that might operate in any alternate universe. Moreover, this rather bizarre implication of the “many universes” idea will be directly tested by each one of us, as we experience death, or rather the constant avoidance of it.

There are other strange implications of the existence of infinitely many universes, with all possible properties and histories. One of them is that all realistic works of fiction, such as the novels of Dickens, are literally true in some alternate universe. *Oliver Twist*, the Artful Dodger, and the others actually exist, and by those names, in some universe. Furthermore, if the biological origin of life seems hard to explain or some steps in evolution seem improbable, one can postulate that virtually miraculous random collisions of molecules occur in some universe, and in fact did so in our universe, if this is the only way to get intelligent life.

Perhaps these bizarre implications of the many-universes theory will give those entertaining this idea second thoughts about how sensible the idea really is.

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Neuroscience, Free Will, and the Incarnation

David Siemens is surely right in saying that the Incarnation challenges contemporary scientific descriptions of human beings, and attempts to relate these to the Bible.¹ I offer below a possible solution to the problem, based partly on the work of Polkinghorne,² and partly on my own.³ I begin by considering human freedom.

Suppose I have to decide between two courses of action, A and B. Suppose further that my brain, body, and environment comprise a physical system, made up of components interacting and moving according to physical laws. Then the sequence of thoughts that I have in making my decision corresponds to a series of configurations of the physical components of my brain.⁴

Suppose now that a superscientist is able to observe these configurations, and predict from the laws of physics how they will change. Two results are possible. The first is that the superscientist correctly predicts what I will choose. In this case, the thoughts encoded on my brain must follow a sequence that is determined equivalently by their content and the laws of physics. Thus if my thoughts lead to “I will do A,” the physics of my brain must lead to the configuration corresponding to “I will do A.” This must certainly be what happens when I carry out an arithmetic calculation by a method I have learned.⁵

Many of my decisions are doubtless predictable. Given a choice between a savory morsel and a sweet one, I usually choose a savory one. Many of my *moral* decisions may also be predictable. Having chosen to serve the Lord, I endeavor to keep to his commandments. However, not *all* my moral decisions (including my decision to serve the Lord) can be predictable. If a superscientist could correctly forecast what I will do in every situation, then I would not be responsible for my actions, because I could say to God on the Day of Judgment, “You determined the choices I made by the way you set up the universe.” The Bible insists that I cannot say this (James 1:12–15).⁶

The second possibility is that the superscientist predicts that the assembly of physical components in my brain reaches a bifurcation point between two configurations, one corresponding to "I will do A" and the other to "I will do B." A quantum-mechanical calculation gives a 50% probability of the assembly proceeding to the first configuration and 50% to the second.

How then do I make my decision? One possibility is that a small perturbation from outside the system considered by the scientist, or a quantum fluctuation, tips my brain in the direction of doing A or B. This again means that I can blame my choice on the way the universe is made. An alternative is that *my thoughts themselves* determine the outcome at this point. As we have seen, when I make a predictable decision, my thoughts follow a sequence that is determined equivalently by their content and the laws of physics. At a bifurcation point, however, the physics is undetermined. In this case, the outcome must be determined by the content of my thoughts alone.⁷ In other words, I make the decision, and am answerable to God for it.

If this is so, the evolution of the universe is determined, not only by physics, but also by the choices human beings make under these conditions. This does not mean that God ceases to control the universe, as I have shown elsewhere.⁸ But it does mean that human beings are responsible for many of their actions, and in measure determine the persons they are, as encoded on their brains.

This model applies to human beings when they have grown up sufficiently to be aware of having to make decisions. In the womb their constitution is monistic; as they grow up it becomes dualistic.

We are now in a position to consider the Incarnation. To become a human embryo, the Son had to empty himself of his personality,⁹ trusting that his Father would overrule in his growth and development as a human being so that

he would acquire the personality he had before he came. This overruling took place particularly in his home, the synagogue at Nazareth, and the temple in Jerusalem. Luke gives us a glimpse of the process when Jesus was twelve (Luke 2:41-52), and of its completion when he was about thirty (3:21-22). This makes the *kenosis* of the Son even more remarkable than in traditional theology.

Notes

¹David F. Siemens, Jr., "Neuroscience, Theology, and Unintended Consequences," *Perspectives on Science and Christian Faith* 57, no. 3 (2005): 187-90.

²John Polkinghorne, *Science and Providence: God's Interaction with the World* (London: SPCK, 1989), chap. 2, and other writings.

³P.G. Nelson, *God's Control over the Universe*, 2d ed. (Latheronwheel, Caithness, Scotland: Whittles, 2000), chap. 4. I can supply copies of this on request.

⁴Note that the behavior of any physical system that depends on the configuration of its components cannot be reduced to that of the components. A simple example is a Lissajous figure, the shape of which is determined not only by the oscillations of its components, but also by their phase.

⁵Cf. Nancey Murphy, "The Problem of Mental Causation: How Does Reason Get Its Grip on the Brain?" *Science & Christian Belief* 14 (2002): 143-57.

⁶Philosophers postulate a type of free will that is compatible with determinism ("compatibilist"), but this fails the test I have applied.

⁷In *God's Control*, I stated that a disturbance is required at a bifurcation (pp. 32-3). If my thoughts determine the outcome, however, this is not needed (cf. *Science and Providence*, p. 32).

⁸*God's Control*, Chap. 5.

⁹Phil. 2:6-7: "who, though being in the form of God, did not deem equality with God something to be clung on to, but emptied himself ..." (my translation).

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