PERSPECTIVES on Science and Christian Faith

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

In this issue . . .

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

VOLUME 57, NUMBER 4 DECEMBER 2005

Perspectives on Science and Christian Faith

Perspectives on Science and Christian Faith (ISSN 0892-2675) is published quarterly for $35 per year by the American Scientific Affiliation, 55 Market Street, Ipswich, MA 01938-0668. Phone: 978-356-5656; Fax: 978-356-4375. E-mail: asa@asa3.org; www.asa3.org

Periodicals postage paid at Ipswich, MA and at additional mailing offices. POSTMASTER: Send address changes to: *Perspectives on Science and Christian Faith*, The American Scientific Affiliation, PO Box 668, Ipswich, MA 01938-0668.

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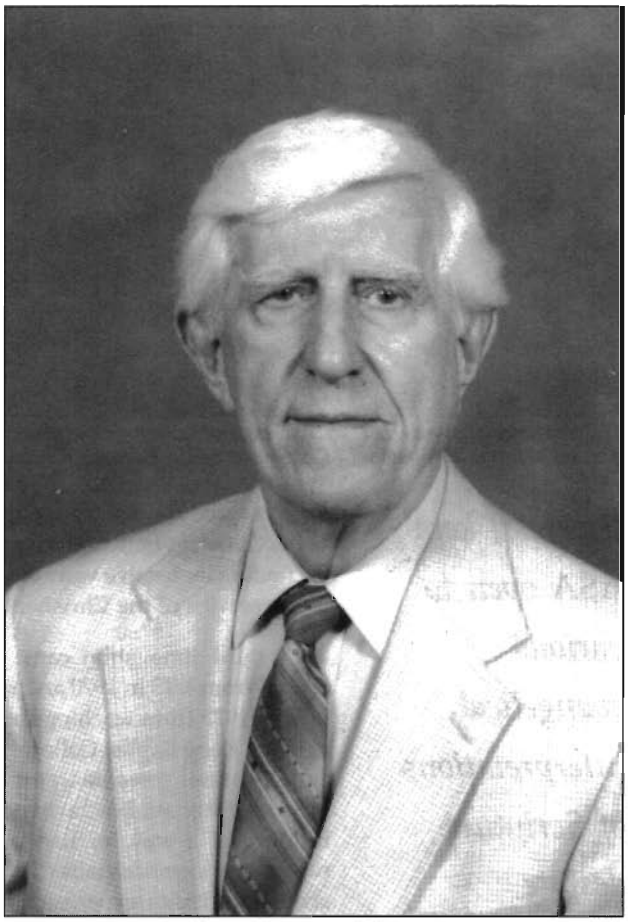
F. Alton Everest (1909–2005): Founder and First President of ASA

Walter R. Hearn



F. Alton Everest (1909–2005)

When Alton Everest passed away quietly at age 95 on September 3, 2005, the American Scientific Affiliation lost the last of its five founding fathers, its first president (1941–1950), and the towering figure whose determination and diplomacy did much to shape the organization in its fragile early years.

Alton Everest, born in Oregon and trained in electrical engineering at Oregon State and Stanford, was a young professor at Oregon State when Moody Bible Institute president William H. Houghton called together a few "Christian men of science" in October 1941. According to science historian Ronald Numbers, "The personable Everest quickly emerged as the organizational leader of the group" (*The Creationists*, Knopf, 1992, p. 159). Numbers tells how its first president kept ASA open to various evangelical interpretations of Scripture despite pressures from such groups as the soon defunct Deluge Geology Society.

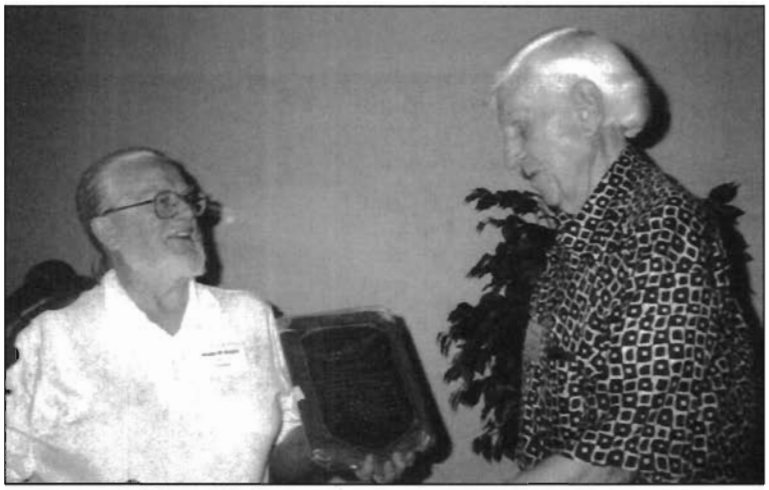
World War II took Everest from his academic career to study underwater sound transmission for the Navy in San Diego, enabling him to travel and spread the word about ASA, which grew to over 200 members by 1950. With wartime restrictions lifted, he set up ASA's first national meeting, at Wheaton College in 1946. He edited ASA's significant "Christian student's science symposium," *Modern Science and Christian Faith,* which first appeared in 1948 and went through a number of printings. In 1958, when asked by then-president Russell Mixter to encourage the formation of local sections, Everest started the *American Scientific Affiliation Newsletter*, editing it with grace and humor for the next ten years.

In 1996 I nominated Alton Everest for the annual Templeton Prize for Progress in Religion. I emphasized how groundbreaking ASA was in 1941, predating all the other 60-some organizations bridging science and theology now cited in the Templeton Foundation's *Who's Who in Theology and Science* (Continuum, 1996), most by forty years or more. ASA's scholarly journal, begun in 1949, is the oldest science/religion journal listed, seventeen years older than *Zygon.*

That was real "progress in religion" but, as I pointed out, beside doing so much for ASA, Everest put his technical skills to work for the Christian church in two other unique ways. In 1945 he helped Irwin Moon found another enduring institution, the Moody Institute of Science (MIS), which used dramatic science footage to point viewers to the *God of Creation* (title of the first of many MIS films). As scientific director, Everest perfected many cinematographic techniques, including the time-lapse and slow-motion photography now common in *NOVA* and *National Geographic* programs. MIS films won many prizes, were seen by millions, and are still used by missionaries around the world to attract people to the gospel of Jesus Christ. In 1959 Wheaton College awarded Everest an honorary

In Memoriam

F. Alton Everest (1909–2005): Founder and First President of ASA



Walter Hearn presenting **Alton Everest** a plaque of appreciation at the 1997 ASA Annual Meeting at Westmont College in Santa Barbara, California.

[Everest] kept ASA open to various evangelical interpretations of Scripture despite pressures from such groups as the soon defunct Deluge Geology Society.

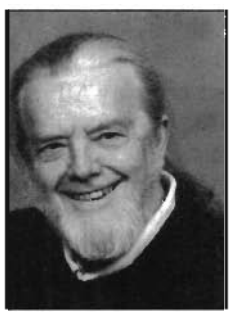
D.Sc. degree for his exemplary integration of his Christian faith and technical skills and for finding innovative ways to use those skills in the service of the Christian community.

A third innovation came after Everest retired from MIS in 1970 and returned to the U.S. in 1973 from teaching communications at Hong Kong Baptist College. While serving as acoustical consultant for hundreds of broadcasting studios around the world, he devised a way for financially strapped missionary organizations to benefit from his acoustical design expertise. He would send them a tape to play in their studio while making a response tape, which was mailed back to him with the dimensions of the existing studio for his sophisticated technical analysis. Each successful job gave him added experience for writing new books on studio design and construction. As the author of nine technical and semi-technical books on acoustic design, he became well known in the audio engineering world. As an energetic participant in the missionary enterprise, Alton was surely well known in heaven before he arrived there this past September.

As it turned out, that Templeton Prize went to a Hindu thinker. Oh, well, writing ten pages about Alton brought me closer to a brother in Christ I already admired, making me respect him all the more. Now I have learned even more details from his delightful *An Over-My-Shoulder View of the 20th Century* (2005). Alton's final book is full of photographs and personal accounts from each period of his life, including his summers with the U.S. Forest Service as a student and his pioneering work on television in the 1930s. The 140-page memoir was put together lovingly by his three children and is available at cost ($10) from his daughter, Mona Everest, 7453 N. Hoyne Ave. 3S, Chicago, IL 60645; email EverMona@aol.com. (I added $2 for postage.)

Going through early issues of this journal for that nomination process, I saw how many ideas presented for discussion at our meetings were later honed into valuable books on science and faith. I came to realize more than ever how important ASA is to the Christian world, and how much we therefore owe to our principal founder. At the 1997 meeting at Westmont College, the last meeting he attended, Alton was given a plaque with these words:

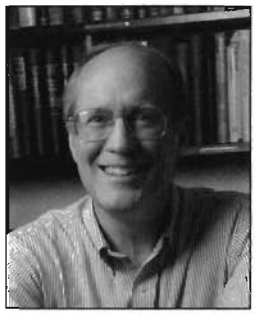
> The American Scientific Affiliation presents this plaque to F. Alton Everest on August 2, 1997, in recognition of your vision and service to ASA. You were one of the five founders and as president for the first ten years (1941–50), helped shape the original constitution and course of the Affiliation. You are a competent scientist of strong Christian faith. For these things we honor you. ❋



ASA Fellow **Walter R. Hearn** *is professor of Christianity and science at New College Berkeley in California and author of* Being a Christian in Science *(Downers Grove, IL: IVP, 1997). After a career in biochemistry (Ph.D., 1948), in 1972 he became a free-lance editor with his wife Virginia. From 1969 to 1993, he edited the* Newsletter of the ASA and CSCA.

The Importance of Causality in Quantum Mechanics

William R. Wharton



William R. Wharton

I have developed the "causality model" of quantum mechanics (QM) ... [and] will argue that stationary states occupy space-time regions which lack events.

Christian theology preferentially favors some philosophical interpretations of quantum mechanics. By using a case study of stationary states of atoms, this paper examines the various interpretations. The preferred interpretation is that all localized events in space-time are parts of chains of contiguous events traversing space-time at a rate limited by the speed of light. This is the process of becoming, i.e., the creation of reality. It is usually not deterministic, leaving room for many first causes that are the initiation of new causal chains.

Causality is important to our Christian world view because of its implicit role in the biblical account of both God and human activity in nature and the consequences of such activities. Each of God's actions is never an isolated event, but is part of a causal chain of events, often with long-lasting consequences toward teleological outcomes. The Bible emphasizes that humans are agents, whose actions also create causal chains with outcomes, for which they are responsible. The Bible, through narrative, strongly suggests that no event can be placed in isolation, but rather everything that happens is part of one or more causal chains, affecting and/or being affected by other events.[1] In science, special relativity requires that successive events in a causal chain be contiguous (locality) in space-time. The ideas of causal chains from both theology and science can be fruitfully integrated into a more complete world view. This world view will require that any change in reality be part of such causal chains.

In this paper, an event is defined as a reality localized in space-time. The argument is presented that when the influence of other events is lacking there is no localized reality. Regions of space-time may lack events. Every event is part of one or more causal chains, affecting and/or being affected by contiguous events. Using this principle, I have developed the "causality model" of quantum mechanics (QM). This paper will concentrate on one of the most common and widely studied systems, stationary states. I will argue that stationary states occupy space-time regions which lack events. This opens up the possibility that a first cause in the future can create a causal chain which traverses the present space-time, providing events. Such an occurrence is known as backward causation.

The main purpose of this paper is not to argue for backward causation, but to affirm our Christian world view with the causality model of QM, of which backward causation is only a part. Scientists, for the most part, also hold sacred that processes in nature consist of causal chains. Unfortunately, the small collection of scientists actively working to understand QM are all too easily giving up on the notions of causality. This abandonment of what was once sacred to science manifests itself in many different ways, of which four are identified below.

Firstly, QM is a stochastic theory in which the theory is primarily limited to giving probabilities of outcomes of processes in the laboratory, instead of deterministic predictions. Furthermore, this indeterminism appears to be an ontological property of nature rather than resulting solely from an epistemic limitation due to incomplete human knowledge. A sufficiently large number of identically prepared, indistinguishable quantum systems give all possible outcomes under identical measurements. Some scientists interpret this to mean everything unseen that is allowed to happen has a reality consistent

William R. Wharton *is chair of the physics department at Wheaton College in Illinois. After eighteen years of research in nuclear physics, he came to Wheaton College in 1984. William has a deep interest in cosmology and teaches astronomy at the Wheaton College Science Station in South Dakota. He was named after his uncle, William G. Pollard, physicist and Episcopal minister. His son, Ken Wharton, is a physics professor at San Jose State. William, an ASA member, exercises daily at a sports center and enjoys playing tennis.*

with what is known and measured. Specifically, reality includes everything that is allowed by the laws of nature. This reality is constrained but not determined by earlier events and similarly does not uniquely determine later events. Not only is its existence unseen, but there is no specific cause-effect delineating it. These ideas of reality without causation influence how we interpret the reality that we can examine and measure. This will become clearer later when we examine the properties of stationary states.

Unfortunately, the small collection of scientists actively working to understand QM are all too easily giving up on the notions of causality.

Secondly, special relativity, which is a well-founded, beautiful theory of nature, suggests that time does not flow. Two so-called space-like events are spatially separated and close enough in time that no signal, limited by the speed of light, has time to go from one to the other. Such events appear in different time sequences to different observers, meaning that there is no frame-independent flow of time. There is no universal reference of past, present, and future. This, coupled with the a-priori concept of "relativity" (no preferred reference frame) has led to the notion of a "block universe," in which the future already exists. From this perspective, the whole book on the history of the universe is written and final. We may be on page 100 and do not know what is in the future on page 150. Nevertheless the contents of page 150 already exist. The future is just as real as the past. This notion of a block universe undermines the concept of causal chains and would certainly contradict the common notion of humans as responsible agents. Sure, in this world view, humans are dynamic characters in the story of life, but the story is already written and cannot be changed by any choices we make in the present. This fatalistic view of the future is demotivating for humans to function as agents exercising controlling or creative opportunity.

Thirdly, the dominant paradigm under which physicists view QM is the Copenhagen interpretation. This interpretation may be primarily a convenient, reliable, and practical way to conceptualize QM rather than a strongly held belief, but nevertheless it influences how physicists view reality. A central component of the Copenhagen interpretation is that a property of a quantum system is not a reality until after it is observed. For example, the electron does not have a position or momentum until the position or momentum, respectively, is measured. Since these two measurements are incompatible, the electron cannot simultaneously have a well-defined position and momentum. In QM, incompatible refers to two types of measurements that uncontrollably change each other's outcomes when done in succession. These ideas, by themselves, do not undermine causal chains. However, in conjunction with this is the inclination of scientists to believe in an objective reality, independent of the observer. The desire is to have a reality separate from the observer. In this philosophy of objective reality, the experimenter decides which measurement, but does not cause the reality, which is measured. Or at the very least, free choice is too subjective to be considered part of the reality studied by physics. According to the causality model, this denies recognition of an important causal chain that is crucial to a self-consistent understanding of QM.

Fourthly, QM is a nonlocal theory, in which two space-like measurements affect the probability distributions of each other's outcomes. According to special relativity, these events cannot be causally related. Two widely separated particles, once in contact with each other, can be entangled, meaning a measurement on one appears to alter the properties of the other. In attempts to understand this, many people limit QM to empirical adequacy, giving up on a deeper understanding with a causal model. Those using nonlocal models to interpret QM must distort the whole notion of causality. For example, Bohm's pilot wave model treats the QM wavefunction as a holistic field that nonlocally guides particles along their trajectories. Michael Dickson thinks this idea can be understood in a universe with an absolute and deterministic beginning.[2] The guidance condition does not "cause" entangled behavior, he argues, but merely represents behavior that flows deterministically from the initial conditions of the universe. The causality model, requiring causal chains of contiguous events, rejects Bohm's pilot wave model on physical grounds.

Newton's first law states that an object free of external forces will move at a constant velocity through space. Its straight-line path through space-time represents a causal chain composed of a potentially infinite number of contiguous events in Newtonian mechanics. The event initially determining its velocity would be the first cause in the chain. On the other hand, in QM we are usually unable to see all of the events in a causal chain. We can observe only separated events. It is only a matter of interpretation whether or not a causal chain connects the separated events, even if it can be shown the events are correlated with each other. Stephen Hawking writes in *The Universe in a Nutshell*:

> We are used to the idea that events are caused by earlier events that in turn are caused by still earlier events. There is a chain of causality stretching back

Words that we view as temporal words, should rather be understood as causal words. Becoming *is the process of a causal chain. The words,* before, until, *and* after, *often are pointing from or to some event in a causal chain ...*

> into the past. But suppose this chain has a beginning. Suppose there was a first event. What caused it? This was not a question that many scientists wanted to address. They tried to avoid it ... In my opinion, this is not a position any true scientist should take. If the laws of science are suspended at the beginning of the universe, might not they fail at other times also? A law is not a law if it only holds sometimes. We must try to understand the beginning of the universe on the basis of science. It may be a task beyond our powers, but we should at least make the attempt.[3]

On the next page, he talks about casinos and rolling dice that he compares to a universe experiencing multiple histories, each with its own probability. He follows this with a pictorial of Feynman's path integral, see figure 1, in which a particle takes every possible path between the two points that are the detected events. Hawking is trying to replace causal chains between two observed events with a web of all possible reality. However, this argument is problematic. While the mathematical technique of the Feynman path integral is very successful in predicting the probability of some future unrealized event, using it to make inferences about the inaccessible past of a realized event is unjustified. There is absolutely no experimental evidence that a particle takes more than a single path between two points. Any interaction identifying a path would nullify all paths inconsistent with the observation, meaning that separate distinct paths can never be verified.

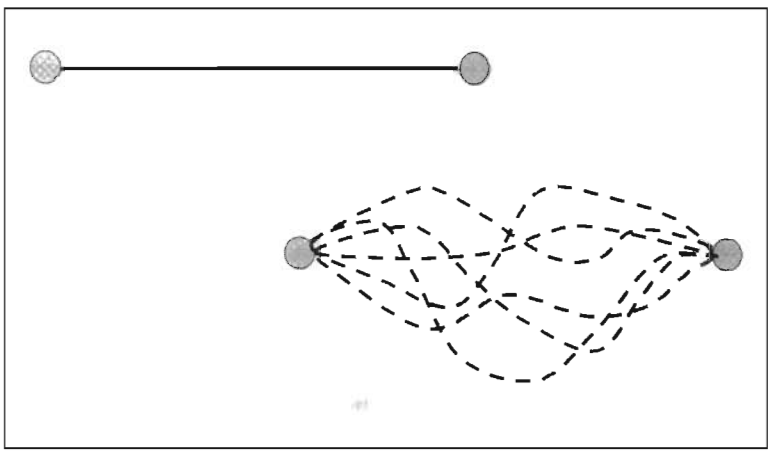


Figure 1. The path of a classical particle (solid line) represents a causal chain. A few of Feynman's paths of multiple histories (dashed lines) replace a causal chain. The endpoints are boundaries determined by external observations.

Special relativity is almost certainly correct that time does not have any flow, and instead should be thought of as a coordinate, similar to the three spatial coordinates.[4] The flow that we associate with the concepts of past, present, and future is a causal flow that does not depend on the reference frame, i.e., each causal chain flows in the same direction in all reference frames. However, different observers have different definitions of the present, because they are experiencing different causal chains. An observer, or agent, has present knowledge of her past that is the collection of all events earlier in her causal chains. The agent is acting in his present to have a causal effect on his future that is further down the causal chain(s). Since different observers are experiencing different causal chains, there is no such thing as a unique global past, present, and future. Words that we view as temporal words, should rather be understood as causal words. *Becoming* is the process of a causal chain. The words, *before, until,* and *after,* often are pointing from or to some event in a causal chain, and are not strictly temporal words.

The block universe model, which denies the ontological process of becoming, is not very pertinent to the study of stationary states, which is the main emphasis of this paper. However, the block universe approach is a central part of attempts to understand other paradoxes of QM, such as Hardy's paradox, and is criticized in my more detailed paper on the causality model.[5]

Nonlocality in QM can be understood, consistent with special relativity, as causal chains moving both forward and backward in time. Backward causal chains are inaccessible to the outside world, thereby preventing superluminal (faster than speed of light) signals. One may find a fuller treatment of locality in my more detailed paper.[6] Both the block universe and the treatment of nonlocality seriously confront our Christian world view, but both are much more technical, as they pertain to QM, than are the issues discussed in this paper. A block universe goes beyond the Christian view of predestination and requires that the future already is a reality.

Stationary States

The ground state of hydrogen consists of a proton and an electron with zero orbital angular momentum. This means that the proton and electron can only move in a radial direction toward or away from each other. This state is known to be stationary, meaning that all observable properties are static or unchanging with time. QM, the most successful theory in physics, of course, also predicts that this state is stationary. Figure 2 shows the energy, potential well, and radial distribution of the electron in the ground state of hydrogen. The hydrogen atom's ground state has spherical symmetry. The Fourier transform of the ground state spatial wave function of the electron is:

$$f(\mathbf{k}) = 2(2a_0^3)^{1/2} \frac{1}{\pi(1 + a_0^2 k^2)^2} \quad (1)$$

where **k** is the wave vector and a_0 is the Bohr radius. The probability distribution for measuring the component of **k** along an arbitrary z-axis is

$$P(k_z) = \iint f^*(\mathbf{k}) f(\mathbf{k}) dk_x dk_y =$$

$$\frac{8a_0^3}{\pi^2} \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} \frac{dk_x dk_y}{[1 + a_0^2 (k_x^2 + k_y^2 + k_z^2)]^4} = \frac{8a_0}{3\pi} \frac{1}{(1 + a_0^2 k_z^2)^3}. \quad (2)$$

It is common to identify $\hbar k$ as the momentum of an electron in the hydrogen ground state and $\hbar k_z$ as its component along the z-axis. This identity is the de Broglie wavelength, $\lambda = h/p$, and $k = 2\pi/\lambda$.

To verify a similar distribution for helium, calculated the same way as equation (2) in 1937, x-rays were scattered off electrons in a large number of helium atoms in their ground state.[7] If we define **p** as the momentum of the electron of mass m immediately prior to the x-ray scattering, standard kinematics gives the equation:

$$2\mathbf{p} \cdot \Delta\mathbf{P} + \Delta P^2 + 2m\Delta E \quad \text{with } \Delta E << mc^2 \quad (3)$$

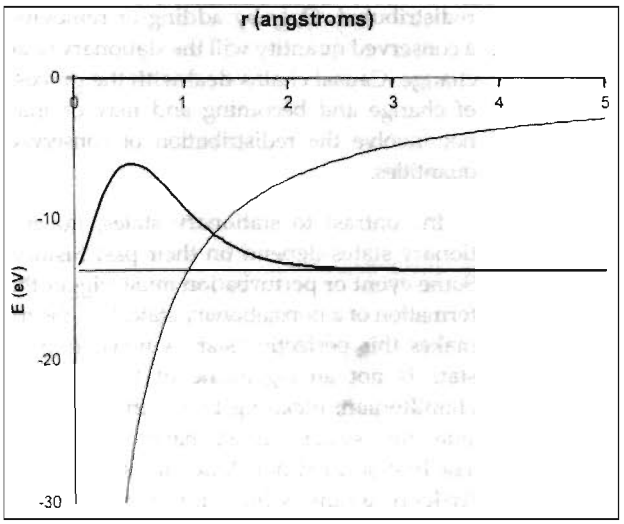


Figure 2. The radial probability distribution of the electron in the hydrogen ground state, plotted above its binding energy of -13.6 eV. The coulomb potential energy curve is also shown.

where $\Delta\mathbf{P}$ and ΔE is the change in the x-ray's momentum and energy, respectively. Letting $\Delta\mathbf{P}$ define the direction of the arbitrary z-axis, the experimental distribution of p_z values obtained using the x-ray data and experimental equation (3), gave an identical result as the theoretical prediction of the helium atom within experimental errors, as shown in figure 3.

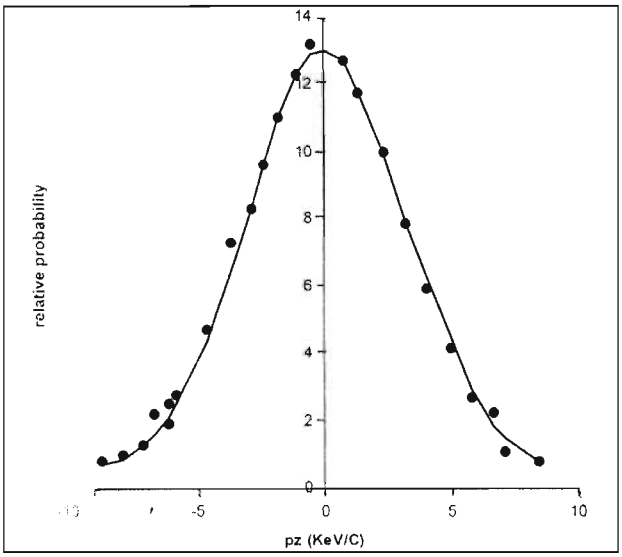


Figure 3. The points are relative probabilities for measuring various values of p_z, obtained from the experimental intensities of Compton scattering from helium,[8] using equation (3). The continuous line is the momentum probability distribution calculated from the helium-atom electronic wave function in the same manner as equation (2).

Let us discuss the meaning of the measured p_z. It is not the momentum of the electron immediately after the x-ray scattering, when its value is $p_z - \Delta\mathbf{P}$. Before the x-ray scattering, the helium atom is in a stationary state. We know this both from theory and experiment. The definition of nonzero momentum of the electron necessitates the movement of mass (energy) from one spatial location to another. This is completely absent in a stationary state. Of course, several simultaneous movements can cancel each other out, making the atom appear stationary. Classically, not even two electrons moving in opposite directions can cancel out movement of mass, because they cannot always be in the same position. They would have to be in all allowed positions at all times, moving in opposite directions. A single electron, as in hydrogen, would have to have both multiple positions and momenta at all times to be stationary. There are three major classes of interpretation of this x-ray experiment: the Copenhagen interpretation, the Everett multi-universes approach, and the de Broglie–Bohm theory.

The **Copenhagen interpretation** says that the electron does not have a precisely defined momentum before the measurement. The measurement process brings to reality its momentum. In this interpretation, the reality can only exist for an instant because after the x-ray scattering, the

There are three major classes of interpretation of this x-ray experiment: the Copenhagen interpretation, the Everett multi-universes approach, and the de Broglie–Bohm theory. ... Amazingly, arguments ... based simply on causal chains give a very natural, unforced explanation of this x-ray experiment ...

electron has a different momentum. Many people interpreting QM today object to the concept of measurement creating reality. Thus they reject the Copenhagen interpretation.

There is another problem with this interpretation. Having a momentum exist only for a point-like instant in time is nonsensical. Momentum, by definition, involves the spatial relocation of mass/energy over a finite time. If momentum only exists for a point-like instant at measurement, there is no movement of mass/energy and therefore no momentum.

The **Everett multi-universes** approach also allows measurement to modify reality.[9] However, it is not so much the creation of reality but rather the splitting off of reality into an infinite number of universes. If the electron simultaneously has all possible momenta, according to the theoretical distribution prior to measurement, then this would be consistent with a stationary state. Upon measurement, a specific value of p_z becomes an exclusive reality in our universe and all other values of p_z become realities in other universes. This interpretation assumes that all of the allowed values of momentum already exist so that measurements merely redistribute them among the various universes. The main motivation and appeal of the Everett interpretation is that the reduction of the distribution from many values to a single value upon measurement is an emergent property of the model.

The **de Broglie–Bohm theory** fails badly in describing these stationary states.[10] In this model, the electron is at rest and at a single spatial location. This would imply that the hydrogen atom has a zero p_z and a nonzero electron dipole moment, both in contradiction to experiment. In this model, in contrast to the other models, the wave function is intended to describe the average properties of an ensemble of many such atoms rather than a single atom. The main attraction of this model is to make QM deterministic.

There are many other interpretations of QM, but none to my knowledge give a viable interpretation of this x-ray experiment. Most interpretations do not explain all of QM, but only selected experiments, and many interpretations do not address the meaning of stationary states. Amazingly, arguments (see next section) based simply on causal chains give a very natural, unforced explanation of this x-ray experiment without any other excess baggage. The excess baggage in the Copenhagen interpretation is the tacked-on, unexplained reduction of the wave function. The baggage of the Everett interpretation is, of course, the multiple, extremely large number of universes.

The causality model has some strange consequences that are properties of QM. Everything follows naturally from the principle that all events must be part of causal chains and that all causal chains must have a first cause. Of course, some may consider causal chains as baggage just as we consider multiple universes as baggage. Hawking considers first causes to be baggage. To understand the importance of causal chains, it is important to contrast stationary states with nonstationary states.

Nonstationary States

Both experiment and QM theory indicate that the properties of any stationary state do not depend on how it was made or on its past history. This is very clear when one considers that all hydrogen ground states are identical, i.e., indistinguishable, regardless of their circumstances. All of its properties are completely determined by the laws of nature and conserved properties, such as energy, angular momentum, charge, lepton number, etc. Conservation laws are different from causal chains. Conserved quantities are permanent and never change, but are simply redistributed. Only by adding or removing a conserved quantity will the stationary state change. Causal chains deal with the process of change and becoming and may or may not involve the redistribution of conserved quantities.

In contrast to stationary states, nonstationary states depend on their past history. Some event or perturbation must trigger the formation of a nonstationary state. QM theory makes this perfectly clear. A nonstationary state is not an eigenstate of the system's Hamiltonian, meaning that something outside the system must have affected it. The best-studied nonstationary states are in Rydberg atoms, which are atoms with an electron weakly bound in a very large orbit. Sometimes this orbit is 1,000 times larger than other bound orbits. The motion of an

electron in its nonstationary Rydberg orbit can be observed in various ways. For example, a short optical pulse excites an electron into a superposition of Rydberg states, forming a small radial wave packet.[11] It is the superposition of these states which make it nonstationary. The electron (i.e., wave packet) moves classically in and out from the ionic core in a highly elongated elliptical orbit. Only if the electron is near the ionic core will photoionization by visible light occur. A collection of such Rydberg atoms are formed identically by the same optical pulse and their behavior is monitored by photoionization. Intensity peaks in this ionization are observed at times after the optical pulse that are integral multiples of the classical round-trip time of the electron moving in its orbit. This confirms that the electron's movement approximates this classical orbit.

Application of the Causality Model to Stationary States

Whereas there is clear experimental evidence of movement and change in a nonstationary state, there is no evidence whatsoever of change in a stationary state, even after extensive study. A typical physicist will find no need to explain the reason for the difference, because the difference is already fully explained in the QM equations. The equations are in complete agreement with experiment for both stationary and nonstationary states. The physicist's mentality is that the ultimate understanding is to write down, from first principles, the mathematical equations that describe the processes in nature. No deeper understanding need be attained.

In contrast, this paper is an attempt at a deeper metaphysical understanding, based on the foundational assumption that causes effect change. If a stationary state is totally immune to anything happening around it, then it is possible that it is not changing or becoming. If it is not becoming, then it may be lacking full reality. An event is defined as reality at a localized space-time region, and such events cannot exist in isolation from what is around them. Every event must be part of a causal chain of contiguous events, either the first cause of the chain or an event being caused by, and then causing, other events.

A particle, such as an electron, moving along a path through space-time is experiencing a causal chain. If a causal chain is absent, then the particle does not have a position or momentum at any specific time. However, a particle may acquire a causal chain through interaction with some other object, such as an x-ray. Werner Heisenberg, the co-founder of QM, described this very well in chapter 2 of his book, *Physics and Philosophy*:

> The concept of the probability wave was something entirely new in theoretical physics since Newton. Probability in mathematics or in statistical mechanics means a statement about our degree of knowledge of the actual situation ... The probability wave of Bohr, Kramers, Slater, however, meant more than that; it meant a tendency for something. It was a quantitative version of the old concept of "potentia" in Aristotelian philosophy. It introduced something standing in the middle between the idea of an event and the actual event, a strange kind of physical reality just in the middle between possibility and reality.[12]

This is a valid description of the causality model. The electron in a stationary state does not have a position or momentum. Its changeable attributes are not yet a localized reality. Just as the electron exists but does not have a value for its momentum or position because there is no causal chain, so also energy exists but is not realized as either potential or kinetic energy. In this sense, there is no final reality, but only a propensity for such reality. This raises the philosophical question, how can something exist without having a value, or how can energy exist without having a form? Using ideas borrowed from Aristotle, we call some of the substance of the universe eternal, or "essential."[13] However, some of the elements present in things are "accidental," resulting from cause and effect that represent change.

I say that the hydrogen atom is not normally subjected to any causal chains and therefore is not undergoing change.

Using these ideas, I say that the hydrogen atom is not normally subjected to any causal chains and therefore is not undergoing change. However, as long as the atom is left alone, all of its properties, determined by conservation laws, are essential. None of these properties can be changed without the addition or removal of a conserved quantity. The electron's momentum or position is not a conserved quantity because of its interaction with the proton. A reasonable belief, based on the notion of causality, is that the electron's future momentum currently lacks reality. Time symmetry suggests a similar property for the past. The laws of physics, as they pertain to the hydrogen atom, are completely time-symmetric; momentum, and anything else subjected to unrealized causal chains, lacks reality in the past as well as the future. Time does not flow, and causal chains, if they are lacking, must be absent in both time directions for stationary states. There should be no distinction between past and future.

This approach is the complete opposite of the Everett interpretation, in which the electron has numerous posi-

For some reason, most people prefer to assign multiple realities rather than no reality, and I think this is fundamentally flawed. At any instant, if electrons exist in multiple locations with multiple values of momentum, then there has to be more than one electron. This would violate lepton number conservation.

tions and momenta simultaneously, rather than none at all. For some reason, most people prefer to assign multiple realities rather than no reality, and I think this is fundamentally flawed. At any instant, if electrons exist in multiple locations with multiple values of momentum, then there has to be more than one electron. This would violate lepton number conservation. Everett is able to retain lepton number conservation by claiming there is a separate universe for each electron. However, the probability distribution in figure 3 makes no sense in the Everett interpretation, which states that each possible outcome of the p_z measurement is realized in some post-measurement universe. If each value of p_z is realized, they should have equal weights that would favor a fairly flat distribution unlike the curve in figure 3. The Everett model does not have a procedure to interpret the measured distributions.

To some extent, however, it is necessary to adopt this multi-valued approach. Electric charge is a conserved quantity, and it is constantly interacting with its surrounding environment. Such interaction requires the charge of the electron to spatially exist in the hydrogen atom, and, ignoring distortions caused by external interactions, it exists as a symmetric cloud with the probability distribution shown in figure 2. Here the probability must be more than a "potentia." In fact, it must be a reality. The probability distribution in figure 2 gives the actual distribution of the one unit of electric charge spread around the proton. The Everett model, with equal weights for every location, cannot explain this distribution.

The cloud of charge does not define the location of the electron. The electron is neither localized, nor in multiple places in space-time. Let us briefly examine the measurement of the electron's spatial position. The probability of finding the electron a distance, r, from the proton in hydrogen is shown in figure 2. Although there is zero uncertainty in the energy of the hydrogen ground state, energy conservation can be violated briefly. This allows for a nonzero exponential fall-off of the probability at large distances from the proton, meaning that a small probability exists for finding the electron in the "classically forbidden region," e.g., for values greater than about 1 Angstrom in figure 2. Here the coulomb potential energy is greater than the total energy. However, the electron, in an isolated hydrogen atom, could never exist as an event at these large distances, although some of its charge can be there. The exponential fall-off in the probability distribution at large distances could conceivably be examined using an electron tunneling microscope probe. The probe provides enough negative potential energy to allow the realization of the propensity for the electron to exist at such a great distance. This is commonly referred to as tunneling, where the electron is pictured initially inside the coulomb barrier, tunnels through, and appears on the other side when detected.

In our interpretation, there is no causal chain going backward in time from this detection event. There is no motion through the barrier, which is impossible because of the lack of kinetic energy under the barrier. The electron simply has a propensity to exist where it is detected, and this has been brought to reality by the probe. This measurement will be the first cause in a new causal chain. The probe will see the probability of finding the electron increase exponentially as it is brought closer to the proton, thereby reproducing the probability curve in figure 2. This process involves two transfers. One is the transfer of energy from the probe to the hydrogen atom causing it to be ionized. The second is the transfer of negative charge from the atom to the probe. Causal chains inside the atom cannot describe these transfers, since nothing is moving continuously through space. The temporal redistribution of electric charge could conceivably be studied through the electromagnetic interaction of the atom with its surroundings. There are QM limits to the temporal resolution. I suspect that the redistribution of charge occurs in an instant.

Comparison of the Causality Model with the Copenhagen Interpretation

The causality model is closely aligned with Bohr's Copenhagen interpretation. However, it also accommodates some of the criticism which Einstein and others have concerning Bohr's interpretation. The primary difference between the causality model[14] and Bohr's is that the former allows causal chains going

backward in time, i.e., backward causation. Backward causation allows the measured value of p_z to exist for a finite time in the x-ray experiment. Using the terminology of Willem M. de Muynck,[15] Bohr's interpretation is based on the following interconnected ideas: contextualistic realism, strong correspondence principle, complementarity, Copenhagen indeterminism, and probabilistic description of individual objects. The following is a brief description of these ideas contrasted with ideas favored by Einstein and compared to the causality model.

Contextualistic realism claims that reality of a property of an object comes solely from its interaction with a measuring instrument. In contrast, Einstein felt that there should be a theory that can describe objective reality independent of measurement. The causality model explains contextualistic reality as the effect of causal chains going both forward and backward in time and initiated by the measurement that is the first cause in each chain. Realism must be contextualized in terms of both the initial preparation of the quantum state and the later measurement, since both actions initiate causal chains into the quantum system. Einstein probably would not have any problem with contextualizing realism in terms of the preparation, and in our time-symmetric model, measurement is treated the same as preparation. Abraham Pais related a conversation with Einstein, questioning contextualistic realism:

> We often discussed his notions on objective reality. I recall that during one walk Einstein suddenly stopped, turned to me and asked whether I really believed that the moon exists only when I look at it.[16]

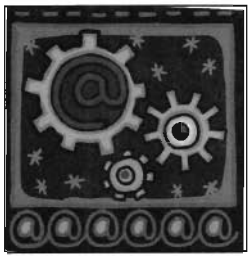
The lack of reality in space-time (i.e., events) only occurs in the microworld, in which the object is waiting for a future event that can bring the reality through backward causation. Einstein's word "exists" is ambiguous since it can refer either to space-time properties or to existence generally. I propose that the electron exists in the hydrogen ground state, but it does not have a position or momentum. Its existence, which does not require a causal chain, is separate from its space-time properties. Unlike the electron in the hydrogen atom, the position and momentum of the moon have been determined by past events. These properties have reality even if no one observes them.

The strong correspondence principle claims that quantum phenomena correspond to classical terms and can be unambiguously communicated only by classical terms. This idea is closely aligned to contextualistic reality in that reality can only be described in conjunction with the classical measuring device. However Bohr's philosophy has some ambiguity here between ontology and epistemology. Whereas Bohr claimed the reality comes from the measurement, the classical description of the measurement is fundamentally flawed since classical concepts are partially inadequate to explain quantum phenomena. He did not hold out much hope for a more adequate explanation. In the causality model including backward causation, classical concepts such as momentum or position of a particle become a reality as a result of measurement and/or preparation. In addition, the classical concept of waves in QM is mostly associated with potentiality, which is a different kind of reality subject to change from a future measurement. Hence, the correspondence principle is valid in that classical concepts of particles and waves are accurate when applicable and interpreted correctly, and is not inherently flawed.

I propose that the electron exists in the hydrogen ground state, but it does not have a position or momentum.

Complementarity claims that incompatible observables cannot simultaneously have precise values because of the incompatibility of the measuring arrangement for each observable. This also includes particle-wave complementarity. For example, the measuring arrangement for observing a unique classical path of a particle is incompatible with that for observing an interference of two or more paths. In the causality model, a particle that has a unique classical position and/or momentum is constrained by the existence of causal chain(s). A particle acting as a wave, with wavelets simultaneously traversing multiple paths, is less constrained by existing causal chains. The wave nature of a particle is a potentiality open to the effects of causes that have not yet acted on the particle. Simultaneous observations of these different phenomena are incompatible because the situations are different. The difference, determined by the experimental apparatus, is based on the existence or non-existence of causal chains.

In conjunction with complementarity is *Copenhagen indeterminism*, which claims that the value of a measured observable cannot be an attribute prior to measurement. In contrast, Einstein treated indeterminism as epistemic. He felt that reality has to be precise. The causality model has Bohr's concepts in a modified form. In the observer's reference frame, the measured observable is not a reality until after the measurement. However, because of backward causation, the past is in a state of becoming; it is not time which flows, but rather the causal chains that include flow backward in time. After the measurement (in a causal sense), the measured attribute becomes a reality for the object at earlier times. Complementarity is also modified. In the situation where the preparation chooses a precise value of one observable and the measurement chooses a precise value of another incompatible observable,



The causality model claims QM is not a universal theory, but only pertains to the microworld, defined as the space-time region where causality can go in both time directions. Humans, taken in totality, are probably in the macroworld where causality effectively only goes forward in time.

the object acquires precise values of both observables for the time between preparation and measurement.

A description of Stephen Hawking's interpretation of a free particle that has two precisely measured space-time locations is on pages 267–8 (see also figure 1). Whereas Hawking would claim the particle does not have a well-defined momentum in between the two measurements, the causality model claims the particle's path is a unique straight world line connecting the two space-time points. This particle acquires precise properties of two incompatible observables by backward causation, and the time between the two measurements lies in the inaccessible past. The world line defines precisely both the magnitude and direction of the particle's momentum. Here, momentum and position are incompatible observables, but both have precise values for all times in between the two measurements.

The Copenhagen interpretation interprets quantum mechanics as giving a *probabilistic description of individual objects* rather than a statistical description of an ensemble of identically prepared objects. Specifically the probability distribution is an ontological reality for individual microscopic objects and not simply a lack of knowledge. Einstein would favor an epistemic statistical description. For him, the particular microscopic object has precise properties, even if they are not classical properties, and must be thought of quantum mechanically as one in a possible ensemble of identically prepared objects. The causality model adopts the Copenhagen interpretation on this point. The probabilistic description is ontological for a single particle until a measurement is made on it. The measurement modifies the probability via backward causation by giving the particle a more precise value at times before the measurement. The probabilistic reality is a different kind of reality than the reality of a measurement. The probabilistic reality is not composed of events in space-time. Rather its existence comes from the initial boundary conditions and the conservation laws. The conservation laws require certain properties of nature to exist and to be real even before events associated with these properties come into existence through causal chains. The conservation laws constrain the causal chains, but do not create the causal chains.

The Copenhagen interpretation has some undesirable features. For example, it postulates that the observer obeys different physical laws than the non-observer, which has been criticized as a form of vitalism, that life is different from matter. The causality model retains differences between the observer and the quantum system, but defines more clearly what these differences are in a way that is not vitalistic. In particular, the causality model claims QM is not a universal theory, but only pertains to the microworld, defined as the space-time region where causality can go in both time directions. Humans, taken in totality, are probably in the macroworld where causality effectively only goes forward in time. The closest idea to vitalism is that humans, as agents, are free to engineer selected causal chains on objects of their choosing. The Copenhagen interpretation claims that the act of observing a system changes it in a random fashion, instantaneously over an extended region (nonlocal). Instantaneous is a problematic word according to special relativity, since there is no unique definition of simultaneity for spatially separated events. The causality model solves this nonlocality problem using backward causation. Specifically the changes that take place in a measurement satisfy the locality condition of special relativity, in which causal chains cannot propagate faster than the speed of light.[17]

Conclusions and Reflections from a Christian World View

The focus of the paper has been a scientific/philosophical analysis of stationary states, showing that a causality model is the most logical interpretation of the conceptual difficulties presented in QM analysis of these states. It is important to emphasize that this approach is grounded in our Christian world view. The block universe, that claims the future already exists, is an objectionable philosophy to our Christian world view. It is the rejection of a block universe, which forms the basis of my underlying presupposition of causality. A block universe denies the process of becoming and the responsibility of human beings. It is particularly troublesome to see the block universe model used to solve paradoxes in QM, and I critique this in detail.[18] The block universe idea comes from

special relativity, which essentially demands that time does not flow. Since I have gained a deep understanding and appreciation of special relativity, I reject any thoughts of altering it. Rather I feel compelled to find a way to make it compatible with my Christian world view. The only way I see to do this is to interpret our perception of (and the biblical perception of) time flow as a causal flow. For this to work, I have to say that the reality of events must be part of causal chains that are series of events through time (and usually space) through which cause-effect propagates. This is the process of becoming (creation of reality) and gives us a perception of time flow.

Since I have gained a deep understanding and appreciation of special relativity [which essentially demands that time does not flow], I reject any thoughts of altering it. The only way I see to [make it compatible with my Christian world view] is to interpret our perception of (and the biblical perception of) time flow as a causal flow.

Both Everett's many worlds interpretation and Hawking's use of Feynman's multiple histories separate reality from cause-effect. In their models, reality does not need a cause, nor does it need to affect other reality in any uniquely identifiable way. Not only do their models fail to explain the perceived flow of time, but also they fail to conceptually explain the absence of time flow in stationary states. I naturally chose stationary states, without time flow, as the case study of this paper because the perception of time flow, which is in fact causal flow, is so central to my Christian world view. QM is filled with many characteristics leading to various informative case studies. I chose stationary states as the one which seemed most revealing.

One aspect which complicates the causality model is the recognition that microscopic causal chains are very fragile and easily terminated. For example, in figure 1, the two endpoints are measurements. If these two measurements are far enough apart in space-time, and activity from other sources is occurring between them, there likely is not any causal chain connecting the measurements. In fact, there would be considerable doubt that the two measurements are observing the same particle. It is impossible to keep track of a single particle's identity when other identical particles are nearby. This is why wave functions must include all terms in which pairs of identical particles are interchanged.

The termination of causal chains and the disappearance of space-time reality are very compatible with a Christian world view. It leaves open the opportunity for both humans and God to create new reality and it avoids the clockwork universe of Newtonian mechanics. I separate the quantum world from the macroscopic world where causal chains are much less fragile and progress reliably forward in time. This is consistent with the Bible, which teaches that long-lasting causal chains exist. This is what gives us our strong sense of time flow. So-called quantum measurements occur at the boundary of the microworld and macroworld, creating first causes and new causal chains in both worlds. This is a source of creativity. The Everett model wrongly explains creativity and novelty as the creation of new worlds.

My model also includes backward causation in which cause-effect progresses backward in time, but limits it to the microworld. This strange notion does not come from my Christian world view. My motivation to include backward causation originally came from the nonlocality of QM, and my insistence that the interpretation of this nonlocality be completely consistent with special relativity. I do not think any other interpretation does this. A confirming result of backward causation is that it fits in so beautifully and naturally with the other parts of the causality model that do come from my Christian world view. Neither my Christian world view nor my understanding of science reveals precisely the boundary between the microworld where QM dominates and the macroworld described by classical physics. In summary, the Christian world view provides some broad constraints on the interpretation of science, but does not dictate specifics of the causality model. ❋

Acknowledgment

I initiated this work at the 1998 Faculty Summer Seminar in Christian Scholarship at Calvin College financed by The Pew Charitable Trusts. In particular I would like to thank John Polkinghorne for his encouragement and insight as the seminar speaker. I would also like to thank two unknown *PCSF* reviewers of this manuscript for giving me extensive, constructive suggestions for improvement, most of which have been incorporated.

Notes

[1]There are 1,750 occurrences of "cause" in the NIV version of the Bible. Often it is the word "because." The vast majority of these refer to either God's actions or human actions.
[2]William Michael Dickson, *Quantum Chance and Non-Locality: Probability and Non-Locality in the Interpretation of Quantum Mechanics* (Cambridge: Cambridge University, 1998).
[3]Stephen Hawking, *The Universe in a Nutshell* (New York: Bantam Books, 2001), 79–83.
[4]Special relativity has beauty, elegance, and simplicity in unifying various properties of nature, including space and time. It has extensive experimental verification.
[5]William Wharton, "Understanding Time and Causality is the Key to Understanding Quantum Mechanics," http://xxx.lanl.gov/abs/quant-ph/0310131.
[6]Ibid.
[7]J. W. M. Dumond and H. A. Kirkpatrick, "A Direct Spectrum of the Structure and Shift of the Compton Line with Helium Gas as the Scatterer," *Physical Review* 52 (1937): 419–36.
[8]Ibid.
[9]H. Everett, "Relative State Formulation of Quantum Mechanics," *Review of Modern Physics* 29 (1957): 454–62. Also http://plato.stanford.edu/entries/qm-manyworlds/
[10]K.Berndl, et al., "A Survey on Bohmian Mechanics," http://arxiv.org/abs/quant-ph/9504010.
[11]T. F. Gallagher, "Quantum-Beat, Level Crossing, and Anticrossing Spectroscopy," in *Atomic, Molecular, and Optical Physics: Atoms and Molecules* 29B, ed. F. B. Dunning (London: Academic Press, 1996), 331–2. For a more recent work, see S. N. Pisharody and R. R. Jones, "Probing Two-Electron Dynamics of an Atom," *Science* 303 (Feb. 6, 2004): 813–5.
[12]Werner Heisenberg, *Physics and Philosophy: The Revolution in Modern Science* (New York: Harper, 1958), chap. 2.
[13]Aristotle, *Physics*, Book II.
[14]Wharton, "Understanding Time and Causality."
[15]Willem M. de Muynck, "Towards a Neo-Copenhagen Interpretation of Quantum Mechanics," *Foundations of Quantum Mechanics, an Empiricist Approach*, Fundamental Theories of Physics 127 (Kluwer Academic Publishers, 2002). See also the Los Alamos preprint archives, http://arXiv.org/abs/quant-ph/0307235 (July 31, 2003).
[16]Abraham Pais, *Subtle Is the Lord: The Science and the Life of Albert Einstein* (New York: Oxford University Press, 1982).
[17]Wharton, "Understanding Time and Causality."
[18]Ibid.

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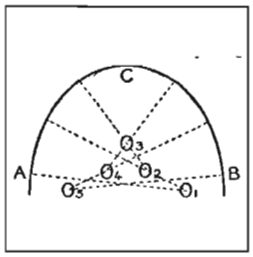
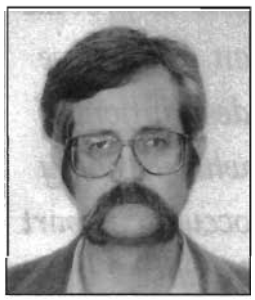


The Limitations of Mathematics in Assessing Causality

Ben M. Carter

From its inception in the sixteenth century, natural science has sought to construct a complete mathematical model of physical reality. This goal was based on three assumptions: (1) that mathematics was equal to the task; (2) that humans, insofar as they perceived the world, perceived it as it is; and (3) that the universe would reveal itself to be fundamentally fairly simple. Today we recognize that not only are all three of these assumptions flawed, their flaws are interrelated and, because of that, formulating a complete mathematical model of physical reality may be beyond our ability. In this paper, I discuss this development in light of William Wharton's work and close with a comment on what this might mean for scientists who are also Christians.


Ben M. Carter

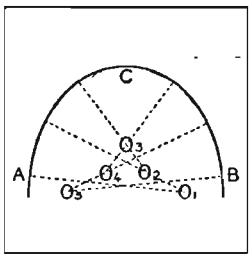
> Right into old age I have had the incorrigible feeling that if, like my schoolmates, I could have accepted without a struggle the proposition that $a = b$, then mathematics might have fooled me endlessly—just how much I only began to realize at the age of eighty-four.
>
> Carl Jung[1]

Science looks for an underlying coherence in the various processes, properties, and outcomes of nature, many of which lack obvious relationship. In other words, science is based on two fundamental intuitions: (1) that the universe is orderly and (2) that its order can be discovered. What is more, scientists since the publication of Newton's *Mathematical Principles of Natural Philosophy* in 1687, have generally been committed to the proposition that the structure of the physical world can be formulated mathematically as laws which demonstrate their validity by being predictive. Initially scientists believed these laws could be forged into a seamless network that would describe the universe completely at a certain level of detail, define what is and is not possible, and preclude certain outcomes. Now they recognize that the laws—and such a goal—have limits set by the uncertainty principle.[2]

But even had its most optimistic agenda been achievable, it would have meant only that science purposed to describe a framework of rules by which it could evaluate certain types of data. Given its own presuppositions, science did not pretend to be able to provide an exhaustive description of what actually occurs, in part because mensuration must always remain approximate, in part because almost everything that happens or has happened remains unobserved, and in part because mathematics itself, which is or has been the preferred means of scientific formulation, might prove inadequate to the task. These limits on the descriptive powers of science are a consequence of its empiricism, the contingent nature of material reality, and constraints inherent in mathematics; and they mean that the descriptions science constructs are primarily inductive.[3] One problem with this, of course, is that conclusions based on inductive reasoning are not unique. One can always hypothesize alternatives.

Science is based on two fundamental intuitions: (1) that the universe is orderly and (2) that its order can be discovered.

Ben M. Carter *earned his Ph.D. in Christianity in the Non-Western World from the University of Edinburgh. Author of four books and a variety of articles and reviews, he wrote a bi-weekly column for* The Dallas Morning News. *He spent many years overseas, particularly in Central America, the Caribbean, and Asia, and was married to Salma Carunia from South India. He was employed through the Dallas/Fort Worth Hospital Council. In June 2005, Ben died in his Irving, Texas home at age 55.*



Article

The Limitations of Mathematics in Assessing Causality

Given its own presuppositions, science did not pretend to be able to provide an exhaustive description of what actually occurs, in part because mensuration must always remain approximate, in part because almost everything that happens or has happened remains unobserved, and in part because mathematics itself ... might prove inadequate to the task.

William Wharton and I have discussed these limitations in the scientific method's capacity to model reality as they relate to his own theory that causal chains with the ability to move backward in time at the level of the microworld can resolve the apparent conflict between quantum mechanics and special relativity. This paper is one result of our dialogue. I will briefly analyze methods science employs in interpreting the world and discuss the role that mathematics and intuition can and cannot play in the process of interpretation. I also will discuss the thesis that a reality external to our minds exists even if we cannot fully grasp it, particularly as that thesis relates to physics.

In an earlier paper, I argued that mathematics, like other forms of human reasoning, may have only limited abstractive value, that it may not be decisive when it comes to answering our questions about nature.[4] In making this argument, I relied primarily on the work done by George Lakoff and Rafael Núñez that interpreted mathematics as metaphor. However, the argument can be illustrated in three other ways.

First, the idea that mathematics can be used to depict natural systems abstractly has been confounded by the intractable complexity of many such systems. To a degree, the computer revolution has rectified this problem by making it possible to model unstable systems with unprecedented accuracy, but predicting specific outcomes is contingent on the exactness of the measurements of such systems' initial conditions. Even slight imprecision quickly corrupts projections as the unstable system is expressed. While infinitely precise measurements could, in theory, make chaos models predictive, such exactitude is, in principle, impossible to achieve. Significantly, as Stephen Wolfram has pointed out in *A New Kind of Science*, it has only recently been feasible to design models that can help us understand the phenomenon of complexity itself.[5] However, these models go beyond traditional mathematical formulas. They instead are based on computer programs that embody more general types of rules. Thus the advent of computers has not only enhanced the power of mathematics, it has allowed us to go beyond traditional mathematics and forge a new intellectual structure for science. Of course, these claims by Wolfram have yet to be fully evaluated by the scientific community. Whether his thesis stands or falls, what is significant is his realization that, in order to address nature as it really is, we need to get beyond the kind of mathematical formalism that has characterized scientific theorizing to date. The complexities of nature highlight the deficiencies of the traditional approach.

Second, it is significant that Immanuel Kant is the philosopher neurobiologists most frequently cite to illustrate the nature of their conclusions. Kant argued that the mind is organized in a particular way and because of that constructs a specific kind of world out of restricted stimuli provided by the sense organs. Neurobiology was shown that a limited ranged of outside influences activate the sense organs to transmit signals, part chemical and part electrical, to various regions of the brain. These regions are only able to process a fraction of the total information they receive, but they are coordinated so that they integrate what they do process into the unified whole, the "virtual reality," that we experience as the external world. This coordination need not imply physical contact among the all of the neural systems. Rather our perception of an external world seems to emerge as increasingly higher level systems in the brain edit and splice the various bits lower level systems provide. One consequence of this is that we have no assurance that we experience the world as it is. Rather we experience a world of our own making. Of course, our virtual world enables us to interact successfully with the real world, but the process that results in that virtual world gives us no grounds for supposing that, by using our virtual world as a standard, we can model the actual world in any genuinely exhaustive way.

Third, the above suggests that our intuitions themselves may be unreliable. This is a concern because we know, since Kurt Gödel formulated his famous theorem in 1931, that mathematics ultimately rests on intuitions that cannot be proved. It is significant in this regard that Gödel was himself "a very strong Platonist,"[6] because Plato's concept of a reality that lies beyond this universe, is unaffected by it, and yet shapes it and makes it intelligible, is the only compelling alternative remaining to those who wish to resurrect from the wreckage of formalism the classicist's claim that mathematics is

grounded in objective truth. Intuitions, I would argue, rest upon one's (often preconscious) model of the world. When, in our experience of the world, we see how an event that might otherwise be inexplicable fits into our naive world view or corrects or overturns it, we have an intuition. But given such a definition, intuitions cannot be unaffected by this universe. Instead they are generalizations based upon the way we imagine the universe to be. Thus the realm of necessary truth, if it exists, remains opaque to them.

That computers have enabled us to go beyond traditional mathematical formulations, that the world we perceive is distinct from the world that is, and that formalism has failed to secure the necessary truths of mathematics leaving them rooted in system-bound intuitions suggest that unraveling the truth about our universe might require tools more powerful than mathematics can provide.

These three illustrations: that computers have enabled us to go beyond traditional mathematical formulations, that the world we perceive is distinct from the world that is, and that formalism has failed to secure the necessary truths of mathematics leaving them rooted in system-bound intuitions, suggest that unraveling the truth about our universe might require tools more powerful than mathematics can provide. After all, the original perception that the laws of the universe might be exhaustively expressed mathematically was itself an intuition based on a belief that the universe would ultimately be revealed as both comprehensible and relatively simple, two assumptions currently in question. And this suggests that while it is perhaps desirable to have a fully developed mathematical model to explain a scientific theory, such a model itself might not be sufficient or even finally necessary.

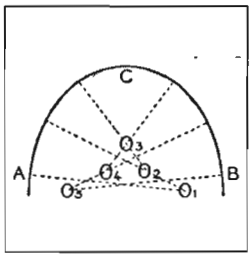
We see this problem in quantum mechanics (QM). QM is mathematically elegant and consistent but the universe it reveals is incomprehensible. That incomprehensibility suggests that the quantum world is not fully explained by the equations physicists used to depict it. Is this because the universe itself at the microlevel really is indeterminate, or does the fault lie with the equations, in the shape of the brain that thought them up, in both, or in something else? If there is a dilemma here, I believe it grows out of our own epistemological limitations, epistemological limitations that would include mathematics, and I believe that the concept of decoherence in QM can help us see that this is so.

First let us review a little history. In 1913 Niels Bohr, while working with Ernest Rutherford in the University of Manchester, began to explore the notion that instead of imagining electrons as analogous to little planets orbiting nuclear suns, it was better to think of them as confined to specific levels or shells around a nucleus and as moving between levels or shells as they absorbed or released specific bits or quanta of energy. After returning to Copenhagen, Bohr, at the urging of Rutherford, published his idea which in time became known as the Copenhagen interpretation.

In his doctoral thesis in 1923, Louis de Broglie argued that subatomic particles, rather than behaving as specific points, act like standing waves and that these waves have frequencies that are simultaneously specific and dissimilar. Later in that decade, Erwin Schrödinger, while reflecting on de Broglie's work, developed his famous equation to describe how such waves might function. Max Born reasoned that Schrödinger's equation was best interpreted in terms of probabilities, but that insight left many people, including Schrödinger himself, uncomfortable since it meant that randomness was built into the very fabric of nature.

According to the Schrödinger equation, as Born understood it, a card perfectly balanced on its edge will not stand forever as predicted in classical physics. Instead, it will fall, but when it falls, it will fall face down and face up at the same time. In other words, the card when it falls will obey a continuous and smooth wave function that is called "unitary" and will create two realities that exist in superposition. However, when we observe the card, our act of observation causes the wave function to "collapse" so that only one part of it survives. Thus we see the card randomly falling face up or face down. We do not see it doing both. We do not see the cards in superposition.[7]

In 1957 Hugh Everett III, while a doctoral candidate at Princeton University, argued that in fact the universe evolves in a unitary way and that the wave function does not collapse. Instead the observer and the card continue to exist in two different places, each place corresponding to a part of the wave function. Everett's idea, formally known as the relative-state formulation, became known popularly as the many worlds interpretation of quantum mechanics. The idea, though initially ignored, has been confirmed via experiments first proposed in 1978 by John Archibald



The Copenhagen interpretation of quantum mechanics has produced three very different views of reality: Zeh's and Zurek's idea of decoherence, Wharton's idea of causal chains which can go backward in time at the quantum level, and Tegmark's idea of a banal universe devoid of much "real" information. Each view is consistent within its set of assumptions but plainly they contradict one another.

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Wheeler and successfully conducted in 1984. The experiment, which showed that a single photon could be in two places at once, has been successfully repeated with atoms, small molecules, and most recently with sixty atom buckyballs. Thus they seem to support Everett's prediction. The obvious question is: if these alternative worlds exist, why do we not perceive them?

Here we introduce the idea of decoherence as it was developed by H. Dieter Zeh, Wojciech H. Zurek, and others during the later decades of the twentieth century. These men argued that the ideal superposition created by the falling card is coherent but that the coherent state can be maintained only so long as it is isolated from the rest of the world. It is the environment itself which destroys coherence and makes it impossible to observe superposition. Thus because it is impossible for us to keep large objects isolated so as to prevent decoherence, and because our brains are themselves part of the environment, we never see superposition. Though from a technical standpoint the wave function created by the falling card never collapses, decoherence creates a situation that is indistinguishable from a collapse.[8] This means that QM does not predict decoherence. Instead the idea is added to the theory in an attempt to explain what is happening.

Wharton has developed another interpretation of the data. Based on the premise that time does not flow, that it is rather a coordinate of measurement, Wharton argues that causal chains, that is, an interconnection of events that assume a direction from cause to effect, flow either forward or, at the quantum level, also backward in time. In his theory, decoherence marks the beginning of new causal chains which are created as a *state vector* of unrealized potential that interacts with its macroscopic environment. Such interaction causes the changeable properties of the two particles, which exist as potential within the state vector, to become actualized. Interaction with the macroscopic environment causes the actualized particles to behave quite differently from one another. The particle that interacts with the macroscopic environment, that is, the particle that has been measured, becomes disentangled from its distant twin, but that twin, because it has not interacted with the macroscopic environment, remains entangled with the potentiality of the disentangled particle. Furthermore, because causal events at the quantum level can go backward in time, what impacts the disentangled particle also impacts its entangled twin as causality races to the inception point of the two particles, then rebounds forward in time on the alternative path to affect the sister particle. This ability of the effect to go backward in time creates the impression that it moves faster than light speed, but it does not.

Measurement, or more generally interaction with the macro world, is key here because the causal chains that trace to the common origin of the two particles are terminated by the decoherence occasioned when one particle is measured. A measurement then is a beginning and an ending of causal chains that go backward or forward in time between the twin particles, and also the beginning of a causal chain that goes forward in time from the measured particle. Thus a single measurement terminates one causal chain and creates two, but the two that it brings to reality are different causal chains. Furthermore, the measurement usually acts as a barrier between the causal chains, thus enforcing their decoherence. For this reason, it can be treated as a first cause since it acts as a beginning for new causal chains. Only if the measurement is determined with one hundred percent certainty by an existing causal chain, may it lack this attribute.[9]

Max Tegmark, physicist at the University of Pennsylvania, has developed yet another idea to account for the data. He begins by arguing that the universe can be compared to a Mandelbrot set which, though it appears to contain a huge amount of information, can be expressed in a simple sentence. Thus, he maintains, most of what we see as real information is illusion. To make his argument, Tegmark begins by assuming that the big bang was very simple. However, this initial simple state involved slight fluctuations in various fields. Gravitation, the electromagnetic force, and the strong and weak nuclear forces worked in a nonlinear way to transform these fluctuations in the simple state into a state that expressed various kinds of complexity. Tegmark goes on to argue that the current wave function of the universe is a superposition of a large number of

macroscopic states that are both extremely different from one another and unperceived by us. We live in this complexity which we perceive as an information rich environment, but what we recognize as information is, in fact, a mental construct predicated on our very limited perspective. Tegmark concludes by claiming that the universe which we imagine as grand and glorious is a very banal place containing almost no information. He uses astronomy to drive his point home, saying that the libraries of data astronomers have collected on their subject contain no "real" information, only information in the eye of the beholder.[10] In another context he says dramatically, "[N]ot even the pines and the Big Dipper of our world would exist if neither we nor any other [self-aware subsets] were here to perceive them."[11] In other words, the universe that we see is itself an example of decoherence created by our very act of seeing it. Such a conclusion, if true, reduces empirical science to the study of an extremely subtle and profound illusion.

Thus the Copenhagen interpretation of QM has produced three very different views of reality: Zeh's and Zurek's idea of decoherence, Wharton's idea of causal chains which can go backward in time at the quantum level, and Tegmark's idea of a banal universe devoid of much "real" information. Each view is consistent within its set of assumptions but plainly they contradict one another. In Zeh's and Zurek's imagination, trillions of interrelated data rich universes multiply themselves as they evolve simultaneously from fixed pasts across the sweep of eternity. In Wharton's imagination, there is only one universe made indeterminate on the quantum level by either a lack of causal chains or casual chains going backward in time from first causes, which have not yet occurred. In Tegmark's imagination, the universe is a data poor banality, a screen for our intellectual illusions.

These three alternatives are the fruit of induction and as such they suggest that the true nature of our physical world is hidden from us. Indeed, given the failure of formalism coupled with our recognition that the world we perceive is distinct from the world as it is, an awareness that points starkly to the limits of our intuitive powers, we may interpret such contractions as an indication that a final exhaustive description of reality is forever beyond our abilities. Perhaps we have no hope of educing in any comprehensive way principles that could help us determine the true nature of reality and the best we can hope for is an analysis of a human construct that comes into existence as we observe the universe. That universe at its quantum level could be characterized by indeterminacy, or perhaps that indeterminacy is an illusion created by our epistemic limitations. The point is we might never know for sure, perhaps because science rests upon metaphysical assumptions that lie beyond the realm of mathematics and, as metaphysical assumptions, are themselves closed to scientific investigation.

As a Christian I believe that I am made in the image of God and that God, who created the universe, is truth. But I also believe that God's thoughts and ways differ from mine. Hence I am not at all dismayed by such a conclusion. What some may see as a frustrating impasse, I view an illustration of our fundamentally religious nature. God gives us not only reason, God also gives us faith. The two must work in tandem. Those who walk by the light of their own fire, as Isaiah says, will know only torment (Isa. 50:11).

Notes

[1]C. G. Jung, (recorded and edited by Aniela Jaffe), *Memories, Dreams, Reflections* (New York: Random House, 1965), 28.

[2]Stephen Hawking, *A Brief History of Time* (New York: Bantam Books, 1988), 166; ____, *The Theory of Everything* (Beverly Hills, CA: The New Millennium Press, 2002), 161. One might ask how the uncertainty principle sets such limits. Briefly, the principle means that observation must necessarily affect what is observed. That means the neutral observer assumed by science does not exist. It is generally granted that the effect of an observer has no significant influence in the world of our everyday experience, but it does have a significant impact on events at the subatomic level since it means that events on that level cannot be measured accurately. And that means not only that accurate knowledge of such events will forever elude us, but also that statements about them are devoid of meaning. In this way the uncertainty principle frustrates both our ability to formulate laws describing events on the subatomic level and to develop a complete scientific picture of the world.

[3]Scientists often argue that their discipline also employs deduction that the theories or laws of science act as major premises in a deductive argument. I will not dispute that. But it remains the case that those theories and laws are derived inductively which is why they can be countermined by additional evidence.

[4]Ben M. Carter, "Mathematics and Metaphysics," *Perspectives on Science and Christian Faith* 55, no. 3 (September 2003): 159.

[5]Stephen Wolfram, *A New Kind of Science* (Champaign, IL: Wolfram Media, 2002).

[6]Roger Penrose, *The Emperor's New Mind* (New York: Penguin Books, 1991), 113.

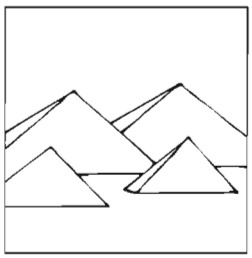
[7]Max Tegmark and John Archibald Wheeler, "100 Years of Quantum Mysteries" *Scientific American* 284, no. 2 (February 2001): 54-61. Schrödinger, in protest against such a conclusion and intending to illustrate its silliness, proposed his famous thought experiment or gedanken in which a cat sealed in a container might be both dead and alive at the same time since no observer had yet looked into the container to collapse the wave function and establish the condition of the cat (Dennis Overbye, "Quantum Theory Tugged, And All of Physics Unraveled" *The New York Times, Science Times*, section "Quantum Wars," p. D4). Of course, one might counter that the cat itself qualified as an observer of its own condition and thus collapsed the wave function moment by moment.

[8]Tegmark and Wheeler, "100 Years of Quantum Mysteries"; and David Deutsch, *The Fabric of Reality* (New York: Penguin, 1997), 50. While Deutsch admits that the "multiverse" interpretation remains the minority opinion among physicists, he argues that this is true for reasons that have much more to do with philosophy than science. *The Fabric of Reality* provides what is probably the finest defense currently available for the proposition that quantum theory is best explained by assuming the existence of a multiverse and why at a minimum at least a trillion (I assume Deutsch means a British trillion) universes run parallel to our own.

[9]William Wharton,"Understanding Time and Causality is the Key to Understanding Quantum Mechanics," http://xxx.lanl.gov/abs/quant-ph/0310131

[10]Max Tegmark, *Foundations of Physics, Letters* 9, no. 1 (1996): 25-41.

[11]____, "Is 'The Theory of Everything' Merely the Ultimate Ensemble Theory?" *Annals of Physics* 270 (1998): 46.



Article

Historical Method and the Intelligent Design Movement
Part I: Intelligent Design Movement as a Foray in Secularization Theory

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I want to focus on the historical claims about the recent past of the West put forward by IDM proponents ...

Proponents of the Intelligent Design Movement identify themselves principally as scientific thinkers working to remove philosophical bias from modern science, especially evolutionary biology. A review of their popular literature, focusing on that of Phillip Johnson, shows that their arguments rest heavily upon historical, not scientific critiques. They are less concerned with science itself than they are with the impact of science on culture. They enter the debate with desired cultural norms pre-selected as the conclusions of their arguments. They therefore write about the secularization of the West and in doing so betray a polemical and apologetic rationale underlying their critique of Darwinian evolutionary theory.

Phillip Johnson, and after him members of the Intelligent Design Movement (IDM), want to know why important and powerful members of the Western societies seek to do without religion. As the name implies, Intelligent Design (ID) is an attempt to revive the theistic Argument from Design, not on classical premises but on scientific observations purportedly not explicable by known natural forces or laws. IDM is a multifaceted intellectual, polemical, and political movement. The main force in its public presence has been Johnson and his campaign to unseat what he sees as the pseudo-science supporting modern evolutionary biology. On the technical side, William Dembski has presented highly sophisticated (though not widely accepted) mathematical and philosophical models for supporting IDM and for creating a design-oriented scientific method. However, at the popular level, as it is expounded in his books and articles, Johnson's ID campaign is really about the place of theology as a science itself (and the misplacing of science as a theology); about the role of philosophy in the interpretation and teaching of scientific investigation; and about forms of authority in the academy and society at large, especially in areas related to ethics. In short, as Johnson has framed it, IDM is much about the secularization of the West.

In the now more than decade long history of the IDM and its critics, arguments have clustered around a series of thematic nodes: whether it is or is not reasonable to conclude that the complexity of living things indicates their design rather than chance appearance; whether many biologists' resounding negative to that question indicates a conclusive scientific finding or is in fact a philosophical prejudice; whether such discussions should appear in textbooks; whether, if "teaching the controversy" were in textbooks, the argument would breach the separation wall between Church and State. In all of this, one angle appears ignored, or certainly underplayed: the extent to which the IDM is a fundamentally historical enterprise. After all, the two basic claims advanced by the movement are historical assertions. The first is that a study of organisms living and fossil, not dependent upon the context of a sacred text, nonetheless reveals the action of intelligent design. Proponents proclaim that life history is in fact the history of an agent or agents acting in our world. The second, which is much nearer to what people tend

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to think of as "history," is a claim about the intellectual development of the West since the era of the Enlightenment and principally since Darwin published *The Origin of Species* in 1859.

While Johnson has a great deal to say about the impact of philosophical naturalism (which he sees at an apogee in Darwinian evolutionary theory) on western intellectual life and society in general, he has not attracted many historians to his cause.

It is not my purpose to enter into the debate about which scientific facts support or demolish claims of design. Instead, as a historian, especially with some background in Church and intellectual history, I want to focus on the historical claims about the recent past of the West put forward by IDM proponents, specifically Johnson but also Nancy Pearcey. It is interesting that while Johnson has a great deal to say about the impact of philosophical naturalism (which he sees at an apogee in Darwinian evolutionary theory) on western intellectual life and society in general, he has not attracted many historians to his cause. Perhaps only one historian of national reputation has become an IDM scholar. Richard Weikart has written engagingly and provocatively about the impact of evolutionary thought on German eugenicists and on the Nazis. Nevertheless ID arguments seem to have moved few historians. This may well be because historians are insular (which I think they are), or because they are overwhelmed by the scientific nature of the debate. I suspect it is also because historians just do not sense the same cultural crisis moment or sense it in the same way that those IDM proponents do and thus are not moved by the IDM's historical critique of Darwinism.

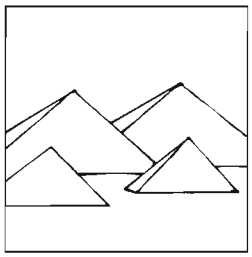
Since the early 1990s, Johnson has appeared in print voluminously and across several formats. He is well documented on the web, especially at the Access Research Network website, in various journals, especially *First Things*, and most famously in various books: *Darwin on Trial* (1991; 1993), *Reason in the Balance* (1995), *The Wedge of Truth* (2000), and *The Right Questions* (2002).[1] Though he engages in scientific and philosophical polemic, Johnson is also essentially writing a Christian history (and not only in the sense of applying terms of Christian philosophy to the problems of history). Johnson argues that "more than science" is at stake. He writes:

> These questions [of whether evolution is literally true or just the best naturalistic theory available] cannot be left to the sole determination of a class of experts, because important questions of religion, philosophy, and cultural power are at stake. Naturalistic evolution is not merely a scientific theory; it is the official creation story of modern culture. The scientific priesthood that has authority to interpret the official creation story gains immense cultural influence thereby, which it might lose if the story were called into question. The experts therefore have a vested interest in protecting the story, and in imposing rules or reasoning that make it invulnerable. When critics ask, "Is your theory really true?" we should not be satisfied to be answered that "it is good science, as we define science."[2]

Secularization as a Historical Narrative Scheme

Johnson answers this challenge by re-writing a creation story of his own: once there was a time when right belief guided people in their basic assumptions and choices about the good of life. Then through the eighteenth century machinations of intellectuals, temptation in the form of secular state theory and in the form of philosophical materialism crept into the original Eden. People clung to the old truth in their minds through force of habit or, more likely according to Johnson, because they were not fully persuaded of the temptation. Then Darwin, in part deluded and in part deluder, produced a grand lie: material forces and natural processes alone could explain the existence and diversity of living things. It was a catastrophic assault on God and God's order. People through ignorance or through the increasing authority and power of science imbibed the lie. Jurists, legislators, even theologians co-opted themselves to promote the lie. Error replaced right reason as the basis of law and policy, and chaos ensued. Thus the Fall. Then, when all seemed blackest, persons of good will and ability began to unravel the lie. It was possible, they said, that in restoring right reason to science, one might therefore refashion science itself to see the old truth once hailed by theology: the origin of all creation in God and God alone. Once acknowledging that fact, people could rebuild law, commerce, education, and science on solid principles of the Natural Law. Right Order might yet return. Thus the Redemption.[3]

In summarizing Johnson this way, I do not intend to be flip. The Creation, Fall, and Redemption scheme is one promoted by IDM commentators, especially Nancy Pearcey. Pearcey is a fellow of Seattle's Discovery Institute, the flagship institution of the IDM. She has also served as the



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The IDM narrative myth depends crucially on our ability to identify unambiguously a time when the power of the lie did not distort humans' minds. ... This is a difficult task, even in the recent history of the modernizing United States.

managing editor of IDM's main journal, *Origins and Design*. She is a Christian apologist and polemicist heavily influenced by Reformed theology, and an impressive debater. Apologists like Johnson and Pearcey represent a striking renaissance in evangelical intellectual life. Johnson in particular is possessed of a broad and brilliant mind, an engaging wit, and facile and tenacious debater's skill. There is nothing inherently wrong with his choice to create a mythological narrative of the decline of the West. It is in fact well within an ancient tradition of Western historiography dating certainly from the advent of Christian times. In recent history, commentators like Oswald Spengler or Arnold Joseph Toynbee, although in different idioms, have done no less.[4]

My objection is not so much in principle, but that this narrative does not carry much persuasive force. The IDM narrative myth depends crucially on our ability to identify unambiguously a time when the power of the lie did not distort humans' minds. To do this, we must presumably survey Western societies sometime between the advent of Christendom but before the onset of the Darwinian revolution. We must identify not only philosophers and thinkers who are saying the "right thing" according to Johnson's criteria, but we must also identify populations in these societies who are routinely doing the right thing and then stop doing it once they feel the impact of Darwin. This is a difficult task, even in the recent history of the modernizing United States.

In their famous study of Muncie, Indiana, Robert and Helen Lynd believed they had documented secularization and the decline of religious belief. Visiting the town in 1929 and again in 1935, they concluded that religious life was markedly declining compared to twenty or thirty years earlier.[5] However, when the National Science Foundation conducted a follow-up study for the fiftieth anniversary of the Lynds' work, the results indicated a strong reversal: by all measures, the town showed a greater religiosity than was apparent even in 1929.[6] Subsequent studies have shown the same thing and more: it is likely that people, in the United States at least, are not only more religiously active but also more religiously literate than ever before.[7]

Such data do not satisfy Johnson. He may concede that people are talking a great deal about God. He argues that they are discussing the wrong one. Johnson has consistently complained that modern theology, having imbibed the evolutionary story, can now only discuss a god who does not do anything: does not create life directly and does not apparently intervene to alter life or to catalyze events on Earth. Such a do-nothing god, as Johnson would have it, is not compelling or even interesting. For his narrative, Johnson wants a god who is demonstrably (in an empirical sense) on the move.

We can say the same for his pre-Enlightenment, pre-Darwinian philosophies: we want to see where such ideas actually reshaped societies, created worlds alternate to our own. Presumably, we will need to see clearly that such societies existed and existed in their ideas and not the other way around. I believe that, though the historical record documents many individuals having reached ascetic and moral heights through their immersion in philosophy or theology, it will not reveal any such *society*. If anything, Johnson's purported "Age of Faith" may be just as much a nineteenth-century construction as was early Darwinian evolutionary theory.[8]

Consider the rates of illegitimacy in pre-Darwinian societies. Presumably, these societies, still under the sway of an authoritative Christian world view, would demonstrate a different attitude toward marriage, sex, and procreation than the Darwinized, secularized western societies Johnson critiques. However, the historical record does not make any such distinction clear. For example, eighteenth-century Toulouse touted a rise in illegitimacy from roughly 2% in the 1680s to roughly 25% in 1788.[9] Depending on the region of the country, between 10% and 30% of all English brides throughout the Stuart era came to the altar pregnant or with children.[10] In America, the prevalence of premarital sexual activity (as measured by reported cases of unwed mothers) has ebbed and flowed in cycles, not in a pattern of steady progression. The pattern indicates peaks in illegitimacy not only in the twentieth century since 1950 but also across the second half of the eighteenth century as well.[11] Moreover, behavior and public expression have not always matched. As late

as 1969, 110 years after the advent of Darwin, 68% of Americans agreed that "it is wrong to have sex relations before marriage."[12] The case of vice is similarly ambiguous. Nineteenth-century America, from before the Civil War, sought to deal with adultery and prostitution by specifying in the laws that such actions constituted crimes only when committed flagrantly and publicly. Social commentators and reformers acknowledged that controlling the acts was impossible, so they hoped simply to keep such behavior out of the public eye.[13]

As historical observers, we have no way to establish any criteria for Johnson's assertions. We have no way of knowing the actual impact of ideas on populations or, for that matter, whether ideas are part of the cultural output of various societies, or the shapers of the societies in which they reign.

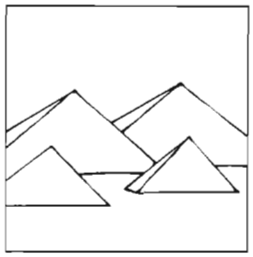
Guessing why these trends might have preceded intellectual disaffection with religious morality, one might point to trends in urbanization just as easily as any cause. As the city grew, what were housing patterns? What happened to family relationships and kin oversight of young people? Could people easily reach the services of clergy and did they want them? Were the fornicating couples of Toulouse religious? One might argue that these people were indeed religious, but not necessarily Christian. Perhaps they were self-identified Christians who were nevertheless ignorant of or dissidents against Church sexual morality teachings. It all depends a great deal upon what one means by "being religious."[14] Certainly those Toulouse artisans were not studying the arguments of scientific philosophical naturalism. The truth seems close to this: as historical observers, we have no way to establish any criteria for Johnson's assertions. We have no way of knowing the actual impact of ideas on populations or, for that matter, whether ideas are part of the cultural output of various societies, or the shapers of the societies in which they reign. Consider one further example: since 1859, have people increasingly fornicated? If they have, is it because they became convinced naturalists who doubted the existence of a law-giving God?

ID proponent Ben Wiker has argued something like this in his *Moral Darwinism*.[15] Wiker explicitly links the hedonism and activism of contraception champion Margaret Sanger to the moral deconstructionism he sees inherent in Darwinian thinking. Setting aside arguments regarding the strength of Wiker's analysis, one is still left with a conundrum: how can we know people's motivations? Were not the changing patterns of sexuality simply the result of people gaining access to cheap, easily supplied contraceptives (arbitrarily picking a reason from among many causes like migration, changing family composition, work patterns, changing political demographics, etc.)?[16] Did people need or wait for philosophical and political justifications for using contraceptives? We have no reason to suspect that, if Darwin had never published, people would have refrained from demanding contraceptive technologies once they were known to exist. In fact, the historical record indicates that people have used contraceptive techniques throughout time, whenever they became aware of them. Considering this point, perfecting the vulcanization of rubber in the mid-1840s[17] was just as big a step along the road to the Culture Wars as anything Rousseau, Locke, Voltaire, or Darwin ever published. Perhaps Charles Goodyear is our villain. Or to reverse the problem: we have no reason to think that a narrative that explained changing patterns of sexuality based solely on the history of contraceptives would be any more convincing than one that blamed philosophical naturalism.

Intellectual vs. Social History: Which Narrative?

Johnson's choice of granting privilege to intellectual history can superficially help his case. By practices of selective sampling, he and allies like Pearcey can portray a contemporary intellectual milieu seemingly awash in Darwinian dogma.[18] In her recent contribution to William Dembski's IDM anthology, *Uncommon Dissent*, Pearcey posits a sort of Darwinian academic coup that in our day has captured school curricula for the purpose of indoctrinating students with a particular world view.[19] She also has produced a lengthy prescriptive history of the ills of Christianity in America. That work addresses the problems of American Protestantism principally in terms of philosophy and doctrine. There are extensive sections on various aspects of developing "worldview." There are over fifty pages dedicated to the dissection of Darwinism. There are, however, no references to nationalism, to either world war, or to the ambiguous role of the churches in the history of segregation. In short, Pearcey again contends that a particular intellectual history, with spin to match her neo-Calvinist preferences, is sufficient for understanding the social crisis she perceives.[20]

However, this reliance on a tilted intellectual history can and often does place these authors in a bind. Evidence does not indicate that a top-down transformation of



Article

Historical Method and the Intelligent Design Movement
Part I: Intelligent Design Movement as a Foray in Secularization Theory

The problem, as Johnson sees it is one of intellectual apostasy. The crisis (and Johnson is emphatic that there is a great crisis) of the West is all a matter of cognition. Other social and economic trends do not figure in his story, except insofar as they may appear to stem from Darwinism. The sin of the West is "thought crime" ...

culture has occurred. If Darwinism has had such a deleterious impact on people, how is it that polling figures show an overwhelming number of Americans who acknowledge God's work in creation or at least question the status of Darwinian evolutionary theory? As the power and prestige of twentieth-century science increased, why did communities like Muncie not apostatize? And what do Americans believe today? Some numbers will help illustrate the point. According to the Gallup Poll organization, between 1982 and 1997, the percentage of Americans who agreed with the statement, "God created people in their present form roughly 10,000 years ago" held steady at around 45%. Two-thirds of high school students polled in 1999, asked about their choice if confronted with contradictory scientific and religious explanations of the world, said that they would accept the religious explanation. Only 27% credited scientific knowledge with priority over religious knowledge. Moreover, between 1983 and 1999, a constant one-third of U.S. public school teachers favored equal time for Creationist alternatives to evolution in the classroom. Lastly, in the general population, between 1982 and 1997, never more than 11% of respondents affirmed the statement that evolution had occurred without any interference at all by God.[21]

It would seem that, given the persistence of the Darwin-doubting numbers in the polls, and given the frustrations this causes people like Richard Dawkins, Daniel Dennett, and Eugenie Scott, there should be no problem from Johnson's point of view. However, Johnson in return cites social trends in violence, family law, abortion, even the apparent ruling philosophy of the Supreme Court to argue that there is a great problem and that philosophical naturalism is the cause.[22] He would counter that while there is resistance to this naturalism at the grass roots, it is nonetheless confused, somewhat passive, and constantly endangered by the power prerogatives of the naturalist elite.

However, one must note that even while that resistance is recorded in these polls consistently from the 1980s, the nation nonetheless has moved relatively seamlessly into a seemingly permanent accommodation of the same social trends which so alarm Johnson. The historian is compelled to ask whether there has ever existed in people's minds an active correlation between the tenets of "Darwinically" buttressed philosophical naturalism and the other things they do in daily life. If believing in Darwin made for the various practices Johnson decries, then the polls suggest that these practices should in fact be relatively rare. If disbelieving in Darwinian theory would make people less likely to engage in or to accept these various practices, then why do Americans, who rank the highest in the world when it comes to doubts about Darwin, eschew the barricades and get on with life in the face of these rapidly changing social trends?

Johnson, of course, bypasses this complexity. Instead, he understands that before he can begin his prosecution, he must establish that a crime has in fact been committed. He must do so even if threatened by historical evidence that does not fit his narrative. Getting that indictment is the purpose of his foray into intellectual history and the goal that keeps him from worrying about contradictory evidence of the sort just cited. It is also the mission of his books, especially *Reason in the Balance*. In some ways, *Reason in the Balance* is nothing but an extended essay on the rise and impact of philosophical naturalism in the West. Johnson begins the book with a brief recounting of the public reception of his *Darwin on Trial* (1991). Here he made the argument, that at least at the level of textbooks and science popularizations, explicators of modern Darwinian evolutionary theory were guilty of misappropriation of evidence, falsely sweeping conclusions, and rhetorical infractions serious enough, in his opinion, to impugn evolutionary theory altogether.

Predictably, critics reacted harshly to Johnson and, as he himself says, the ensuing argument soon came to focus not on individual facts but on "how science works." Johnson's critics claimed he was in error in understanding what constituted a scientific fact and how scientists used such facts in their thinking. Johnson argued that he was not ignorant of scientific method, but that he consciously refused to accept the premises that philosophical naturalism basically equated science or that he was under any obligation to propose alternative models for the origin of life or for biological diversity.[23] Instead, Johnson responded with a historical argument. He claimed that for reasons not

really driven by scientific discovery, the civilizations of the West had effected a swap in "Creation Stories." The older model had been the familiar one of creation by God for a set purpose and according to a plan. The newer one, which Johnson would date to the latter eighteenth century, he calls the "naturalistic creation story." This story, he claims, is marked by a consensus first among elites, then generally, that God is but the product of human imagination, and that "all living creatures evolved by an unguided, purposeless material process of random genetic change and natural selection." This naturalism, he argues, only "took hold" after Darwin's 1859 publication of *The Origin of Species*.[24]

Therefore, the problem, as Johnson sees it is one of intellectual apostasy. The crisis (and Johnson is emphatic that there is a great crisis) of the West is all a matter of cognition. Other social and economic trends do not figure in his story, except insofar as they may appear to stem from Darwinism. The sin of the West is "thought crime" and from this fundamental error, many others have sprung. In his later works, Johnson, and some of his colleagues like Pearcey, have not been coy about declaiming the results. They link the collapse of theology as a premier intellectual pursuit, the decline of public education, public moral standards, the advent of legalized abortion, and even the twentieth-century totalitarian dictatorships to the rise of a Darwin empowered philosophical naturalism in the arts and sciences. Johnson, Pearcey, and some other IDM writers do not seem interested in population trends, migration, capitalism, industrialization and the growth of the cities, nationalism, not one but two world wars, mass communications, mass transit, or even the computer age. For them, everything hinges on Darwin. It is this rigid single-mindedness that causes these IDM proponents to discount and/or misunderstand other forms of historical evidence and other narratives. I suspect that it is also a strong reason why most historians take no interest in Johnson's crusade.

From the Privilege of Intellectual History to the Privilege of Theology

In IDM literature aimed at specifically scientific issues, IDM advocates are careful to repeat that the nature of the designer is not an issue. Their claim is simply that living things display a profound complexity which known natural processes cannot have created. Johnson comments:

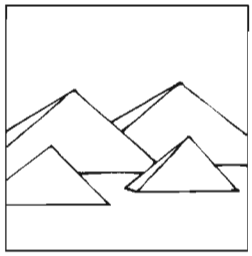
> Science is committed by definition to empiricism, by which I mean that scientists seek to find truth by observation, experiment, and calculation rather than by studying sacred books or achieving mystical states of mind. It may well be, however, that there are certain questions – important questions, ones to which we desperately want to know the answers – that cannot be answered by the methods available to our science. These may include not only broad philosophical issues such as whether the universe has a purpose, but also questions we have become accustomed to think of as empirical, such as how life first began or how complex biological systems were put together.[25]

This, by the way, raises the question of a rationale for ID. ID purports to use the tools of empirical science to *rule out* the possibility of mere naturalistic laws and chance being sufficient as causes for phenomena like the origin of life or the construction of complex biological systems. How can we obtain an empirical demonstration of the unsuitability of empiricism for investigating phenomenon we suspect are beyond the realm of empirical investigation in the first place? And, how can we determine which such phenomena are in fact outside that realm?

In the works of Johnson, IDM is inseparable from a theological position wherein the science plays an apologetic role.

Assuming they have carried that point, proponents continue that it is reasonable and scientific to infer a designer.[26] Of course, IDM writers like Dembski, Michael Behe, Jonathan Wells, and Paul Nelson so far have not carried the first point in the general marketplace of ideas. But if they did, they assure their opponents that there would be no need to specify the designer. Johnson has been more forthright. Acknowledging that emphasis on Gen. 1:1 ff. has severely handicapped creationist critics of evolutionary biology, Johnson has repeatedly argued that the discussion should shift to the prologue of St. John's Gospel, "In the beginning was the Word ..."[27] Johnson contends that this is a broadly theistic assertion, leaving room for an allegorical interpretation of Genesis and possibly even the inclusion of other, non-Christian theists. He is undoubtedly right as far as that goes but the greater question remains: it is not clear just how this shift of ground will please Johnson's scientific critics any better than the use of Gen. 1:1 ff. Johnson must know that it will not and therefore must employ the tactic to different ends, like squelching disharmony between young earth creationists and other potentially IDM-friendly groups, a problem endemic to the "Big Tent" strategy of IDM.[28] The point stands however that, in the works of Johnson, IDM is inseparable from a theological position wherein the science plays an apologetic role.

Still, Johnson is a master of engaging polemic, provocative, and highly emotionally charged rhetorical jousting



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worthy of the "culture war" debates of the 1990s. However, just as many critics cannot bring themselves to call it "science," it is equally difficult for a historian to see it as good history. If I were to classify Johnson's place in Western historiography, I would see him as an "anti-Whig." The Whig historians of the nineteenth century, particularly skeptical rationalists like W. E. H. Lecky or J. B. Bury, argued that the advance of civilization was a sort of evolutionary process which became visible in retrospect to the eye trained to follow the intellectual threads of progress. Moreover, the narrative of this development was progress indeed, a sort of teleological journey toward the higher intellectual consciousness wherein humanity freed itself from superstition and ignorance, namely religion. As the great British intellectual historian Owen Chadwick commented:

> [H]istorians of European intellect, like ... Lecky or ... Bury, doubted [that the Christian Churches fruitfully adjusted to new knowledge of the world]. To them the progress of truth consisted in the light of science invading dark chambers inhabited by mysticism, until at last no darkness should be left.[29]

For Johnson, the trend is precisely the opposite. As we have seen in his works and those of other IDM apologists, there was a time when Western intellectual life was on the right track. Then, beginning in the eighteenth century, something began to go wrong. Finally, with the advent of Darwin, catastrophe struck, precipitating the Fall. The floodgates of apostasy opened and chaos ensued. Taken in this light, the narrative of *Reason in the Balance* is a Christian history.

Johnson asserts that the rise of philosophical naturalism as the defining method of the sciences has spilled over into other areas, including theology. Having imbibed its own antithesis, theology is powerless to speak to the problems of the now deluded public. Christian influenced policy ideas have no hope in a setting where philosophical naturalism is triumphant and the very fundamentals of society are in jeopardy. As Johnson puts it: "Christian family morality looks like oppressive nonsense if you take for granted that Christian metaphysics has been shown to be false."[30]

So according to Johnson, the real goal behind it all is the rescue of Christian family morality via the rescue of Christian metaphysics. It becomes clear that the IDM is about something else besides science, or at least something more than just science. Particularly in the writings of Johnson, ID becomes a scientifically based apologetic designed to make room for the revival of theology as a serious academic and even public policy enterprise. Even theorist William Dembski routinely resorts to language and ideas of the Culture Wars when writing outside of his scientific idiom. The popular public face of IDM is cultural criticism. It is the very progression from culture critique to idiosyncratic intellectual history to theology driven policy that has rendered ID suspect and has clouded whatever scientific contribution its advocates might otherwise have made. ❋

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Acknowledgment

My hearty thanks go to Roman J. Miller and the insightful referees he engaged for *PSCF*. My colleagues Phil Sinitiere and Glenn Sanford read and made valuable comments on drafts of this article. So too did Edward Davis, to whom goes a special thanks for inviting me to Baylor's Christianity and the Soul of the University Conference in March of 2004. This article stems from my paper given there.

Notes

[1]For a sympathetic but very informative coverage of Johnson's anti-evolution career, see Thomas Woodward, *Doubts About Darwin: A History of Intelligent Design* (Grand Rapids, MI: Baker Books, 2003).

[2]Phillip E. Johnson, *Darwin on Trial*, 2d ed. (Downers Grove, IL: InterVarsity Press, 1993), 159.

[3]Nancy Pearcey, "Century of Cruelty: Making Sense of Our Era," *Boundless* (December 1999). See also Pearcey's forward to Johnon's, *The Right Questions: Truth, Meaning, and Public Debate* (Downers Grove, IL: InterVarsity Press, 2002). Pearcey repeats her use of this scheme in her *Total Truth: Liberating Christianity from Its Cultural Captivity* (Wheaton, IL: Crossway Books, 2004), 134*ff*.

[4]For Toynbee's great work, see D. C. Somervell, *A Study of History*, abridged, 2 vols. (New York: 1947–1957). See also Oswald Spengler, *The Decline of the West*, 2 vols. (New York: Knopf, 1926–1928).

[5]Robert Lynd and Helen M. Lynd, *Middletown: A Study in Contemporary American Culture* (New York: 1929), 407.

[6]Theodore Caplow, et. al., *Middletown Families: Fifty Years of Change and Continuity* (Minneapolis, MN: University of Minnesota Press, 1982), 192, 229,

255-6. For an overview of the development of the secularization debates, see William H. Swatos, Jr. and Kevin J. Christiano, "Secularization Theory: The Course of a Concept," *Sociology of Religion* 60, no. 3 (1999): 209-28.

[7]Swatos and Christiano, "Secularization Theory," 215.

[8]Ibid., 219-20. The idea that an "Age of Faith" is a nineteenth-century misinterpretation of medieval history is developed in the work of the Jesuit historian Peter Raedts. See also W. de Ruyter, "Dark, Backward, and Barbarous," *Leiden Institute for the Study of Religions Newsletter* 1, 3-8.

[9]Owen Chadwick, *The Secularization of the European Mind in the Nineteenth Century*, Canto Edition Reprint (New York: Cambridge University Press, 1991), 3.

[10]Keith Wrightson, *English Society, 1580-1680* (New Brunswick, NJ: Routledge, 1984), 84-6.

[11]Daniel Scott Smith and Michael S. Hindus, "Premarital Pregnancy in America 1640-1971: An Overview and Interpretation," *Journal of Interdisciplinary History* 5, no. 4, The History of Family, II (Spring 1975): 537-70.

[12]Ibid., 560.

[13]Andrea Tone, *Devices and Desires: A History of Contraceptives in America* (New York: Hill and Wang, 2001), 8-10.

[14]Steve Bruce, *God is Dead: Secularization in the West* (Malden, MA: Blackwell Publishers, 2001), 45-59.

[15]Benjamin Wiker, *Moral Darwinism: How We Became Hedonists* (Downers Grove, IL: InterVarsity Press, 2002).

[16]Smith and Hindus, 559-60.

[17]Charles Goodyear patented the process of vulcanization in 1844. Soon thereafter, both industrial and consumer rubber products, including vaginal diaphragms, became increasingly available. See Tone, *Devices and Desires*, 53-5.

[18]Johnson, *Defeating Darwinism by Opening Minds* (Downers Grove, IL: InterVarsity Press, 1997). This is Johnson's popular guide for "striking back" at the supposedly monolithic control of "Darwinism" in intellectual and public life.

[19]Pearcey, "Darwin Meets the Berenstain Bears: Evolution as a Total Worldview" in William A. Dembski, ed., *Uncommon Dissent: Intellectuals Who Find Darwinism Unconvincing* (Wilmington, DE: ISI Books, 2004), 53-73.

[20]Pearcey, *Total Truth*.

[21]Eugenie Scott, "Problem Concepts in Evolution: Cause, Purpose, Design, and Chance," *NSCE Resource Publications* (1 October 1999), www.ncseweb.org/resources/articles/695_problem_concepts_in_evolution_10_1_1999.asp Johnson himself has used similar data to argue not that the public has safely rejected unwarranted philosophical naturalism, but rather that the academic elite have staged a coup against the democratically based educational system. Johnson, "Evolution as Dogma: The Establishment of Naturalism," *First Things* 6 (October 1990): 19-21.

[22]Phillip E. Johnson, "Nihilism and the End of Law," *First Things* 31 (March 1993): 19-25.

[23]Johnson, *Reason in the Balance* (Downers Grove, IL: InterVarsity Press, 1995), 12-5.

[24]Note that Johnson's narrative is linear and unidirectional. Research into the phenomenon of secularization indicates it may in fact be cyclical. See Swatos and Christiano, "Secularization Theory," 16-7.

[25]Johnson, "Evolution as Dogma," 21.

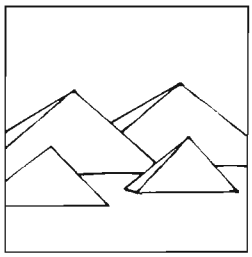
[26]Cf. Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Free Press, 1996); William A. Dembski, *Intelligent Design: The Bridge Between Science and Theology* (Downers Grove, IL: InterVarsity Press, 1999); William A. Dembski, *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (New York: Rowman and Littlefield Publishers, Inc., 2002).

[27]Johnson, *The Wedge of Truth: Splitting the Foundations of Naturalism* (Downer's Grove, IL: InterVarsity Press, 2000), 151-7.

[28]Robert T. Pennock, *Tower of Babel: The Evidence against the New Creationism* (Cambridge, MA: MIT Press, 2000), 18-26.

[29]Chadwick, 15.

[30]Johnson, *Reason in the Balance*, 32.



Article

Historical Method and the Intelligent Design Movement
Part II: A Historical Critique of a Historical Critique

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Part II: A Historical Critique of a Historical Critique

Kenneth E. Hendrickson

A previous section of this article argued that the Intelligent Design Movement (IDM) functions more as a historical cultural critique than as a scientific paradigm. This section will offer a critique of IDM in those terms: how well it performs the task of historical argument and criticism. IDM publicists like Phillip Johnson or Nancy Pearcey do not offer a well-rounded assessment of the recent intellectual history of the West. Neither do they give a clear picture of the public role of the Churches in the West, a topic central to their thesis. Anglican Bishop N. T. Wright is proposed as a superior model of Christian history writing and historical criticism.

I hope to offer specific evidence that demonstrates the weakness of Johnson's case and to show that, taken to its own logical conclusions, his secularization argument will ultimately become destructive of the very ideals he hopes to promote.

In the first part of this article, I argued that at the heart of the Intelligent Design Movement (IDM) there lies a historical world view rooted in a narrative of intellectual apostasy and cultural decline of the West. Phillip Johnson, a leading popular promoter of the national movement, has routinely invoked history in an attempt to demonstrate that the advent of Darwinian evolutionary theory brought on a terrible moral and social crisis in western Europe and North America. He offers this narrative of crisis as one of his proofs that Darwinism is "false knowledge" and as a principle reason to subject Darwinism to rigorous dissection and ultimately rejection. He argues that once science re-acknowledges Divine agency in the origin and diversity of life, the West will have regained the road to cultural and spiritual regeneration.

I attempted in the first part to show that Johnson's line of argument begs more questions than it answers. First, he writes from the assumption that intellectual history is a privileged history, more likely to give us real knowledge than other forms of history. He assumes that such intellectual history best describes western secularization, for that is what he is describing. He also assumes that his intellectual history describes a cause, not symptoms or results, of the changes that he investigates. In the concluding part of this article, I hope to offer specific evidence that demonstrates the weakness of Johnson's case and to show that, taken to its own logical conclusions, his secularization argument will ultimately become destructive of the very ideals he hopes to promote.

When he resorts to his narrative of Western intellectual apostasy predicated on accepting Darwin, Johnson has committed the same error he decries in his opponents. William Provine,[1] a harsh critic of IDM and a self-declared atheist, once wrote:

> [W]hen he deduced the theory of natural selection to explain the adaptations in which he had previously seen the handiwork of God, Darwin knew that he was committing cultural murder. He understood immediately that if natural selection explained adaptations, and evolution by descent were true, then the argument from design was dead and all that went with it, namely the existence of a personal god [sic], free will, life after death, immutable moral laws, and ultimate meaning in life.[2]

This argument begs too many important questions: who says that everything about Christian theology hung solely on the argument from Design? Who says there was "a" Christian theology to "be demolished" in the

manner Provine describes?[3] Indeed, who says that the fate of one English Protestant theological argument had much to say about world Christianity at all? Johnson makes a terrible mistake by agreeing with Provine that this is a reasonable or accurate assessment of the problem. Unfortunately, it is a mistake at the very heart of his historical assessment of Darwin; he is not merely responding to a critic like Provine, he is playing the exact same game albeit from the other end of the court. This strategy is a mistake because this historical assessment betrays a limited perception of the Christian world, both in the nineteenth century and today.

It is true that the publication of Darwin's *Origin* caused theological controversy in Britain. It is also true that it was not particularly disturbing in the Catholic or Orthodox worlds. Darwin's contemporary and countryman, John Henry Cardinal Newman, a staunch anti-liberal, saw no threat in Darwin at all. He even endorsed a plan for Oxford to give Darwin an honorary doctorate.[4] It is equally true that numerous, influential American evangelicals did not see a crisis in Darwin's work.[5] Johnson tends to dismiss Christians who do not take umbrage at evolutionary theory. In this, he is persuaded by the critique offered by the nineteenth-century American Reformed theologian Charles Hodge.[6] Hodge argued that Darwinism was *de facto* atheism and that evolutionary thinking and Christian theology had no meeting points whatsoever. His argument, however, was not then or now universally accepted. Provine and Johnson reveal a parochialism when they assert that the fate of nineteenth-century Anglican design arguments determined the course of all Christianity or, as Provine would have it, all theism. One hardly knows what to make of such generalizations as appear in Provine's quote and one hardly knows what to make of the Christian theist Johnson for accepting Provine's terms of argument.

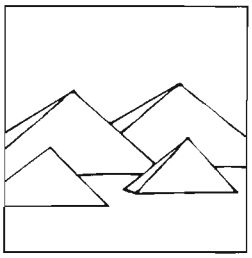
Theology Beyond Design: The Case of Thomas Chalmers

By 1859, the debate as to whether Christian revelation hinged on successful design arguments was hardly new, especially in Johnson's own Reformed tradition. In the first decades of the nineteenth century, the national Church of Scotland, the Kirk, endured a serious internal struggle. The causes were political and theological, but one of the venues of contention was the role of "natural revelation" in the overall Christian message. How much, if at all, should a Christian rely upon the apparent indications of Divine action in the world as a means of detecting God and discovering his attributes?

Thomas Chalmers (1780–1847) was a Scottish-born theologian, educator, philosopher, and political thinker and perhaps one of the most influential voices in nineteenth-century Reformed Christianity. Early in his career, Chalmers established himself with his 1813 publication of "Christianity," an article in the *Edinburgh Encyclopedia*. In that piece, he forcefully repudiated the role of natural theology in Christian conversion and formation.[7] The rationalistic natural theology of William Paley did not illustrate a simple synthesis of science and religion in nineteenth-century Britain. Chalmers, for example, rejected the eighteenth-century paradigm not as antithetical to faith, but as insufficient to encompass the Christian doctrines of sin and salvation.[8] Nonetheless, Chalmers was a scientific and systematic thinker, extolling Baconian induction and defending the historicity of Christian tradition in terms of a scrupulously Baconian dissection of the historical record.[9] Christian faith, he argued, could credibly stand on its own historical credentials and testimonies. It ought not stand, he continued, on its "reasonableness of doctrine," since the whole point of revelation was to open to human minds those aspects of the divine life which would not appear reasonable at all, being beyond human experience and cognition.[10]

Chalmers argued that ultimately Christianity must be historically grounded in the testimony to the life of Jesus and the internal conversion that that testimony impelled on the believer. Natural theology was not an independent insight into the mind of God.

The very next year, in 1814, Chalmers published *The Evidence and Authority of the Christian Revelation*, a free-standing version of the *Encyclopedia* article. As the Glasgow Religious Tract Society circulated pamphlets based on extracts from *The Evidence*, Chalmers' arguments circulated among a national audience. A great debate ensued over whether natural theology and the reasonableness of Christian belief ought to outweigh the internal conviction experienced by readers of Scripture who found in it an "accurate portrayal of the human condition and of its remedy." Natural theology had some role to play in Christian doctrine, but was not necessarily the basis. Chalmers argued that ultimately Christianity must be historically grounded in the testimony to the life of Jesus and the internal conversion that that testimony impelled on the believer. Natural theology was not an independent insight into the mind of God.[11] After all, it was quite possible that people could easily inject their preconceived notions, or



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project their own desires, onto their image of God. It was also likely that people not otherwise believing in God could misconstrue the evidence of God's presence in creation.

In later life, Chalmers converted to an advocacy of natural theology. By the 1830s, his reputation was such that the Royal Society invited him to author one of the Bridgewater Treatises. In 1833, he duly published *The Adaptation of External Nature to the Moral and Intellectual Constitution of Man.* Invoking the argument from design as evidence for God's role in creation, Chalmers rather predictably relied on biological complexity and the insufficiency of chance. Responding to earlier criticisms, Chalmers further argued that while natural theology could not convince or convert the skeptic, it nonetheless functioned to place a moral burden on the skeptic to make an open-minded investigation of Christian faith. He cited the existence of human moral reason as evidence of a Creator who purposely elevated the human mind above the logic of mere survival.

The case of Chalmers demonstrates that long before Darwin, and even under the sway of the famous Bridgewater project, theologians did not universally place science apologetics at the heart of Protestant Christian theology.

Ultimately, it was a case of apples and oranges. As Chalmers put it, the historical and rational evidence of Christianity was "abundantly sufficient to satisfy the scrutinizing researches of the learned." However, the internal evidence, comparing one's own experience of conscience to the teachings of Christianity, "lay within the grasp of every sincere inquirer." Chalmers had purposely redirected the role of natural religion in theology toward a theodicy of personal experience, the universality of conscience, and the internal pull of Scripture on the heart of the believer.[12] Even in his Bridgewater phase, Chalmers never concluded that a natural theology, specifically the argument from design, constituted a *basis* of Christian revelation. It could, he argued, be never more than a tool and even that only under certain circumstances. When Charles Hodge later published *What is Darwinism?* he therefore took a more radical stand than was prevalent even among Reformed Christians and which did not really speak to Christianity in general.

The case of Chalmers demonstrates that long before Darwin, and even under the sway of the famous Bridgewater project, theologians did not universally place science apologetics at the heart of Protestant Christian theology. Neither Provine nor Johnson in their exchanges acknowledges this history. They rather have created a false dilemma, about which for their own reasons they agree, even if from opposite sides. As Irving Kristol has commented:

> [S]cientific "naturalism" and "creationism" do not exhaust the possibilities of explanation. Any "teleological" explanation, in purely philosophical terms, that sees the origins of species as an inevitable movement from "lower" to "higher" can be made to fit the facts very plausibly. Such explanations are irreconcilable with scientific "naturalism" which rejects teleology, but can be made to fit rather neatly into a religious view, which would then posit a claim to being able to explain the source of this teleological dynamic. There are some quite distinguished German and French "phenomenological biologists" who think along these lines ...[13]

The Secularization Narrative Revisited: The Role of Protestantism

Nearly thirty years ago, Owen Chadwick produced a series of lectures which became his classic, *The Secularization of the European Mind in the Nineteenth Century.* In the book, Chadwick argued that historians could only describe secularization as a trend or movement without really being able to define it precisely at all. As with other epoch titles like "the Middle Ages" or "the Renaissance" or even "the Reformation," one could be much surer that something had happened than one could be sure of precisely what. One could pick an arbitrary "before" point and find fruitful contrasts with an arbitrary "after" point. Still, the observer would have to be careful not to take his "before" and "after" as absolute realities. Moreover, according to Chadwick, it matters a great deal *which* secularization one wants to discuss. Is it elite intellectual skepticism like that of the *philosophes*? Or perhaps the speaker means to refer to working class anticlericalism and bluff unbelief? Or again, perhaps someone employing the term means to refer to middle class disaffection from the material and commercial restrictions of

traditional society based on Church authority? Do we mean to discuss cool bourgeois religious conformity, ribald peasant anti-piety (whether European or of the sort that scandalized promoters of both the first and second Great Awakenings in America), or the rise of unchurched urban masses in the modern industrial era?[14] Not all secularisms are created equal. Neither are the causes of secularization monolithic or obvious. Some lie even within the Churches themselves.

From the sixteenth century forward, breaking the transnational reach of the Roman Catholic hierarchy proved appealing to various emerging national governments. ... Recourse to Protestant theology and ecclesiology often facilitated the break and promoted secularization friendly to civil authority.

In truth, there are a plethora of causes that historians attach to secularization. Scientific advances are only one and perhaps not the foremost.[15] Not all historians even acknowledge secularization as a real phenomenon; there are those who do not.[16] Most historians who do accept it, see secularization as the loss of authority of the institutional churches in the Western societies (as opposed to an actual loss of popular religious belief). The causes of this institutional loss are many. Political liberalism itself militates against the very idea of official dogma. Capitalism produced an industrial working class in conflict with propertied classes who controlled the churches. Anticlericalism fed on nationalism, and on class-based political movements, and was exacerbated by loss of contact with local clergy as populations moved and expanded. The experience of competing forms of entertainment and enlightenment in the burgeoning urban centers drew people away from churches. The rise of professional historical research and teaching, with its emphasis on systematic research, and causative narratives sounded a retreat from the notion of Providence. Finally, mass migration disrupted the transmission of community traditions.

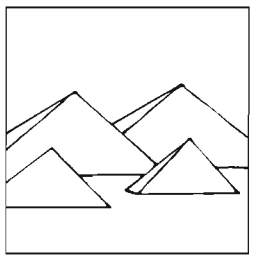
There is another way in which the churches themselves became the catalyst of modernization and secularization. In the political battles between Protestantism and Catholicism across Europe, more often than not it was Protestantism which proved more congenial to the emerging nation-states and more congenial to state control or acquiescing to state power. Historically Catholicism could easily enough find itself co-opted to the needs of local government (one thinks of the Church in France both prior to the Revolution and under the Napoleonic settlement). Nonetheless the Church tended to become the champion of various particular constituencies inconvenient to the state: the Papacy, clergy and religious orders, sometimes aristocracy, sometimes ethnic minorities, and sometimes electoral minorities (who might also qualify as ethnic minorities like the Bavarians).

Over the course of the nineteenth century, various Popes, especially Pope St. Pius IX, used the Vatican as a platform to critique and influence modern social trends. It is well known that from the sixteenth century forward, breaking the transnational reach of the Roman Catholic hierarchy proved appealing to various emerging national governments (particularly in Britain and Germany where Darwinism later did very well). Recourse to Protestant theology and ecclesiology often facilitated the break and promoted secularization friendly to civil authority. Edward VI (or more properly his council) and Elizabeth I of England certainly thought so, but the trend continued long after them. Writing about the resurgence of papal authority in the nineteenth century, Chadwick stated:

> So there is some element of truth in the proposition that, in those political circumstances [of an assertive papacy and reviving Catholicism], Protestantism led towards secularization. Some of the leading French anticlericals were neither atheist nor agnostic but Protestant. Bismarck conducted his Kulturkampf—which had a secularizing effect in all the German churches and not only the Catholic—in the name of evangelical freedom.[17]

The Role of Protestantism: The Case of John William Draper

The recourse of nineteenth-century science apologists to anti-Catholicism rather than anti-theism makes the same point. John William Draper (1811–1882) was an English born chemist, medical researcher, and historian of science. In his youth he immigrated to the United States, where he studied medicine. He established a successful academic career at the University of the City of New York in the chairs of chemistry and medicine. By the early 1870s, he was an eminent man of American science. Such was Draper's reputation that when Edward L. Youmans created his famous International Scientific Series, he turned to Draper for a volume on the conflict between "Religion" and "Science." The series brought together some of the biggest names in Anglo-American science writing: John Tyndall, Walter Bagehot, and Herbert Spencer. Draper's



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[Draper] argued at great length that Catholicism was the real enemy [of science] and that the Reformation churches, even if they did not always recognize it, were the natural friends, even sisters of science. ... Darwin and Darwinian evolution figured not at all.

contribution, *The History of the Conflict Between Religion and Science* (1873), was a smash hit in both America and Britain. The first printing sold out as did the printing of the very next year. It rapidly appeared in eight languages besides the original English. More than fifty years after its release, *Conflict* still circulated among the interested population and was re-released as a pocket edition by the London-based Rationalist Press Association. Recommended companion volumes were Haeckel's atheist *Riddle of the Universe*, and Joseph McCabe's lurid and sensationalist Catholic bashing *Twelve Years in a Monastery*.

Draper for his part did not pit science against all Christianity. He argued at great length that Catholicism was the real enemy and that the Reformation churches, even if they did not always recognize it, were the natural friends, even sisters of science. Draper held that the Reformation made possible a safe retreat from Christian anthropomorphism such as Muslims had already achieved. Ideally, for Draper, the continued advance of Protestant liberty would finally crush Roman obscurantism and with it such supposedly pagan doctrines as the Incarnation and the Trinity.[18] Darwin and Darwinian evolution figured not at all. Draper, his publisher, and his worldwide audience were quite satisfied that the real question at hand was the authority of the Catholic Church and its reactions to scientific progress.

Only years later does one find references to Darwin and the *Origin* as the center of the "conflict" against all Christianity.[19] By that time, much historical mythologizing had occurred, not the least being T. H. Huxley's famous misrepresentation of his debate with Bishop Samuel Wilberforce at Section D of the 1860 meeting of the British Association for the Advancement of Science.[20] It was not clear whether Darwin or Darwinian political mythology had become the enemy of Christianity, if enemies they had to be. E. B. Pusey, Anglican priest and a critic of Darwin's theory so harsh as to compete easily with the absolutist Charles Hodge, believed that the real theological crisis of the 1860s was the publication of *Essays and Reviews*, which first introduced German rationalist biblical criticism to English audiences. Pusey did not publicly respond to evolutionary theory as a threat until 1878.[21]

It simply was not the impression of contemporary observers then, or for some time after, or the consensus of historians now, that the publication of *Origin of Species* or *Descent of Man* alone constituted the dramatic breakpoint that Pearcey or Johnson would have us believe. Certainly these books both occasioned controversy but that is not to say, as do Johnson and Pearcey, that they marked a massive paradigm shift away from Christianity. More than thirty-five years ago, sociologist and historian Susan Budd demonstrated that large-scale loss of belief, in Britain at least, did not rely on the sorts of intellectual trends Johnson and Pearcey cite. As Budd wrote: "... the revolution in scientific and theological thinking seem[ed] largely irrelevant. The loss of faith for Freethinkers was not an intellectual but a moral matter."[22]

Protestant assaults on Catholicism, read as internecine religious conflict, contributed just as much. Moreover, modern researchers even now do not see that Darwin's books occasioned a death knell for religion. It is good to recall here William Provine's falsely dichotomizing polemic against Johnson. Reflection reveals that the Victorian-era process of secularization tied into many social trends, Catholic/Protestant tensions foremost among them, as much or more than it did to scientific progress. Christianity itself as a general phenomenon has contributed to secularization whenever it allied with state powers to repress native spiritualities or in its centuries long attack on magical practice.[23] It has contributed too whenever it has been invoked to reject established norms of the sacred even within itself. As Richard K. Fenn has observed:

> No force is more secularizing than a religion of the spirit that refuses to make the customary sacrifices to the old shrines, whether they be of the temple and its priesthood or of the Christian church itself. The Reformation is the prime example of a movement that broke the monopoly of the church on the sacred, and the Pentecostal movements of Latin America and Africa are ... contemporary cases in point.[24]

Chadwick and Fenn are hardly alone. Most historians and sociologists of religion have pointed out that Protestantism itself has been

a type of secularizing force, especially in the United States and western Europe. Given their rhetorical commitments, it is difficult to see what use Johnson or Pearcey could make of that history.

An Alternative Model: The Case of N.T. Wright

Johnson proposes that western intellectuals would do well to assume the posture of the theistic realist,[25] meaning the belief that God is objectively real and objectively "Other" to humans and all creation. He therefore is advocating a route to ontological certainty which he thinks is denied to those who deny theistic realism. He also asserts that all other positions must capitulate to a naturalist agnosticism. Yet this all-or-nothing approach is not necessary for the attempt at a Christian history. It may in fact be harmful since, as I have tried to show, the a priori commitment to defend this theistic realism can handicap historical inquiry.

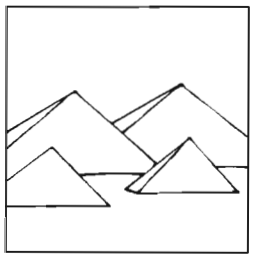
To get at this point, let us consider the work of N.T. Wright. Wright is a particularly fitting choice for a number of reasons: he holds impeccable Christian theological credentials being recent Canon Theologian at Westminster Abbey, now the Anglican Bishop of Durham and a Society for the Propagation of Christian Knowledge Research Fellow; he is critical of Catholic theology, a distaste Johnson shares; and he is deeply informed by the Reformed tradition, a taste which Johnson also shares. He is a biblical exegetical scholar of world reputation. It is not my purpose, or within my competence, to deal with Wright as a theologian and Bible scholar. Rather, I am interested in comparing Wright's use of historical method and exposition of Christian belief to Johnson's methods. I make the comparison because I believe that Johnson is best understood as a Protestant apologist. In his recent *The Resurrection of the Son of God*, Wright performs as a Christian historian *a fortiori*. He sets himself the task of upholding the historicity of the Resurrection and thus the reasonableness of the Christian confession of faith.

Wright works to show that St. Paul and the Apostles meant two specific things in their early preaching: (1) that Jesus was risen from the dead in a definitive and concrete and bodily way; and (2) that the Resurrection of Jesus showed he was both Messiah and the Son of God divinely sharing in God's own nature. This two-fold demonstration is a necessary move. Wright fully understands that in retrospect, a resurrected Christ is the Christ of the Church. However, in a first-century context, a resurrected Jesus of Nazareth, though truly resurrected, might yet signify something else entirely.[26] Historical exactitude demands Wright take nothing for granted and allow no anachronism to creep into his investigation. The two-fold scheme also shows that Wright is doing Christian history in both senses apparent in Johnson: Wright is reciting and affirming the Christian narrative, specifically of Redemption, but he is also approaching a critical appraisal of his texts in a Christian-informed epistemology that leaves open for him conclusions affirming the objectively real, concrete, and bodily Resurrection of Christ. Wright is working simultaneously at levels of metaphor, sacred myth, but also of the universally accessible historical record. Wright presupposes nothing.

Johnson might well argue, and in fact frequently says, that he is not interested in steering science to any given conclusion but rather to opening science to possible conclusions shut off by philosophical prejudice. But notice the difference between Wright and Johnson. Johnson is not coy about proposing the first chapter of St. John's Gospel as the appropriate creation story from which to begin our exploration of the world. Neither is Johnson coy about the political implications of his epistemological choices: he very much wants American society, having regained knowledge of God's dignity as Creator, to reform public policies along lines of Natural Law. Wright wants to demonstrate that the Gospels are in fact credible historical evidence for a miraculous event. However, despite the detail and force of his arguments, even Wright shies from delivering ontological certainty of the Resurrection or conclusions that would follow from it.

[Wright] builds his case from the ground up: starting with the first-century environment of Second Temple Judaism, of pagan beliefs, of philosophy, and of lexicography. Wright reconstructs a historical milieu while Johnson postulates a pre-Fall state.

He builds his case from the ground up: starting with the first-century environment of Second Temple Judaism, of pagan beliefs, of philosophy, and of lexicography. Wright reconstructs a historical milieu while Johnson postulates a pre-Fall state. Wright breaks his problem into several different subtasks. He is careful to avoid question begging by acknowledging the multi-faceted nature of his task. He knows he must say something about the environment of Judaism in antiquity, about traditional beliefs of the Jews, about the beliefs of the various Gentile peoples, about applicable historical sources, and about the reliabil-



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ity of the Gospels as historical sources. He is also clear that he must divide his task between that which is principally historical and that which is theological or apologetic. Wright wisely warns us not to accept a facile, pseudo-absolute wall of separation between such fields, but he is very far from conflating them himself.

Despite the more than eight hundred pages of his book, Wright caps the limit of his investigation with one crucial move: he rejects the Gospel of St. Peter. He does this because (1) the Church in forming the canon of Scripture did so and because (2) he independently agrees with that decision based upon his critical reading of Peter.[27] The decision signifies a great deal, because Peter is the purported Gospel that supplies eyewitnesses to the actual Resurrection event. The canonical Gospels do not describe the actual rising of Jesus but rather the immediate resulting environment and the reactions of various people as they meet the risen Jesus or hear of what has happened.

Therefore, after pouring out a mass of scholarly work, Wright confirms that while he can confidently say what he thinks the Apostles thought and preached, and what he thinks the Apostles experienced, he cannot provide an ontological certainty regarding the Resurrection of Jesus. Neither the nature of the event nor the available historical records can do that. The Bible itself does not promote such a scheme but rather teaches that faith rests on Apostolic testimony (e.g., John 20:29) and that it is ultimately a gift from God. In other words, there is a necessary dependence on indirect transmission and interpretation. This is not very surprising since that is how all of history works, sacred and profane.

Consider some of Wright's comments on his own method. On the one hand, Wright is clearly sympathetic to a point often repeated by Johnson: in doing history, or any intellectual inquiry, an arbitrary exclusion of things "too theological" is a *de facto* favoritism for some form of deism, agnosticism, or atheism. On the other hand, Wright cautions, the mirror image of this error is

> rank supernaturalism whose miracle working god routinely bypasses historical causation ...To recognize the link between history and theology ... is not to decide questions of history or theology in advance, but to give notice of the many-sidedness of the topic.[28]

Johnson cannot hold to this advice because his historical narrative of the Fall is specifically about a *loss of the Creator*. Therefore, as a historical critic seeking to put things aright, he inevitably looks for the opportunity to reintroduce the Creator. Thus we have from the latter 1990s on, his increasing reference to the Prologue of St. John's Gospel. And note, St. John is not writing generally about deity, as does St. Paul in Romans 1 (there Paul affirms only that nature provides evidence of God's existence, not the actions or the thoughts of God) but is explicitly referring to the *Logos* of God in the person of Jesus Christ. When Johnson must return to revelation to complete his critique of modern naturalism, he thus violates his own and Wright's cautions. By nature, the creature cannot know much if anything about the Creator without the Creator's self-revelation. But, as Wright decisively demonstrates, the Revelation of God is not history (or science) as we usually practice it; it is miracle. As he puts it:

> What we do not know—not because we inhabit a modern scientific worldview, but because at this point all human history tells the same story—is that someone who is well and truly dead can become well and truly alive again.[29]

Wright denies he can offer historical "proof" of Christian claims.

As Wright decisively demonstrates, the Revelation of God is not history (or science) as we usually practice it; it is miracle. ... Wright denies he can offer historical "proof" of Christian claims.

It is not, as Johnson and Pearcey have contended, that a specific world view blinds us to God's hand in the origin and diversification of life. It is that all human experience points to the same thing—that people, plants, and animals exist and proliferate and change based on internal capacities related to material forces. Therefore it is not patently absurd to suppose that people, plants, and animals originate in material forces. To *know* that it requires the hand of God in turn requires revelation. It is a specifically religious belief. I do not, as many do, categorize that as a lesser knowledge or disparage belief as such. In fact, Johnson may well be correct that possessing such knowledge is objectively better than not possessing it. That would be a separate argument. How-

ever, it is part and parcel of Christian belief that God's generous creation of the world is an anomalous act. Therefore I have to acknowledge that it will not be amenable to any investigation that could fit under what we normally call "science": the unraveling of causes *within the world.*

It is not, as Johnson and Pearcey have contended, that a specific world view blinds us to God's hand in the origin and diversification of life. ... [P]eople, plants, and animals exist and proliferate and change based on internal capacities related to material forces. Therefore it is not patently absurd to suppose that people, plants, and animals originate in material forces. To know that it requires the hand of God in turn requires revelation.

If this were not so, it is difficult to understand why the very beginning of the Bible is dedicated to crediting God for his creation. Tradition has it that the Torah was given to Moses in special revelation, presumably to tell him and the people of the Covenant what they would otherwise not know about the world. Why tell them something glaringly obvious? Hebrews 11:3 indicates that we know God is Creator through Christ only in faith. The passage claims that creation *ex nihilo* is known by faith. Even St. Paul in Romans 1 does not say, for instance, that from creation people could discern God's goodness but only his power. As Thomas Chalmers argued nearly two hundred years ago, the Bible itself does not support a natural theology, at least not one that gets us very far in answering the questions that Johnson thinks are important. Wright understands this clearly. He concludes his massive study taking the strong position that the bodily Resurrection of Jesus is not just a sufficient but a necessary condition for explaining the historical records of early Christianity. In doing so he nevertheless analyzes his own conclusions with impeccable historical logic:

> I do not claim that [my conclusion] constitutes a "proof" of the resurrection in terms of some neutral standpoint. It is, rather, a historical challenge to other explanations, other worldviews. Precisely because ... we are faced with worldview-level issues, there is no neutral ground, no island in the middle of the epistemological ocean, as yet uncolonized by any of the warring continents. Saying that "Jesus of Nazareth was bodily raised from the dead" is not only a self-*involving* statement; it is a self-*committing* statement, going beyond a reordering of one's private world into various levels of commitment to work out the implications [emphasis in the original].[30]

Wright takes his readers no farther because the forms of knowing required to turn his historical conclusions into Christian commitment do not fall within the goals and methods of history. I would argue that the same situation pertains when we change venues from history to science and from the historicity of the Christian Gospels to the origin of life.

Conclusion

Phillip Johnson once wrote:

> Occasionally, a scientist discouraged by the consistent failure of theories purporting to explain some problem like the first appearance of life will suggest that perhaps supernatural creation is a tenable hypothesis in this one instance. Sophisticated naturalists instantly recoil with horror, because they know that there is no way to tell God when he has to stop. If God created the first organism, then how do we know he didn't do the same thing to produce all those animal groups that appear so suddenly in the Cambrian rocks?[31]

I aim Johnson's complaint back at IDM writers to express my own objection to their uses of history. If it should be the business of science to cite the specific workings of God in nature, then how do we merely stop at biology? Why then do we not extend "Design" to the humanities as well? Reflecting upon the rhetoric of IDM apologists like Johnson and Pearcey, I conclude that IDM could also become a "history stopper." While posing a historical case for the failure of science, it begs more questions than it answers and it turns a conveniently blind eye on the history that does not support its political claims.

❋

Notes

[1]Johnson has met Provine in debate on a number of occasions and is even fond of describing the good relations that exist between them. As Johnson sees it, he and Provine are agreed on the meaning and stakes of the debate about philosophical naturalism and Darwin: that the options are Darwin or nothing, or Design or nothing. Neither man accepts third alternatives to this dilemma.

[2]Provine, "Responses to Phillip Johnson," *First Things* (October 1990): 23.

[3]The work of John Hedley Brooke and Jonathan R. Topham has demonstrated that the supposed omnipresence of Paley, even in British Protestant theology, is largely a myth. John Hedley Brooke, "Natural Theology and the Plurality of Worlds: Observations on

the Brewste-Whewell Debate," *Annals of Science* 34 (1977): 221–86; ——, "The Natural Theology of the Geologists: Some Theological Strata," in L. J. Jordanova and Roy S. Porter, eds., *Images of the Earth: Essays in the History of the Environmental Sciences* (London: British Society for the History of Science, Ltd., 1979); Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge: Cambridge University Press, 1991); and Jonathan R. Topham, "'An Infinite Variety of Arguments': The Bridgewater Treatises and British Natural Theology in the 1830s," (Ph.D. diss., University of Lancaster, 1993). All works cited in Jonathan R. Topham, "Science, Natural Theology, and Evangelicalism in Early Nineteenth-Century Scotland: Thomas Chalmers and the *Evidence* Controversy" in David N. Livingstone, D. G. Hart, and Mark Noll, eds., *Evangelicals and Science in Historical Perspective* (New York: Oxford University Press, 1999).

[4]Gregory P. Elder, *Chronic Vigour: Darwin, Anglicans, Catholics, and the Development of a Doctrine of Providential Evolution* (New York: University Press of America, 1996), 73–7.

[5]David N. Livingstone, *Darwin's Forgotten Defenders: The Encounter between Evangelical Theology and Evolutionary Thought* (Edinburgh: Regent College Publishing, 1987).

[6]Charles Hodge, *What is Darwinism?* (New York: Scribner, Armstrong and Co., 1874). Historian Edward B. Davis sees Johnson as a latter day Hodge, a characterization that Johnson tacitly accepts. Edward B. Davis, "Of Gods and Gaps: Intelligent Design and Darwinian Evolution," *The Christian Century* 115, no. 20 (July 1998): 678–81.

[7]Topham, "Science, Natural Theology, and Evangelicalism," 45.

[8]In fact, several historians of Scottish Christianity have found that Hume's famous critiques of causation, at times held along with his critique of miracles to be severely damaging to Christian theology, rather strengthened doctrines of the Kirk regarding the role of biblical revelation and the individual experience of God's activity. Topham, "Science, Natural Theology, and Evangelicalism," 147–8.

[9]Daniel F. Rice, "An Attempt at Systematic Reconstruction in the Theology of Thomas Chalmers," *Church History* 48, no. 2 (June 1979): 177.

[10]Topham, "Science, Natural Theology, and Evangelicalism," 152, 155.

[11]Rice, "An Attempt at Systematic Reconstruction in the Theology of Thomas Chalmers," 176–7.

[12]Daniel F. Rice, "Natural Theology and the Scottish Philosophy in the Thought of Thomas Chalmers," *Scottish Journal of Theology* 24 (1971): 35–8.

[13]Irving Kristol, "Responses to Phillip Johnson," *First Things* (October 1990): 25–6.

[14]Chadwick, *The Secularization of the European Mind in the Nineteenth Century*, Canto Edition Reprint (New York: Cambridge University Press, 1991), 10, 12.

[15]Sociologist Steve Bruce argues that science has not undermined religion very much at all, at least not in a direct clash between particular findings of science versus particular religious beliefs. Surveying the works of Peter Berger, Bryan Wilson, David Martin, and Roy Wallace, Bruce notes that none saw science as a serious force in secularization. The apparent paradox is this: secularization in the West is profound; science per se does not seem to cause it at all. See Steve Bruce, *God is Dead: Secularization in the West* (Malden, MA: Blackwood Publishers, 2001), 106–17.

[16]For the most part, since the 1990s, historians and sociologists have tended to accept that "secularization" is a real phenomenon (rather than perhaps just a trend whereby spirituality moved out of institutions). This was not always the case and is not universal consensus now. Moreover, the term "secularization" is a network of meanings and ideas. At base, all these ideas suggest that we are discussing "a long-term decline in the power, popularity, and prestige of religious beliefs and rituals." Bruce, *God is Dead: Secularization in the West*, 44.

[17]Chadwick, *The Secularization of the European Mind in the Nineteenth Century*, 139.

[18]John William Draper, *The Conflict Between Religion and Science* (1927; reprint, London: Watts and Co., 1873), ix–xvi. Draper had already explicated these themes at tremendous length in his two volume *History of the Intellectual Development of Europe* (New York: 1861). The success of *The Conflict* led him to issue a second edition of the massive *History* in 1876.

[19]Chadwick comments that he does not see routine references to "Darwin has disproved the Bible" until the 1880s. On anecdotal evidence, Chadwick would not place the impact of Darwinian ideas on general society much before that time.

[20]J. Vernon Jensen, "Return to the Wilberforce-Huxley Debate," *British Journal of the History of Science* 21 (1988): 161–79.

[21]Elder, *Chronic Vigour*, 33.

[22]Susan Budd, "The Loss of Faith: Reasons for Unbelief among Members of the Secular Movement in England, 1850–1950," *Past and Present* 36 (April 1967): 106–25. The quote is her concluding sentence.

[23]Richard K. Fenn, ed., *The Blackwell Companion to the Sociology of Religion* (Malden, MA: Blackwell Publishers, 2001): 196–7.

[24]Ibid., 197.

[25]Johnson, *Reason in the Balance* (Downers Grove, IL: InterVarsity Press, 1995), 48–50.

[26]N. T. Wright, *The Resurrection of the Son of God* (Minneapolis, MN: Augsburg Fortress Publishers, 2003), 27.

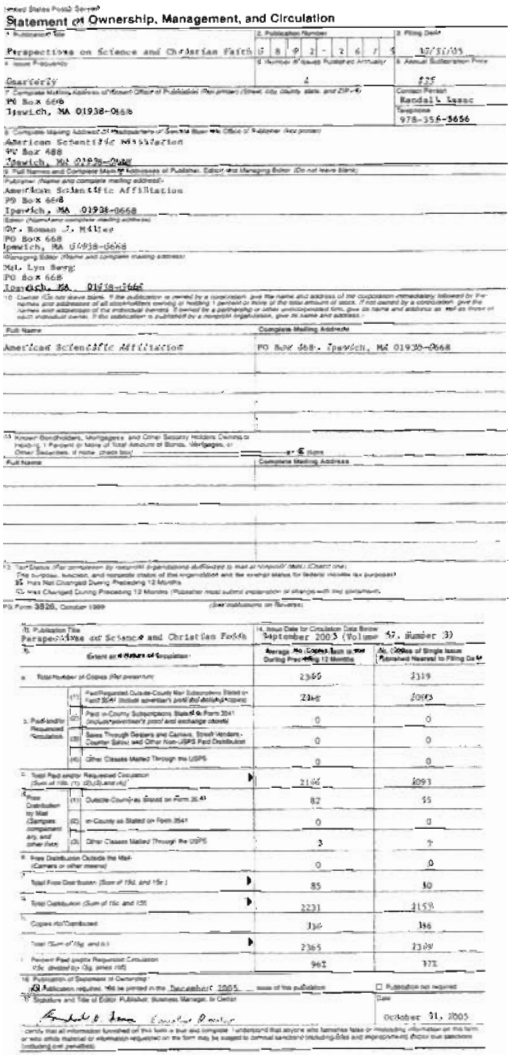
[27]Ibid., 15, 152–5.

[28]Ibid., 5.

[29]Wright, *The Resurrection of the Son of God*, 711.

[30]Ibid., 717.

[31]Johnson, "Evolution as Dogma," 18.



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Perspectives on Science and Christian Faith | 5 8 9 2 - 2 6 7 5 | 10/31/05

Quarterly | 4 | $25

PO Box 668
Ipswich, MA 01938-0668

Contact Person: Randall L Isaac
Telephone: 978-356-5656

American Scientific Affiliation
PO Box 668
Ipswich, MA 01938-0668

Publisher (Name and complete mailing address):
American Scientific Affiliation
PO Box 668
Ipswich, MA 01938-0668

Editor (Name and complete mailing address):
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Ipswich, MA 01938-0668

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PS Form 3526, October 1999 (See instructions on Reverse)

15. Publication Title: Perspectives on Science and Christian Faith	14. Issue Date for Circulation Data Below: September 2005 (Volume 57, Number 3)	
16. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	2365	2319
b. Paid and/or Requested Circulation (1) Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. (Include advertiser's proof and exchange copies)	2345	2303
(2) Paid In-County Subscriptions Stated on Form 3541 (Include advertiser's proof and exchange copies)	0	0
(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Paid Outside-USPS® Paid Distribution	0	0
(4) Other Classes Mailed Through the USPS	0	0
c. Total Paid and/or Requested Circulation (Sum of 15b. (1), (2),(3),and (4))	2345	2303
d. Free Distribution by Mail (Samples, complimentary, and other free) (1) Outside-County as Stated on Form 3541	82	55
(2) In-County as Stated on Form 3541	0	0
(3) Other Classes Mailed Through the USPS	3	7
e. Free Distribution Outside the Mail (Carriers or other means)	0	0
f. Total Free Distribution (Sum of 15d. and 15e.)	85	62
g. Total Distribution (Sum of 15c. and 15f)	2231	2158
h. Copies not Distributed	134	161
i. Total (Sum of 15g. and h.)	2365	2319
j. Percent Paid and/or Requested Circulation (15c. divided by 15g. times 100)	96%	97%

16. Publication of Statement of Ownership
☑ Publication required. Will be printed in the December 2005 issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner — Date: October 31, 2005

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Book of Life

A Scientific Affirmation of the Judeo-Christian Ethic

Victor Shane

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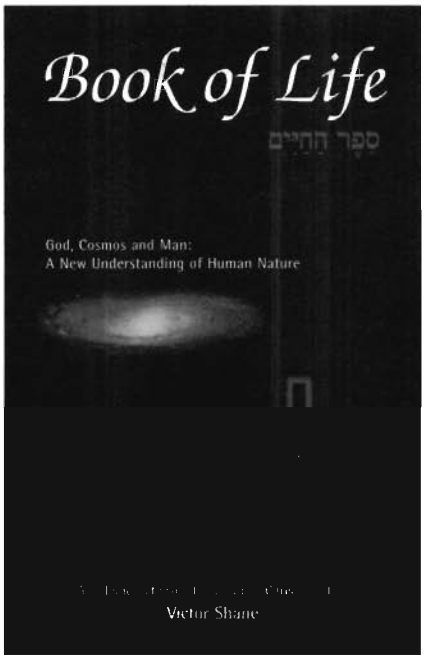

Most scientists will agree that the universe is moving from low to high probability (entropy) states, and that physical systems tend to move from low to high probability states as well.

History catalogs a similar tendency on the part of human institutions to move from ordered to disordered states. Can the evidence of history be reconciled with that of science to affirm the warnings of Scripture? Why does "evil" tend to get selected more often than "good?" Is it because it embodies a higher (more "natural") probability state?

Hypothesis: If God created man from the physics of this universe ("dust of the earth"), wouldn't you expect the nature of the universe to resonate within the nature of man? And if so, wouldn't you expect warnings from God to this effect?

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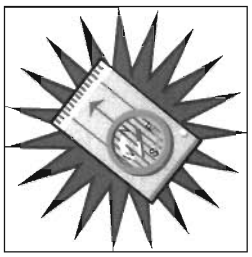

Inconstant Multiverse

Robert B. Mann

Robert B. Mann

Explaining why there is something rather than nothing is one of theology's primary tasks. Recent scientific findings in cosmology have suggested a new theological task: explaining why there is something rather than everything. This task arises because of the conjunction of two intriguing properties of our universe: its strong biophilic selection effects and its apparent causal-connectedness on its largest scales. Current explanatory paradigms – respectively the anthropic principle and the inflationary universe – have suggested to many that our observable universe is a small part of a much larger structure called the multiverse. A multiverse presents us with a containment problem, since its logical extension suggests that anything that can exist, does exist. I argue such a perspective is incompatible with the foundations of both science and theology. As an antidote, I propose the altiverse: a set of possible alternatives that logically exist but are not physically realized.

Explaining reality in teleological terms is a common feature shared by all forms of theological inquiry, both Eastern and Western.

One of the most longstanding and perplexing questions that humanity has ever wrestled with is the problem of existence: why is there something rather than nothing? It is a challenge that has eluded philosophers and scientists alike, as it would seem to be a necessary condition for all other forms of rational inquiry to take place. Yet, at the same time, while it is not impossible to imagine a state of nothingness, it is difficult to understand why this is not the natural state of affairs.

It is here that theological forms of inquiry make certain inroads. Rather than accepting the existence of things *prima facie* and then proceeding from there, theology seeks to understand the origin of existence. Indeed, the task of explaining why anything exists at all is generally regarded as one of theology's root tasks. The core hypothesis underlying such inquiry is generally teleological in character: namely, that there is an underlying purpose behind the existence of all things.

Explaining reality in teleological terms is a common feature shared by all forms of theological inquiry, both Eastern and Western. In both cases, the telic approach has both immanent and transcendent aspects. The immanent aspects are concerned with human behavior in the here and now. What is the most fruitful means for navigating the self through one's natural and social environment? What is the appropriate relationship between the individual and the community? More generally, given the framework of existence, how should one live? The answers to these and other like questions take distinct forms among the different world religions (and even within a given religion). However their common feature is that of understanding and resolving such issues in a telic context.

The transcendent aspects of telic explanations of reality are concerned with broader questions that go well beyond the concerns of particular individuals or communities. Here one is concerned with why the framework of existence is what it is. Eastern religions generally adopt the view that there is an ultimate reality behind all extant things, and that our perception of this ultimate reality is obscured or distorted to varying degrees by the superficial aspects of our everyday experience and our natural environment. Western religions generally ascribe this ultimate reality to God, and work from the hypothesis that things exist because a Creator intended them to be so. The basic idea of God is that of some (infinitely) superior being creating time and space, matter and energy, and order from chaos, ulti-

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mately for some purpose. The Creator transcends the creation, distinct from it to varying extents. Extreme Deism takes the perspective that the Creator's only relationship to the creation is that of initiating its existence. In contrast to this, the Christian God becomes intimately involved with creation and with the created beings within it, so much so that the transcendent God is also the immanent Holy Spirit, who at one particular period in history coalesces into the person Jesus Christ.[1]

The symbiotic relationship between Christian notions of immanence and transcendence resonate across the various world religions. An understanding of one has implications for the other. Theological reflection as to how one should live in this world naturally leads to questions as to why this world is the way that it is. Conversely, contemplation of the grand panoply of existence leads naturally to questions of what one's purpose is within the larger world stage. The yin and yang of immanent and transcendent understandings of reality are encircled by a telic thread. Neither can be understood outside of a telic framework. To reiterate, a salient characteristic of a theological explanation is that it is teleological in essence: things exist because there is some purpose or intent that caused them to be.

There are many that find this form of explanation quite unsatisfactory. The common objection generally takes the form of a question: "If God created everything, what created God?" More sophisticated forms of theology furnish an answer to this question that takes on the following general form: God is understood to have a qualitatively different character from other existing things, and is, in some sense, self-created by definition.[2] While skeptics might acknowledge this philosophical possibility, many nevertheless remain discomforted. Simply put, they seek some kind of evidence to support a telic understanding of the "why something instead of nothing" question.

Biophilic Selection Effects

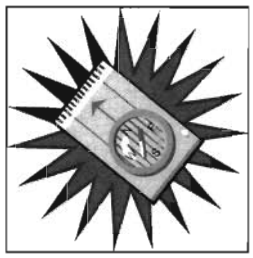
Recent work in physics and cosmology has provided no small amount of indirect support for the theological explanation. This is because of the mounting evidence that we inhabit a biophilic universe: one whose properties admit the existence of life as we know it.[3] Of course, it is obvious that we could not inhabit a universe that was hostile to life. However it has become clear that the necessary conditions for life to exist depend upon very special physical circumstances. Specifically the constants of nature—the speed of light, the relative strengths of the forces, the masses of the various subatomic particles—are intimately linked to the existence of life. A hypothetical universe in which these constants took on numerical values that differed only a very small amount from the values measured in the laboratory would be a biophobic universe: it would not harbor any physical systems that could support life as we know it. Examples abound that illustrate the point: modify only slightly just one of the constants of nature, and one finds that the resultant laws of physics would not permit any stable atoms heavier than hydrogen, or not admit stable planetary systems to form around stars, or render the carbon nucleus unstable, or precipitate some other life-stopping situation.[4]

This recently appreciated observed state of affairs provides partial empirical support for a telic explanation of existence. Out of all possible universes that one could imagine generating by changing the constants of nature, a biophilic universe can be obtained only by making a very particular choice of these constants. This is a very strong selection effect. It is not unreasonable to entertain the possibility that a superintelligence governs this selective state of affairs, and that this "fine tuning" of the constants of nature is by intent as opposed to accident. Conversely, the alternate situation—namely that biophilic universes are possible for a broad range of choices on physical constants—would undermine a telic explanation.

The primary reason underlying much of the skepticism behind theology's response to the problem of existence is that it is a telic form of explanation as opposed to an ecbatic one.

Much of the discourse today in science and religion has to do with these biophilic selection effects. It has been argued in many different contexts that such selection effects (often referred to as the anthropic principle) are best understood in a theological framework, one that purports they signify actual choices made by a Creator that desired a universe containing (sentient) life. The intriguing relationships between the masses of the subatomic particles, the strengths of the various forces of nature, and so on, are what they are, it is argued, because of the purposeful intent of a Designer.[5] To use the words of Paul Davies, they suggest in very strong terms that there is indeed "something behind it all."[6]

It is clear, however, that such a perspective has not met with universal approval. The primary reason underlying much of the skepticism behind theology's response to the problem of existence is that it is a telic form of explanation as opposed to an ecbatic one. The word ecbatic derives from the Greek word *ekbatos*, signifying result without intention. An ecbatic process, then, is one that follows a natural course of action. This is in contrast to the notion of *telos*, or purpose, from which the adjective telic is derived.



Article

Inconstant Multiverse

[Scientific explanations] seek to describe nature – and perhaps all of reality – in terms that do not rely on a concept of purpose. ... This ecbatic approach toward understanding reality – often referred to as naturalism – has enjoyed enormous success since its inception during the enlightenment.

The flow of water over a waterfall is an ecbatic process, whereas the flow of water through an aqueduct is a telic process. If an action is rendered "so that it was fulfilled" then it is ecbatic; if rendered "in order that it might be" then it is telic.

Scientific explanations are generally ecbatic in character. They seek to describe nature – and perhaps all of reality – in terms that do not rely on a concept of purpose. Rather than understand the phenomenon of thunder in terms of the displeasure of certain deities, a scientific explanation would seek understanding in terms of the motion of air masses and the charge separation of the various particles within them. This ecbatic approach toward understanding reality – often referred to as naturalism – has enjoyed enormous success since its inception during the enlightenment. There is no doubt that it has transformed virtually every aspect of modern life, including communications, medicine, transportation, manufacturing, and recreation.

This strong measure of empirical success gives one good reason to revisit the question of existence. From an ecbatic perspective, rather than explain the "something instead of nothing" conundrum in terms of purpose and relationship, one seeks instead an explanation in terms of an impersonal causal chain of events. Faced with the strong biophilic selection effects noted above, an ecbatic explanation of existence must rely on additional philosophical input. It is here that the multiverse enters the scene.

Consider first that not all selection effects have a telic origin. Nontelic selection effects in any system can have one of two explanations: necessity or chance. If the selection effects are governed by necessity, it means that there is some operative underlying physical law that obstructs certain situations from occurring that would otherwise be admissible. For example, the observation that the total amount of electric charge never varies in any closed physical system is explained by the necessity of the conservation of charge from the underlying physical laws of electricity and magnetism (as opposed to a fortuitous situation in which the charge is always balanced). If the selection effects are governed by chance, then different considerations come into play.

Governance by chance means that there have been many similar replications of the system in question (either in time, in space, or both) that are consistent with the physical laws that describe it. If the replications are identical to each other, then of course nothing is gained in terms of understanding why a given system might have special characteristics (the selection effects). However if the replications differ slightly from one another, then eventually (again, either in time or space or both) all possible configurations of the system will be realized. Hence one can employ probabilistic arguments to explain the observation of a system with certain special features: since the replication process ensures that all (or nearly all) configurations are realized, then configurations with special features must also be realized, and the observer was simply fortunate in observing such features. In other words, the particular observed features of a given system are present simply because one is bound to get lucky after many repeated attempts. For example, it is no surprise that a lottery has a winner: out of the many similar tickets sold, one of them must be the winning ticket.

This approach is commonly applied in the scientific method. In subatomic physics experiments, the billions and billions of events recorded in particle collisions ensure that rare and unusual processes will be seen. In biology, patient observation within the natural habitat of a given species ensures that eventually its unusual characteristics (e.g., a mating ritual) will be seen.

Ecbatic explanations must rely on either necessity and/or chance to explain selection effects in any system. To the extent the explanation relies upon necessity, it means that out of all the possible configurations of a system that one could contemplate, only certain particular configurations are observed due to some underlying physical law or principle. To the extent the explanation relies upon chance, it means that the observed particular configurations are the result of a statistical anomaly that could occur from many similar replications of the system. In contrast to this, a telic explanation of a selection effect posits that the observed particular configurations are the result of an intelligent agent making deliberate choices within the constraints of the system; a different agent (or the same agent with different intentions)

would make a different choice, yielding different particular configurations.

Ecbatic Explanations of Biophilic Selection

In order to explain the selective biophilic features of our universe via necessity, one would have to construct a physical theory that is logically and mathematically self-consistent only when its constants of nature take on the values we observe. While it is difficult to fully rule out such a possibility, there have been no compelling forthcoming physical theories that have had such a feature. Indeed, most physical theories that have been constructed (or even contemplated) are logically self-consistent regardless of the empirical values of the fundamental constants. However there is some hope that perhaps a fully unified theory of everything (i.e., of all forces and particles) will explain these empirical values from mathematical first principles. Proponents of string theory have long argued that this is one of many tantalizing possibilities that string theory offers.[7] String theory aspires to be the root fundamental theory of physics from which all other physical theories are derived. An expectation of such a fundamental theory is that it be able to explain the observed values of the constants of nature, including the masses of all particles and the strengths of the forces that govern their interactions.

What we traditionally refer to as the universe is more properly referred to as the observed universe, and that it is a small part of a much larger structure known as the multiverse.

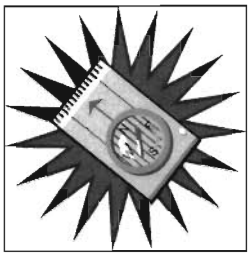
Should an explanation by necessity of the fundamental constants of nature prove successful, it would be a remarkable result. It would almost certainly undermine a telic explanation for the observed cosmic biophilic selection effects, though it is not inconceivable that such an explanation would point to a deep telic understanding of nature. At the very least the telic explanations of biophilic selection effects would have to be revisited.[8] However, a necessary explanation for the observed constants of nature is nowhere in sight at this point in the history of theoretical physics.

It is therefore reasonable to entertain a chance explanation of biophilic selection. This can be done by invoking the concept of the multiverse.[9] The idea here is that what we traditionally refer to as the universe is more properly referred to as the *observed universe*, and that it is a small part of a much larger structure known as the multiverse. By definition, the multiverse contains many similar replicants of the observed universe, with each universe differing slightly from the others in small but quantitatively distinct ways. In the context of the biophilic selection effects noted above, each universe within the multiverse is hypothesized to differ from its companions by having slightly distinct values of its fundamental constants. The multiverse is thus posited to be an enormously vast collection of universes, each with their own particular values for the strength of the electromagnetic force, the mass of proton, and so on. Like the lucky winner of a lottery, our universe happens to be the special one among its many replicants in which the constants of nature take on just the proper values for life to exist. The other replicants also exist, but they are sterile, with their constants of nature yielding a universe that is devoid of life.

Empirical Support for a Multiverse?

Is there empirical support for the multiverse scenario? This question merits some consideration, since one must first ask what would count as evidence. Almost by definition, multiverse models propose a physical situation in which our observable universe is replicated many times over, either by repeated numbers of big bang scenarios (perhaps via gravitational collapse of a black hole in a pre-existent universe[10]) or by extending the universe over a much larger spatial region than is currently observed (or perhaps both). Whatever the mechanism, in the multiverse scenario, our observable universe is regarded as a tiny domain in a much larger structure. Since it is the *observable* universe that is considered to be a tiny domain, it cannot by definition access the other parts of the much larger multiverse in which it is embedded. There is therefore no experiment or observation that one could perform which would provide direct empirical evidence of the multiverse, though indirect support is not inconceivable.[11]

Consider first a multiverse in which the big bang is repeated many times over, each time followed by a big crunch, or re-collapse of the universe. Here one regards our universe today as simply the current repeat in the bang-crunch cycle. However, since essentially all information from a given universe is destroyed in its big crunch, the universe that is subsequently born afterward is empirically disconnected from its predecessors. One could only infer the existence of such predecessors by finding a specific theoretical model of a bang-crunch cycle that provided the most coherent and compelling correlation with cosmological observation. The attraction of such cyclic



The inflationary universe, first proposed nearly twenty-five years ago, was put forward to solve two key cosmological puzzles within standard big bang cosmology ... One puzzle is referred to as the horizon problem ... The second puzzle is termed the flatness problem ...

models is in their avoidance of issues concerned with initial conditions, a situation decidedly telic in character.

Cyclic models, however, are not without problems. One of these is that a given universe inherits the entropy of its predecessors, increasing the maximal size and duration of a cycle from bang to crunch.[12] Extrapolating backward in time, one encounters a cycle of length zero, leading to an initial condition scenario that undermines the ecbatic motivation for the model. Recent cosmological evidence of type IA supernovae, the cosmic microwave background radiation, and the power spectra of galaxies points away from such a model insofar as our universe is accelerating in its expansion, mitigating against a big crunch sometime in the distant future.[13] While it is not inconceivable that the multiverse could consist of temporal replicants of our universe, it appears unlikely that this is the case (though recently a new model of a cyclic universe has been proposed[14]).

The other alternative is that of multiverse models that replicate our universe in space. This idea fits in rather nicely with the paradigm of an inflationary universe. The inflationary universe, first proposed nearly twenty-five years ago, was put forward to solve two key cosmological puzzles within standard big bang cosmology (itself extremely successful in correlating the observable properties of our universe). One puzzle is referred to as the horizon problem: how is it possible that the temperature of the cosmic microwave background (now known to be 2.725 K) can have a temperature uniform to better than one part in 30,000? This uniformity holds for widely separated regions of space, so much so that they have never been able to communicate with each other even by influences traveling at light velocity. The boundary of the region beyond which one is unable to receive a signal from some distant source because of the finite speed of light is termed a horizon in cosmology, from which originates the name of this puzzle. In the standard big bang theory, this required level of uniformity must be assumed. The second puzzle is termed the flatness problem: why, in geometrical terms, is the curvature of the universe so small (i.e., so nearly flat, like a tabletop, instead of curved like either a sphere or a saddle)? Einstein's general theory of relativity predicts that this is a very unlikely result of the evolution of the universe from the big bang, unless the initial curvature is confined to an incredibly narrow range of possibilities. Why should this be so?

The inflationary universe paradigm (referred to as "inflation" for short) proposes that all parts of our observable universe were once in causal contact in the very distant past.[15] The matter and energy of the universe therefore can come to a homogeneous thermal equilibrium. After this, about 10^{-35} seconds after the big bang, the universe expands for a fleeting instant at a much higher rate than one would expect (this is due to hypothesized properties of elementary particles not accounted for in the standard big bang model). Gravitation effectively becomes repulsive for a short period, and the average distance between any two points (the scale size) in space grows by a factor of about 10^{50}. Distant regions of the universe are pushed out of causal contact with one another while maintaining the homogeneity of structure and uniformity of temperature. This process ends by some means after about 10^{-32} seconds, after which time it expands according to the standard big bang model. Small scale structures (galaxies and clusters of galaxies) form after this time.

Within the context of inflation, our observable universe that extends 13.7 billion light-years in every direction was once a very tiny structure, no larger than a grapefruit. It is natural to imagine that the spatial extent of the full universe was much larger in size at that time. As a consequence of inflation, all of space has expanded to enormous size, many times larger than our observable universe. We cannot observe these other spatial regions simply because there has not been enough time for light (and any other matter or energy) to travel from these regions into our universe. Indeed, present cosmological data implying an accelerated expansion indicate that the light from these distant regions will never reach us.[16]

The inflationary paradigm thus provides a home for a spatial multiverse. Our observable universe in this context is simply a very tiny region in a vast spatial structure. It is quite conceivable that within this vast spa-

tial structure the mechanism by which inflation begins and/or ends is not constant, but varies from place to place. The multiverse would then be broken up into different spatial domains of varying size, a typical size being much larger than our observable universe. Within each domain, the constants of nature could take on distinct values as a consequence of the different ways that inflation begins and ends. In most of these domains, the set of values inherited are biophobic. However, on probabilistic grounds, there will be some region in which the set of values are biophilic. The only regions of the multiverse that can be recorded by observers are clearly the biophilic regions. The observed empirical values of the constants of nature are thus understood to be the consequence of an ecbatic observational selection effect: namely only those regions of the multiverse that have biophilic values will contain observers.

The inflationary paradigm ... provides a home for a spatial multiverse. Our observable universe in this context is simply a very tiny region in a vast spatial structure.

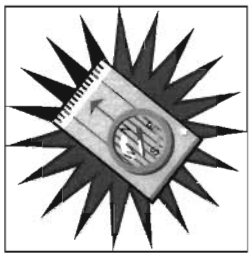
Is such a model empirically credible? Recent cosmological data suggest some tantalizing possibilities. Inflation predicts that fluctuations in the primordial density in the early universe have the same amplitude on all physical scales, and that there should be on average equal numbers of hot and cold spots in the fluctuations of the cosmic microwave background temperature.[17] Detailed measurements from the Wilkinson Microwave Anisotropy Probe (WMAP) over the past year have provided us with a great deal of information that quantitatively constrains cosmological paradigms.[18] In particular, the detection of a large-angle anti-correlation in the temperature–polarization cross-power spectrum—is a signature of adiabatic superhorizon fluctuations in the microwave background, consistent with the expectation of the inflationary paradigm.[19] Superhorizon fluctuations are small fluctuations that very rapidly get amplified to become much larger than the observable universe. This does not happen in non-inflationary models (e.g., cosmic strings), where correlations in observed physical quantities cannot be larger than 2°; hence detection of correlations in the microwave background on angular scales larger than 2° provides very strong evidence for the existence of this kind of amplification (and therefore for inflation). The WMAP experiment was able to measure both fluctuations in the temperature (which physically are due to fluctuations in the density of photons) and fluctuations in the polarizations of photons (which physically are due to the spatial distribution of the velocity of the fluid of baryons just prior to the time at which it was cool enough for stable atoms to form). In an inflationary paradigm, both fluctuations are amplified to superhorizon sizes and become anti-correlated over large angular scales—at present there is no non-inflationary model that does the same thing. These anti-correlations have been observed by WMAP.

Implications

Such data, while not providing direct empirical support, suggest that the notion of an actual multiverse must be taken very seriously. While it may never be possible to definitively prove its existence, it is certainly conceivable that in the foreseeable future observational evidence for inflation will become extremely strong, thereby yielding strong circumstantial evidence supporting the notion that our observable universe is a very tiny part of a much larger structure, namely the multiverse. This raises significant challenges for theology, since the ecbatic perspective that the multiverse paradigm places on the origin of the constants of nature undermines a telic understanding of biophilic selection effects. Simply put, if we have empirical support for a compelling ecbatic mechanism for explaining the origin of the constants of nature, why would we adopt a telic approach to this issue?

To rise to this theological challenge is no small task. Telic explanations of a given phenomenon are generally invoked for one or both of two reasons: either there is considerable experience with previous telic mechanisms or there is no rationally compelling ecbatic explanation. For example, the unearthing of a bit of pottery in an archaeological dig is generally understood in a telic context (some person(s) made it) because we have a wealth of experience that pottery is made by human beings. Similarly, we infer that the arrangement of boulders at Stonehenge has a telic explanation (i.e., some group of persons constructed it) not because we have significant past experience, but rather because there is no compelling naturalistic means by which this arrangement could have occurred. This last approach invokes a telic mechanism by default.

Since we have only one observable universe, we cannot rely on experience with previous telic mechanisms to explain it. In the absence of positive indicators for telic processes, we must rely on invoking teleology by default. Given the extraordinary biophilic selection effects noted above, this is quite reasonable provided there is no plausible ecbatic mechanism. We have seen that the most likely ecbatic mechanism relies upon the concept of a multiverse. It has generally been thought there is a neutral choice[20] between the two approaches: the selection effects could either be explained by a superintelligence making a choice



The notion of a multiverse is not compatible with the notion of a deity who makes choices that have consequences.

...

The scientific method has no hope of predicting outcomes based on initial conditions.

...

The problem with the multiverse [is]: once you start replicating universes, you cannot stop.

among possibilities or by our universe being a small region within a multiverse as described above. However, the recent data from WMAP, to the extent that they confirm inflation, provide indirect empirical support for a multiverse.

Some might like to argue that both options are available: namely, that the multiverse has a Creator. While this perhaps cannot be ruled out on grounds of logic, it seems to me that this case is intellectually pointless. A god who creates a multiverse is a god who creates all possible choices. In other words, whatever can be created is created. However, this is not a god who chooses among a set of possibilities to realize a purpose. Such a god is even less relevant than that proposed by deists. The notion of a multiverse is not compatible with the notion of a deity who makes choices that have consequences.

Indeed, the logical extension of the multiverse scenario suggests that anything that can exist does exist, provided constraints of logical self-consistency are satisfied. The observable region of our universe therefore in this context has the properties that it has simply because all possible alternatives have been physically realized elsewhere (and/or sometime) in the multiverse. We should be no more surprised to observe the special biophilic properties of our universe within the multiverse than we should be to see a 29-hand of cribbage be dealt every so often to players that play the game constantly.

Further reflection on this point indicates a serious problem of intellectual self-consistency with the multiverse scenario. Recall that the purpose of the multiverse is to allow us to regard our universe as a very tiny structure within a much larger setting, so that its special observed properties (the constants of nature) take on their values for probabilistic reasons. Within the vast domains of the multiverse, only very special regions can take on such values. However one can naturally ask the question: how many regions take on such special values? Clearly the answer must be at least one, since we are here to observe them. But is the answer more than one? And if so, how much more?

Simple inspection indicates that the answer must be more than one. Since each domain of the multiverse takes on values of the fundamental constants of nature in a random way, it is logically possible that more than one domain can have biophilic properties similar to our own. If there is something that obstructs this, the onus is on the ecbatic model to explain why. If nothing obstructs this, then more than one biophilic region is possible. But how many more? If the number is two, then this also merits explanation. Indeed, any finite number of biophilic regions demands an ecbatic explanation as to why only finitely many such regions exist within a multiverse of infinite spatial size. A telic explanation (namely the number of biophilic regions was the choice of a superintelligence) is pointless, as it undermines the original ecbatic motivation of the multiverse.

Further problems abound. If there are infinitely many biophilic regions in the multiverse, then there must be a region whose causal history is nearly identical to that of our own observable universe. This means that there is another region of the multiverse—an unimaginably vast (but finite!) spatial distance away from our own—in which there exists a planet whose physical, biological, and social history is nearly identical to that of our own earth's history. The second "earth" could be duplicated by a third "earth," again almost identical in all aspects of its structure and history. Continuing to draw on the vast resources of mathematical infinity to the point of absurdity, the extension of this model to the extreme suggests that all possible logically consistent alternatives for any physical subsystem have been realized somewhere (and/or sometime) in the multiverse. This includes the activities of each and every living being. For example, I must have written (or will write) this essay countably infinitely many times, with all of its possible variants likewise written.

Such a scenario seems ridiculously absurd, on par with the notion that the entire universe is simply a dream that I am having. It undermines not only the telic foundations of theology, but of scientific reasoning itself. We gain no intellectual profit from such an approach since the scientific method has no hope of predicting outcomes based on initial conditions. Our confidence in the ability of experiment to empirically falsify any scientific model that explains a causal chain of events from A to B is undermined. Not only

are the constants and laws of nature environmentally determined (due to our random location in the multiverse) but so are the actual outcomes of any specific event. Experiments, rather than falsifying scientific models that describe one universe, instead become a kind of "weather report" that simply tell us what our corner of the multiverse is like now. An intellectually honest commitment to a multiverse would entail considering all logically admissible ad-hoc scientific models, since we cannot be sure that we are not in a region of the multiverse that is described by such an ad-hoc model. We might just as well invoke a *que sera sera* attitude toward science, since the multiverse allows all possible options.

This then is the problem with the multiverse: once you start replicating universes, you cannot stop. Yet we must stop in order to avoid the absurd (yet logically admissible) conclusions noted above. It is therefore necessary to impose some constraints on the multiverse. Perhaps it is only finite in size and/or duration. Perhaps logic forces only a finite number of biophilic regions to exist.

From an ecbatic perspective, one is then led back to either arguments of necessity or chance. If one is to constrain the multiverse in some way, one must furnish logically compelling (and empirically testable) reasons for doing so. This by no means is a small challenge, particularly if one wishes to avoid both a telic interpretation of the constraints and an undermining of the statistical rationale for biophilic regions that the multiverse is supposed to provide.

Theology's New Question

One is thus led to a new problem for theology: why is there something rather than everything? This challenge is no less daunting than the "something instead of nothing" question. While it might seem initially absurd to contemplate such a question, we have seen that multiverse scenarios naturally lead to this consideration. If theology wishes to retain a telic understanding of our universe, it is just as important to address this question as it is to address the more traditional issue of *creatio ex nihilo*. The god who brings things into existence must also be a god who prevents all possible things from existing.

As a theological antidote to rampant replication of universes, I propose that the observable universe be embedded in an altiverse: a set of possible alternatives that logically exist but are not physically realized. Unlike the multiverse, in which there are many universes that have a physical existence, the altiverse simply encompasses that range of possible alternative states that our single observable universe can evolve into from a given set of initial conditions. Change from one state to another depends on the necessity of physical law, the statistical likelihood of random processes, and on the desires of intelligent agents (natural and supernatural) to achieve particular ends.

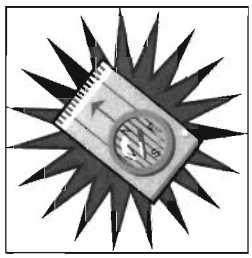
This latter assertion—that the desires of intelligent agents play an intrinsic role in the development of the universe (or a small part of it) from one instant to the next—would seem to imply that there are gaps in what would otherwise be a seamless causal picture from physical theory. It is reasonable to ask what supporting evidence there might for an altiverse with causal gaps. Following are four examples:

1. *Quantum mechanics:* There is a wealth of empirical evidence that we live in a quantum world, one in which a given set of initial conditions can yield a variety of results. Although quantum theory can predict the statistical probabilities over many trials for a replicated set of systems, the actual causal connection between a given initial state and a given final state remains outside the purview of the theory. One could understand an altiverse to be the set of all possible outcomes of a given quantum-mechanical system.

2. *Chaotic phenomena:* It is now generally understood that small changes in initial conditions can yield vastly different physical outcomes for a given system. Although deterministic equations can describe systems that have this property, it is simply not possible to predict the outcome of the evolution of any such system with arbitrary accuracy for arbitrarily long times. One could understand the altiverse to include the vast range of possibilities that a chaotic system could realize.

3. *Conscious will:* Recent experiments have demonstrated that it is possible for mental states to influence material objects.[21] The actual experiments involved the connection of the brains of monkeys to a computer. The monkeys—conditioned by the promise of a reward—learned how to manipulate a joystick so that a dot on the computer could move to intersect another dot. A study of the brain wave patterns of the monkeys during this task allowed the experimenters to develop an algorithm that would manipulate the dot based on the brain wave patterns. Upon connecting their brains to the computer containing the algorithm, the monkeys soon learned how to manipulate the dot by thought alone. One could understand the possible set of points the dot could move to as providing a map for the altiverse of choices that the monkeys could make.

4. *Compact spatial topology:* It was recently pointed out that the data from WMAP provide suggestive evidence that the universe is of finite spatial size, consisting of twelve curved pentagons joined together in a sphere about 30 billion light years across.[22] The lack of power for the larger scale fluctuations in the microwave background might be because the universe is not large enough to support such fluctuations. This situation could occur if the universe has topological identifications, making it somewhat like a cosmic house of mirrors. If this proposal survives further empirical scrutiny, then it would falsify (or at least seriously constrain) a multiverse of large spatial size. Such findings would be more congenial with the concept of an altiverse, in which out of all possible topologies, only one can be realized.



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Discussion

The relationship between the telic and the ecbatic is one of the frontier avenues of study in the science/faith dialogue. While an ecbatic understanding of reality remains of crucial importance to the scientific method, it is not without its limitations. I have argued that the concept of a multiverse implies one of its key limitations, namely the implication that anything that can exist, must and does exist. Avoiding the absurdities rendered by such an implication forces a new question for theology to address: "Why is there something rather than everything?"

I have further proposed that the concept of an altiverse could be a fruitful way for theology to proceed to address this question. It asserts that the many possible states of a given physical system represent potential choices, only one of which is actualized at any particular instant. It further asserts that a transition from one state to another could occur for telic and/or ecbatic reasons. In the context of cosmology, an altiverse paradigm would assert that there is only one physical universe.

As a final comment, it is important to note that while an ecbatic understanding of reality is foundational to the scientific method, it is also incomplete. This is particularly important in the applied sciences, whose goal is to make use of our understanding of a given physical system to achieve a desired end. In this sense, a telic understanding of the world around us and our relationships within it is indispensable. Uniting this understanding with that of a cosmic teleology remains one of theology's ongoing tasks. ❋

Notes

[1]For an overview of an explanation of orthodox Christianity from a scientific perspective, see J. Polkinghorne, *The Faith of a Physicist* (Princeton, NJ: Princeton University Press, 1994).

[2]Another possibility is that of pantheism, the notion that the world is either identical with God or is in some way a self-expression of his nature. A distinct but related concept is that of panentheism, the idea that the universe is God's body, but God's awareness or personality is greater than the sum of all the parts of the universe. The former idea does not provide a particularly satisfactory response to the origin-of-God question; the latter idea is consistent with the notion of a self-created God. For further information see I. G. Barbour, *Religion and Science* (San Francisco, CA: Harper San Francisco, 1997).

[3]It is possible to imagine that life could take on a radically different character from that which we have observed (e.g., noncarbon based, different configuration of DNA basepair substructure, etc.) While this possibility is logically admissible, it is highly speculative, and there is no positive evidence in favor of it. Throughout this essay by "life," I shall mean "life as we know it"; I will not address the question as to whether a very different kind of life from that which we know could exist in a universe whose properties are quite different from our own.

[4]For an extensive description, see J. D. Barrow and F. Tipler, *The Anthropic Cosmological Principle* (New York: Oxford University Press, 1988).

[5]J. Polkinghorne, *Reason and Reality* (Harrisburg, PA: Trinity Press International, 1991).

[6]P. C. W. Davies, *The Cosmic Blueprint* (New York: Penguin, 1995).

[7]For a popular introduction, see B. W. Greene, *The Elegant Universe: Superstrings, Hidden Dimensions and the Quest for the Ultimate Theory* (Vintage, 2000).

[8]For a description of possible philosophical perspectives on the origin of the universe see P. H. Collins and G. F. R. Ellis, *Before the Beginning* (New York: Marion Boyers Publishers, 1993).

[9]For a description of the philosophical rationale behind the multiverse, see J. Leslie, *Universes* (New York: Routledge, 1996).

[10]For a more complete introduction to this idea, see L. Smolin, *The Life of the Cosmos* (New York: Oxford University Press, 1997).

[11]Ibid.

[12]R. C. Tolman, *Relativity, Thermodynamics and Cosmology*, (New York: Oxford U. Press, Clarendon Press, 1934).

[13]A. G. Reiss, et al., "Observational Evidence from Supernovae for an Accelerating Universe and a Cosmological Constant," *Astronomy Journal* 116 (1998): 1009; and S. Perlmutter, et al., "Measurements of Omega and Lambda from 42 High-Redshift Supernovae," *Astrophysical Journal* 517 (1999): 565.

[14]For a review, see P. Steinhardt and N. Turok, "Cosmic Evolution in a Cyclic Universe," *Physical Review* D65 (2002): 126003.

[15]For a recent pedagogical exposition, see G. S. Watson, e-print archive astro-ph/0005003; see also A. H. Guth and A. P. Lightman, *The Inflationary Universe* (Reading, MA: Perseus Press, 1998).

[16]Tolman, *Relativity, Thermodynamics and Cosmology*.

[17]See again G. S. Watson, , e-print archive astro-ph/0005003.

[18]C. L. Bennett, et al., "First Year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Preliminary Maps and Basic Results," *Astrophysics Journal Supplement* 148 (2003): 1; and D. N. Spergel, et al., "First Year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Determination of Cosmological Parameters," *Astrophysics Journal Supplement* 148 (2003): 175.

[19]H. V. Peiris, et. al., "First Year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Implications for Inflation," *Astrophysics Journal Supplement* 148 (2003): 213.

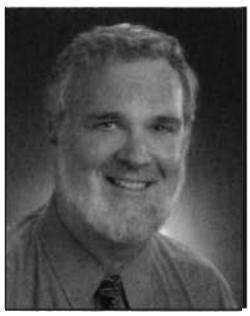
[20]Leslie, *Universes*.

[21]M. D. Serruya, N. G. Hatsopoulos, L. Paninski, M. R. Fellows, and J. P. Donoghue, "Instant Neural Control of a Movement Signal," *Nature* 416 (2002): 141.

[22]J. P. Luminet, J. Weeks, A. Riazuelo, R. Lehoucq, and J. P. Uzan, "Dodecahedral Space Topology as an Explanation for Weak Wide-angle Temperature Correlations in the Cosmic Microwave Background," *Nature* 425 (2003): 593.

Current Concepts of Capacity and Autonomy in Medical Decision-Making: A Critique from a Christian's Perspective

James J. Rusthoven



James J. Rusthoven

Determining a patient's capacity and protecting one's autonomy have become increasingly important in medical decision-making and bioethics. Capacity and autonomy usually connote the ability to make decisions (capacity) without necessary help or coercion from others (autonomy). Advances in neuroimaging have led to imaginative studies of the anatomic and physiologic basis of the different aspects of capacity. Similarly, clinical instruments have been created to capture clinical nuances of capacity among different patients. The worthiness as well as reductionistic pitfalls of both approaches are discussed. A major challenge for Christians is the pursuit of a biblically-grounded concept of capacity and autonomy that counters the rationalistic and individualist concepts of secular society. Such a concept could lead to more normative assessments of capacity and put added value on the communal and faith dimensions of autonomy in medical decision-making.

The concept of capacity to make informed decisions remains a major topic of discussion and debate in clinical bioethics.[1] Embedded in the premise that patients or clinical research subjects must give informed consent to participate in treatment or clinical research, capacity is not fully understood as a concept of medical decision-making. While the terms competence and capacity are often used interchangeably, the former tends to be used in legal contexts while the latter refers to decision-making capability in clinical situations. For example, when evaluating and designating a surrogate decision-maker, one looks for a person who is competent to make decisions in the best interest of the patient who is now incompetent to do so. One of the Oxford Dictionary's definitions of capacity is "the ability or power to do something." Competent, on the other hand, is defined as "having the skill or knowledge to do something successfully."[2] As such, competence implies the capability to act, to muster the communicative and/or technical know-how to act when called upon.

To understand what is known about both basic neuroscientific and clinical aspects of human capacity, I will begin with a recent example of how basic neuroscience information can be used to support one set of faith-based beliefs over another. In response to the claim that belief in the human capacity for reason and responsibility should supercede or replace "religious" belief as a moral guide to making decisions, I will explore the present concept of capacity. Some of the limitations inherent in reducing capacity to measurable and quantifiable functions both in neuroanatomical correlative studies and in the development of clinical tools to iden-

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Article

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tify clinical components of capacity will be discussed. Finally, I will suggest that our present societal concept of autonomy, as a fundamental bioethical principle of capacity, is a major stumbling block to developing a richer understanding of self, and thus a more normative appreciation for determining one's capacity to make medical decisions.

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Does the Brain Have Serious Design Flaws?

In a May 2004 issue of our local Hamilton newspaper, Robert Buckman was quoted as saying that he "distrusts religious beliefs."[3] An avowed atheist and president of the Humanist Association of Canada, Buckman "espouses a non-religious ethical philosophy of life that looks to human capacities for reason and responsibility rather than divine salvation." He believes, says the article, that "religious beliefs ... are a product of the right temporal lobe, a complex area of the brain associated with deep feelings of the mysterious or the divine when stimulated." He further raises concerns that, within the temporal lobe, religious feelings are linked to the limbic system which has been associated with aggressive behavior. Suggesting that this link is a design flaw in our brains, he urges that people should not trust their religious beliefs as moral guides out of fear that religious beliefs can generate violent behavior.

Buckman is no crackpot. He is an articulate and respected medical oncologist as well as an internationally recognized speaker who teaches health care professionals how to break bad news to patients in the terminal stages of disease.[4] Brushing aside religious beliefs and expression as products of an evolutionary aberration of cerebral development, he tries to ignore the motives and presuppositional basis of actions on the Cartesian assumption that reason itself is a valid starting point for actions.

While several issues arise for us as Christians from Buckman's challenge, I would like to focus on his belief in the human capacities for reason and responsibility as a "non-religious" ethical philosophy of life. His narrow definition of "religious" tries to push aside the reality that such faith in reason is itself presuppositional, much like the Christian's faith in God. His faith in science and reason is shared by many contemporary scientists. The concern is not that the scientific work is done. In *The God Gene*, Dean Hamer tries to make the case of a genetic basis of dispositions to religious belief.[5] We may well be "hardwired" to seek God, though sin (an acquired trait!) interferes with our relationship with God. Rather, the concern is in the reductionistic interpretations that often result from scientific research and that can be used, as Buckman has done, to champion the cause of reason as the god in whom people should trust.

If we as Christians are to respond to such interpretive challenges, we must first understand human capacity (or incapacity) to reason, to act responsibly, and to make decisions requiring action. It is particularly in medicine where the lack of a patient's capacity to make decisions touches on major areas of bioethical concern, including the loss of that patient's free choice or autonomy. In addition, we must discern the differences in the perceptions of capacity between secular humanists such as Buckman and Christians and how one's world view impacts the framing of these perceptions for medical practice and for public engagement. In developing a Christian framework for understanding capacity, one must understand the present clinical and ethical paradigm and understand from where it has historically come. We then must decide, through reflective critique, if an alternative framework better captures the truth of how God would have us make decisions about our health.

Searching for a Neuroanatomic and Neurophysiologic Basis of Capacity

Bioethicists Ruth Faden and Tom Beauchamp have arguably claimed that decision-making requires three components: understanding, intentionality, and voluntariness.[6] Understanding has been considered a fairly straightforward concept for which patient-friendly tools have been developed.[7] Numerous decision-aids (perhaps more specifically called comprehension aids) have been shown to improve patient understanding of concepts related to the potential benefits and risks of treating diseases such as cancer.[8] Intentionality and voluntariness, on the other hand,

involve more abstract dimensions such as initiation, intention, motivations, and judgment, to name a few; these have been collectively referred to as executive functions. Early correlations of clinical syndromes of dysfunctional thought with brain anatomy suggested that normal initiation, planning, and problem solving are dependent on a normally functioning dorsolateral prefrontal cortex, lesions of which result in disorganized thinking, loss of abstract thinking, and difficulties with multistep tasks (so-called "dysexecutive syndrome"), attributes associated with reasoning capacity. Similarly, motivation was linked to the same region, with some anatomical disturbances associated with apathy, and in the extreme, loss of movement, speech, and indifference to pain (akinetic mutism).[9]

We should question whether reducing such complex functioning as capacity to variations in blood flow within specific parts of the brain will be helpful in understanding the implications of subtle clinical gradations of disorder among these components of capacity.

Utilizing the newer radiographic technologies such as magnetic resonance imaging (MRI) and positron-emission tomography (PET scanning), studies have shown anatomic variants consistent with losses of executive functions, as manifest by intentionality and voluntariness, in patients with overtly psychotic states such as schizophrenia.[10] In less severe affective disorders such as depression or anxiety, PET neuroimaging has shown reductions in blood flow in depression states and increases in flow in anxiety states. While the number of studies is small, the internal validity of these results is supported by the return to normal blood flow following effective treatment.[11]

These observations add to our understanding of the basic physical and physiological modalities of the cognitive and affective components of capacity. However, we should question whether reducing such complex functioning as capacity to variations in blood flow within specific parts of the brain will be helpful in understanding the implications of subtle clinical gradations of disorder among these components of capacity. Furthermore, the cost of performing such expensive tests may not ethically justify their use as practical components of clinical capacity determination. Yet, less costly, clinical instruments designed to identify subtleties of executive dysfunction have often lacked reproducibility and are generally inadequate on their own.

Attempts to Capture Capacity with Clinical Instruments

While comprehension aids seem to assist patients in translating information into terms and concepts that they better understand, such aids may not improve patient anxieties or even the ultimate choice in treatment options offered.[12] Moore has recently critiqued various clinical instruments designed to help determine capacity, including so-called executive dysfunctions. From his perspective, they tend to be brief, semi-structured, and narrow in scope, lacking in sensitivity and specificity, and often exhibiting heterogeneity of performance among subjects. Importantly, they fail to consider other dimensions including the effects of time, of beliefs and culture, of fears of abandonment or neglect if the patient does not enroll, and of the uniqueness of different clinical situations inherent to each case.[13]

In addition to testing with measurement tools, careful individual clinical interviews seem necessary to identify affective states that may distort decision-making capacity by suggesting reduced capacity through poor performance of the test.[14] For example, apathy may result in decisions contrary to one's values and beliefs out of feelings of guilt deserving of punishment or a lack of caring. In anxiety disorders, tests may suggest patients are capable but they may be dependent on outside influence out of low self-esteem and fear; patients may fear that not following the physician's wishes could lead to retribution. Sensitivity to patients' vulnerabilities requires exceptional attention to expressiveness and responsiveness in the patient-physician dialogue, without which the clinician may unwittingly control the patients' choices through their powers of suggestion.

Suchman, et al. have recently constructed a thoughtful model for improving empathic communication, identifying empathic opportunities wherein patients express an emotion that creates an opportunity for a supportive, empathic response by the physician.[15] Such aids to attentive interviewing involving nuanced interactions with patients or research subjects may be crucial in determining the emotions and "states of mind" that may affect a judgment of capacity, aspects that may not be captured by the sensitivity and specificity of present standard discernment tools.

This suggests that reducing capacity to its various components may be the easier part of the science. The challenge that comes to clinicians is to conceptualize and frame these multiple dimensions to gain a normative, working understanding of capacity to help guide patients to make decisions that are best for them. As newer, more complex, and more numerous treatment options have become available in medicine, decision-making has

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become increasingly complex. Models for developing patient-physician relationships have been proposed which, contrary to the paternalistic spirit of the Hippocratic tradition, attempt to derive decisions through negotiated trade-offs based heavily on the values and beliefs of each party.[16] These models have been strongly influenced by liberal individualism and the care ethics developed largely by feminist leaders, with both traditions anchored in moral relativism and value-neutrality. In making care management decisions, a critical legal and ethical imperative is the expression of implicit or explicit consent to proceed with a mutually agreed upon course of action.

The Importance of Autonomy in Understanding Capacity

Such informed consent has been a major focus of therapeutic decision-making within the bioethics community. It involves a semi-formalized process through which patients should be empowered to make informed, uncoerced decisions about their care or about their willingness to serve as research subjects. A foundational principle of this process is the need for decisions to be made autonomously, usually defined as deciding on a course of action without external influence or coercion.[17] This in turn has been tied to the belief that self-determination is an inalienable right to make one's own decisions, *even if they are not the wisest in the judgment of others.* Full capacity and autonomous choice are considered necessary, closely related requirements toward achieving meaningful decisions. Individuals who are judged less-than-fully capable to make decisions are often considered in law and in practice deprived of completely autonomous choice.

It is my contention that our current societal idea of autonomy is often inadequate, due in large part to (1) its place within the philosophical framework of liberal individualism and (2) a sequence of crises of abuse in human research that have occurred over the last seventy-five years. The reaction to the latter was a necessary focus on the individual subject. But in so doing, relational connections traditionally inherent in conceptions of self became detached under the prevailing philosophical and cultural influence of liberal individualism. Autonomy as conceived in modern secular terms is foreign to the biblical idea of individuality and the responsibility for one's own actions. Some have tried to understand what the Bible says to us about Christian ethics on the presumption that the isolated individual is the primary focus of such an endeavor. This in turn has led to the search to develop formalized methodologies using critical reason that all individuals can employ in making decisions.

Fowl and Jones contend that such a strong focus on the individual distorts one's interpretive reading of Scripture by failing to account for the ways that our predecessors in the faith have read the Scripture "in and through particular communities, particularly ecclesial ones, in the past."[18] While the individual remains directly accountable to God, the central focus of the message to individuals is through communal structures. Janzen sees ethical teaching in Scripture through paradigms, understood as a personally and holistically conceived image of a model or theme. In the Old Testament, the individual is understood within the familial paradigm. God addresses individuals as his people through the family and through the peoplehood of Israel. In the New Testament, Jesus' message is to his followers while that message from Paul and the other apostles are often addressed to the Church at large or to specific church communities.[19] Thus, contemporary ideas of autonomy are often stripped of the contextual and historical aspects that form part of the ontological essence of the individual. Seen through such lenses, the scriptural understanding is distorted.

In *After Virtue,* Alasdair MacIntyre has argued that the secularization of morality in the Enlightenment period resulted in the loss of the beliefs that moral judgments determine what human conduct would be teleologically appropriate and that such judgments reflected universal law as commanded by God.[20] The consequences have included "liberated" humans, with the resultant loss of traditional roles and relationships. Allied with this came the belief that autonomy as self-reliance is the best way to be free from the coercive influences that historically have plagued patients and

have made them subservient to paternalistic physicians for centuries. Unfortunately, such autonomy is largely devoid of the social and political dimensions that traditionally helped to define self. One result of this loss has been the necessity for legal protection for patients considered questionably or clearly incapable through an appointed surrogate decision maker. I propose that we need to revisit our historical concept of self. We need to reincorporate more integrally the relational support that helps to define us as individuals, the support which has historically been, and in many present-day non-Western cultures continues to be, an indispensable part of decision-making involving individuals in community.

The Necessary Complexity of Capacity Assessment

How should we discern between the capable and incapable? How does one's concept of decisional autonomy influence this distinction? Some have argued that creating dichotomous thresholds is too simplistic, not accounting for the continuum of capability within the population. Grisso and Appelbaum have suggested that competency assessments must consider not just the level of understanding and reasoning but also the level of cognitive demand associated with the decision.[21] Furthermore, should the therapeutic ratio of any intervention be considered? If a patient is offered a treatment which is considered to offer a good chance of a major benefit with a low risk of toxicity, should a lower threshold be set when the patient accepts such an option but a higher threshold apply to patient refusal? In light of these multiple factors, Grisso and Appelbaum have argued that thresholds may need to vary from case to case, leaning toward a more casuistic, and perhaps more relativistic approach to capacity decision-making.[22]

Note also that once such factors are added for consideration, patient autonomy becomes even more contingent on the value-laden judgment of the caregiver as to what defines "reasonable" and "sensible" decisions. Is this paternalism revisited? Is it coercion? In an attempt to move away from such caregiver influences, Moore feels that the caregiver's primary responsibility in capacity determination is to rule out both external and internal coercion, the latter connotating decisions "unduly motivated by a mental disorder."[23] The patient is left to determine his or her personal belief-driven choices, even if they seem unreasonable to the caregiver. Philosopher and bioethics scholar Robert Veatch seems to advocate the extreme of this position, moving aside physician beliefs and judgments in an effort to give complete autonomy and decision-making power to the patient.[24] But this creates a particular dilemma for those who are less-than-fully capable of making their own decisions. Is a legally designated surrogate the normative solution or just the only one in situations where supporting relationships are inadequate or non-existent?

Relational Autonomy: Secular and Christian Notions

The care ethics movement has provided insights into the relational void inherent in post-Enlightenment liberal individualism through its emphasis on the importance of human relationships in addressing ethical issues around patient decision-making. A product of feminist bioethical thought representing a family of moral reflections, ethics of care are devoid of a central moral principle. These reflections focus on the care for persons with whom one has a significant relationship, including an emotional commitment to and willingness to act on behalf of such persons. In an example from Beauchamp and Childress, a father is found to be histocompatible with his daughter who needs a kidney transplant.[25] After considering the situation, he declines to be the donor, citing various reasons including fear of surgery, a lack of courage, and the lack of guarantees that the transplant will be permanently successful. In addition, he asks the physician to tell his wife that he is not histocompatible, expressing fear that the truth would ruin his family. After considerable reservation, the physician tells the wife that her husband cannot donate because of medical reasons. A bioethicist from a care ethics perspective would emphasize not only what physicians do (for example, keeping confidentiality or not) but also how they act, what motivates them to act, and whether their actions support or disrupt positive relationships. From this moral perspective has come the idea of *relational autonomy*, a concept which denies the independence of self from other human relationships but seeks to understand the importance of those relationships for making medical decisions.[26]

Christian character ethics also has developed in response to liberal individualism and the obsession with rationality. As with ethics of care, this framework focuses less on the rightness and wrongness of decisions and more on what factors shape the character of the agent of action and decisions. A movement akin to virtue ethics, character ethics recognizes the importance of relationships as an indispensable dimension for nurturing one's character. Character is not developed by self-made individuals but by the encouraging and correcting influence of community.[27] Within this ethical framework, discipleship through following Christ is essential in forming and molding human relationships. The life, death, and resurrection of Christ is the central moral focal point, in contrast to the anchor-less feminist idea of relationships for their own sake. Thus, while those using a care ethics framework recognize the moral deficiencies in liberal individualism, they cannot understand the full picture of their insights due to their ignorance of the meaning of Christ's redemption of human relationships as part of a redeemed creation order.

As Christians, we need to critically reassess the idea of capacity and autonomy in light of these historical and current realities. Our culture promotes self-determination

I think it is our responsibility as Christian neuroscientists and health care workers to interact collaboratively toward a biblical and clinically meaningful concept of capacity and autonomy, and thus adding normative strength and validity to difficult health care decisions.

and self-reliance as the true sign of maturity and adulthood, often leaving a vacuum for developing new and fulfilling relationships during adolescence. Yet, believers in Christ know that we are responsible for the welfare and care of our fellow human creatures as part of our creational mandate, especially those in our closest relationships of family and church. But should not this extend to meaningful discussions about what is important to the individual and the community at large for making later life and end-of-life decisions? Perhaps the legally designated surrogate could be replaced by advanced decision advisors who help individuals and families to understand and articulate preferences in advance of incapacity, in light of community-backed covenants based on common values and beliefs.

Conclusions

I think Moore and Raymont are on the right track in stressing the complexity of what constitutes decision-making; as Raymont suggests: "... the concept of capacity has now evolved into a sophisticated ethical and legal construct ..."[28] Not only must we be capable of making cognitive, logical, deductive associations of thought, we also need to be in the right frame of mind (e.g., minimal anxiety, fear of retribution if the wrong answer is given, etc.). We need to understand what level of capability is required of the circumstances, and how time may change either the level of capacity or the level of cognitive difficulty. But at a deeper level, perhaps we need to move beyond the past intense concern about coercive forces affecting patients and subjects, toward a more biblical understanding of autonomy in our culture.

In so doing, perhaps we need a greater focus on more formal communal support that incorporates mutually lived out communal values and beliefs in decision-making. For Christians, this could involve communal reflection among "moral friends"[29] on family and church community values and beliefs in anticipation of later medical decisions during times of future incapacity. Finally, I think it is our responsibility as Christian neuroscientists and health care workers to interact collaboratively toward a biblical and clinically meaningful concept of capacity and autonomy, and thus adding normative strength and validity to difficult health care decisions. ❋

Notes

[1]Much of the content of this article was presented at the biomedical ethics symposium at the 2004 ASA annual meeting on "Neuroscience and the Image of God," at Trinity Western University, Langley, BC.

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Glossary of Defined Terms

Autonomy – freedom of action or self-government. In bioethics, one of the four basic principles conceived by William Ross and adapted by Tom Beauchamps and James Childress as the essence of a framework for bioethical engagement.

Cartesian – relating to the French philosopher Rene Decartes and his ideas, including his foundational faith in reason as the key to solving problems.

Capacity – the ability or power to do something. In bioethics, capacity often refers to the ability to think and make decisions for one's self.

Christian character ethics – a movement in Christian ethics responding to widespread moral decline, the need to recognize the historical consciousness of our time, a lack of recognition of the formative influences of friendship, discipleship to mentors, and emotions and desires. Central to this idea is incarnational discipleship which points to Christ as the embodiment of our ethical practices.

Competence – the quality of having the necessary skill or knowledge to do something successfully. In bioethics, competence is closely related to and sometimes considered synonymous with capacity, though it is often the term used in legal contexts. However, competence usually implies a similar degree of capacity but may also connote the actualizing of one's capacity.

Ethics of care – a framework for understanding ethical problems which emphasizes the empathetic and human relational aspects of ethics. Grounded in a feminist tradition, this family of ethical movements sees relationships for their own inherent value rather than in the context of a broken creation order in need of God's grace through Christ.

Hippocratic tradition – pertaining to the writings of Hippocrates, the Greek physician whose oath embodies much of the ethical basis for contemporary codes of medical ethics.

Histocompatible – referring to the presence of the same or similar proteins on cells of the immune system of an organ donor and of the recipient. This would predict for a low chance of an immune reaction against the graft's cells or against the recipient's cells after the transplant has occurred.

Limbic system – grouping of regions largely within the temporal lobe such as the hippocampus and amygdala associated with the neural organizations for emotional, motivational aspects of behavior. Abnormalities of this system can produce affective changes in personality including anxiety, aggression, and depression as well as memory loss.

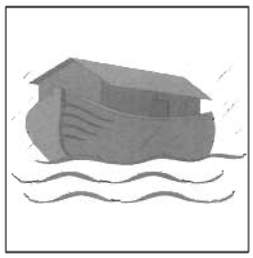
MRI – acronym for magnetic resonance imaging, an imaging technique based on changes in the magnetic properties of living tissues.

Paternalism – the tendency to protect those over whom one has control by, at least in part, restricting their freedom. In bioethics, this usually refers to the disposition or policy to make decisions for patients rather than allowing them to make their own.

PET – acronym for positron emission tomography, a dynamic radiographic imaging technique used to distinguish parts of the brain according degrees of actively metabolizing glucose and blood flow. Also used in the management of cancer patients to visualize tumor deposits which are metabolically more active for glucose than surrounding tissues.

Relational autonomy – term used to connote a focus on the effect of relationships with other humans on the autonomy of individuals.

Temporal lobe – portion of the brain associated with a wide variety of functions including hearing, smell, the capacity to read, write, and to understand the meaning of spoken words. Disorders associated with this lobe include expressive or receptive dysphasias (inability to speak or understand words).



The History of the Universe in a Nutshell: Reflections on 2 Peter 3

Krista Kay Bontrager

Krista Kay Bontrager

2 Peter 3 ... provides intriguing insight into how the biblical authors may have viewed the early chapters of Genesis, including the creation account.

There is a sentiment on university campuses that discussions about religion and science are generally welcome, as long as they do not happen at the same time. Discussions about the Bible belong in the religion department. Discussions about science belong in the science department. And seldom, if ever, the two shall meet. What may be surprising to some is that this sentiment is not limited to secularists.

Prominent evolutionary biologist Simon Conway Morris, a devout Anglican, made clear in a recent radio interview that he wanted no part of marrying science with the Bible.[1] Esteemed Old Testament scholar John Walton promotes a similar, but more moderate position.[2] While Walton believes the scientific record can, at least in some sense, point us to the Creator, he is hesitant to derive any scientific content from the early chapters of Genesis. One common concern for Christian scholars like Conway Morris and Walton is that they want to guard the integrity of the Bible by not trying to make it say something scientific that it was never intended to say, thereby sparing it from ridicule if an interpretation is eventually overturned by science. The Roman Catholic Church's handling of the Galileo fiasco is frequently put forth as Exhibit A of the folly of such concordist methodology.

Walton rests his position squarely on the common evangelical belief that the meaning for any given text lies in the author's intent, which sets certain boundaries for what the text means and how it can legitimately be interpreted.[3] One key restraint in the interpretive process involves the literary genre—the shared rules of interpretation that allow readers to access the author's meaning. Walton then uses these principles to try and demonstrate that the author of Genesis 1 and 2 intends to convey a creation narrative much in the same vein as other creation myths of the ancient near east.[4]

If this hypothesis is correct, it seems to follow that Genesis 1 and 2 should not be taken "literally," meaning that it should not be taken as having much, if any, actual historical content. But is this paradigm consistent with how the Bible interprets itself? Do the biblical authors speak about the early chapters of Genesis in such a way as to indicate that they saw it as being either mythology or history? Moreover, neither Simon Conway Morris nor John Walton has a problem with the miraculous nature of the Incarnation. They are willing to grant that the Bible contains *some* historical content, at least as it pertains to the life of Jesus Christ. The question is, what parts of the Bible are meant to be interpreted as myth (if any) and what parts are intended to be understood as history?

One way of tackling these provocative issues is to look at parallel creation passages and try to detect how other biblical authors view Genesis 1. One such passage is 2 Peter 3. This little used chapter provides intriguing insight into how the biblical authors may have viewed the early chapters of Genesis, including the creation account.

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Putting 2 Peter in Context

Before jumping into chapter 3, it is important to lay the groundwork for the epistle in general. Reading an epistle is a bit like listening to one end of a phone conversation.[5] Sometimes the reader has to "fill in" what the other caller is saying in order to understand the motivation behind the response. To better evaluate Peter's comments, it is helpful to gather any possible background information on the recipient church and author. Unfortunately, Peter does not reveal the location of this ancient church, so we do not have any specific information about the original audience. But the epistle contains some clues about the problem that motivated Peter to write in the first place. By outlining the thought-flow of his letter (see table 1), it is possible to gain a reasonable understanding of the heresy that concerns him.

Peter opens his epistle with the customary elements, (1) identifying the writer, (2) identifying the recipients, and (3) an introductory greeting (1:1–2). Peter omits the usual "thanksgiving" portion of the letter and cuts to the core issue by exhorting the church to grow in their "godliness through knowledge" (1:3). New Testament scholar Douglas Moo comments that this section appears to be a "mini-sermon" in itself, complete with three points:[6]

1. God has given Christians all they need to become spiritually mature (vv. 3–4).
2. Christians must actively pursue spiritual maturity (vv. 5–9).
3. Christians must pursue spiritual maturity if they expect to be welcomed into God's eternal kingdom (vv.10–11).

Peter's call to spiritual maturity necessitates that Christians reflect certain virtues.

> For this very reason, make every effort to add to your *faith goodness*; and to goodness, *knowledge*; and to knowledge, *self-control*; and to self-control, *perseverance*; and to perseverance, *godliness*; and to godliness, brotherly *kindness*; and to brotherly kindness, *love*. For if you possess these qualities in increasing measure, they *will keep you from being ineffective and unproductive in your knowledge* of our Lord Jesus Christ (2 Peter 1:5–8, emphasis added).[7]

These verses bear a remarkable resemblance to Paul's famous description of the fruit of the Spirit (Gal. 5:22–23). Peter's discussion of godly character this early in his letter will later provide a counterpoint for discerning false teachers at the end of chapter 2.

By verse 9, Peter is already alluding to the trouble afoot in this congregation. "But if anyone does not have them, he is *nearsighted* and *blind*, and has *forgotten that he has been cleansed from his past sins*" (1:9, emphasis added). Apparently there was a group in this church who had, practically speaking, nullified their redemption in Christ. At this point, Peter does not reveal a full explanation for the motivation behind either his exhortation or his warning, but clearly his intent is pastoral. He wants God's people to examine themselves and make their "calling and election sure" so that they will not be led astray (1:10–15). Peter sends this warning as a kind of "last will and testament" as his death seems to be imminent (1:12–15).[8]

The next major section turns to doctrinal problems. Peter begins by "refreshing" the memories of these Christians about the empirical foundation for the Christian faith. Christianity makes an intimate link between history and theology. God's intervention in past human events provides the rational foundation to believe that he will intervene to keep his covenant promises in the future. At a foundational level, Christianity is based on the question: Does the Bible contain an accurate account of the experiences of those who witnessed past miracles?[9]

The Bible records the eyewitness testimonies of many, including Peter and the Old Testament prophets, who have preserved God's words and deeds in history.

> *We did not follow cleverly invented stories* when we told you about the power and coming of our Lord Jesus Christ, but we were *eyewitnesses* of his majesty.

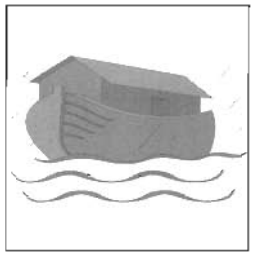
Breakdown of 2 Peter

I. Opening of the letter
   - A. Greeting (1:1–2)
   - B. Exhortation to grow in godliness through knowledge (1:3–11)
   - C. Transition: Warning of his imminent death (1:12–15)

II. Body of the letter: Responding to false teachers
   - A. Warning against false teachers (1:16–21)
   - B. Their coming predicted (2:1–3a)
   - C. Their judgment assured and the promise of rescue for the godly – historical examples (2:3b–9)
     1. Fallen angels
     2. Noah's flood
     3. Sodom and Gomorrah
     4. The rescue of the righteous (Lot)
   - D. Their character described (2:10–22)
   - E. Christ's Return: The final answer to scoffers (3:1–16)
     1. Three answers (3:5–9)
     2. Warning (3:10)
     3. Exhortation to live a righteous life in light of Christ's return (3:11–16)

III. Conclusion of the letter (3:17–18)

Table 1: Breakdown of 2 Peter



Communication

The History of the Universe in a Nutshell: Reflections on 2 Peter 3

Christianity is not based on esoteric, secret teaching or fabricated legends. It is based on publicly witnessed, historical facts.

> For he received honor and glory from God the Father when the voice came to him from the Majestic Glory, saying, "This is my Son, whom I love; with him I am well pleased." We ourselves *heard* this voice that came from heaven when we were with him on the sacred mountain.
>
> And we have the word of the prophets made more certain, and you will do well to pay attention to it, as to a light shining in a dark place, until the day dawns and the morning star rises in your hearts. Above all, you must understand that *no prophecy of Scripture came about by the prophet's own interpretation.* For prophecy never had its origin in the will of man, but men spoke from God as they were carried along by the Holy Spirit (2 Peter 1:16-21, emphasis added).

Christian faith is not merely a religion of personal, subjective experience—although it certainly contains that component. It is grounded primarily in particular historical facts—God's interventions in history—which provide us with the rational foundation for our hope that God will keep his future promises. And, this argument provides the framework for Peter's response to the heresies afoot in this church in chapter 3.

Building on this foundation, Peter begins chapter 2 with a blunt warning about the future coming of false teachers who will deceive the body of Christ.

> But there were also false prophets among the people, just as there *will be false teachers* among you. They *will secretly introduce destructive heresies,* even denying the sovereign Lord who bought them—bringing swift destruction on themselves. Many *will follow their shameful ways and will bring the way of truth into disrepute.* In their greed these teachers *will exploit you* with stories they have made up. Their condemnation has long been hanging over them, and their destruction has not been sleeping (2 Peter 2:1-3).

Tragically, it appears the church is being thrown into confusion by these false teachers who originate from *within* the church itself (2 Peter 2:1, 21). However, it would seem at first glance that Peter's repeated use of the future tense in these verses contradicts his use of the present tense elsewhere (2 Peter 2:11, 17, 18) and his apparent knowledge of their character and teachings.

So, the question is, when will these "false teachers" come? Chapter 3 offers a possible explanation: the "scoffers" will come "in the last days" (3:3). The New Testament seems to suggest that the "last days" were inaugurated with the first coming of the Christ, not his second.

> In the past God spoke to our forefathers through the prophets at many times and in various ways, but *in these last days he has spoken to us by his Son,* whom he appointed heir of all things, and through whom he made the universe (Heb. 1:1-2, emphasis added).

Moo suggests that Peter's statements at the beginning of chapter 2 are a paraphrase of the warnings of Christ about the coming of false Messiahs (Matt. 24:4-5, 10-11, 23-24; Mark 13:22).[10] Perhaps the bottom line is, these false teachers have arrived in Peter's church and may continue to permeate Christianity throughout the church age.

Peter does not reveal much specific information about the content of these "destructive heresies." However, the crux of what these false teachers are saying appears to center around their denial of the "sovereign Lord who bought them" (2 Peter 2:1) and that these heretics exploit vulnerable Christians with "made up" stories (2:3). The descriptors hint at the motivation behind Peter's previous discussion in chapter 1 and bring the problem into sharper focus. Apparently, this church was wrestling with something akin to what John appears to be fighting in his first epistle, a denial of the Incarnation (1 John 1:1-4). Like John, Peter does not want the church to forget about the historical nature of the Christian faith. "*We did not follow cleverly invented stories* when we told you about the power and coming of our Lord Jesus Christ, but we were *eyewitnesses* of his majesty" (2 Peter 1:16, emphasis added). Christianity is not based on esoteric, secret teaching or fabricated legends. It is based on publicly witnessed, historical facts. In other words, if we could build a time machine and reverse the hands of time to the first century, we would actually hear the words and witness the deeds of Jesus for ourselves.

Despite the presence of these false teachers, Peter assures the church that God's judgment is *certain*. He then gives three concrete examples of God's wrath against the ungodly—the fallen angels, Noah's flood, and Sodom and Gomorrah (2:4–10a). Equally certain, however, is God's preservation of the righteous. In this case, God rescues Lot from the midst of judgment (2:7). This principle of judgment and preservation is revisited in chapter 3.

Peter uses the latter part of chapter 2 to paint a rather unflattering profile of these heretics. Although they enjoy a degree of popularity within the Body of Christ (2:2), Peter piles up his warning with harsh descriptors. These false teachers are motivated by and have become experts at greed (2:3, 14). They follow the "corrupt desire of the flesh" (2:10).[11] They despise authority (2:10) and blaspheme on "matters they do not understand" (2:12). The result is that they have done "harm" to the Body of Christ (2:13). Their idea of "pleasure is to carouse in broad daylight" (2:13). Their "eyes are full of adultery" (2:14).[12] They "never stop sinning" (2:14) and they "seduce"[13] the doctrinally "unstable" or immature (2:14). Clearly, false teaching is not the only problem. Not only do these heretics fail to practice the Christian virtues outlined in Peter's opening exhortation (1:5–8), they have become spiritually "near-sighted and blind" and voided their redemption in Christ (1:9). Peter's description certainly harkens the reader to Paul's description of the "works of the flesh" (Gal. 5:19–21). The fate of those who introduce these "destructive heresies" into the church is doom. The "blackest darkness is reserved for them" (2:17), which could very well be a reference to hell.

God's Interventions

This preliminary groundwork provides the context for taking a closer look at chapter 3. Based on the previous discussion, it seems reasonable to conclude that these "scoffers" are the same ones introducing "destructive heresies" into the church in chapter 2.

> First of all, you must understand that in the last days scoffers will come, scoffing and following their own evil desires. They will say, *"Where is this 'coming' he promised? Ever since our fathers died, everything goes on as it has since the beginning of creation."* But they deliberately forget that long ago by God's word the heavens existed and the earth was formed out of water and by water. By these waters also the world of that time was deluged and destroyed. By the same word the present heavens and earth are reserved for fire, being kept for the day of judgment and destruction of ungodly men.
>
> But do not forget this one thing, dear friends: With the Lord a day is like a thousand years, and a thousand years are like a day. The Lord is not slow in keeping his promise, as some understand slowness. He is patient with you, not wanting anyone to perish, but everyone to come to repentance.
>
> But the day of the Lord will come like a thief. The heavens will disappear with a roar; the elements will be destroyed by fire, and the earth and everything in it will be laid bare (2 Peter 3:3–10, emphasis added).

In addition to undermining the Incarnation, these false teachers apparently deny the second coming of Christ (3:4) and the impending judgment of God against the sins of the world (3:10). Mocking the faith of Christians, these false teachers ask, "Where is this 'coming' he promised?" They support their position with a kind of naturalism that ridicules divine intervention in human history. "Ever since our fathers died, everything goes on as it has since the beginning of creation."[14]

Peter counteracts the naturalism of these heretics and buttresses his argument about the certainty of God's future judgment with two historical examples where God intervened. This brings our discussion about the historical nature of the early chapters of Genesis into sharper focus. Peter answers these false teachers by harkening the reader back to the early pages of Genesis (3:5–7).

> But they deliberately forget that long ago by God's word the heavens existed and the *earth was formed out of water and by water*. By these *waters also the world of that time was deluged and destroyed*. By the same word the present heavens and earth are reserved for fire, being kept for the day of judgment and destruction of ungodly men (2 Peter 3:5–7, emphasis added).

In addition to their denial of God's future intervention, apparently these same "scoffers" also deny God's past intervention in the antediluvian world. Although some have used 2 Peter 3:5 as the basis for proposing creative theories about the earth being created out of water, this reasoning need not be the case. Peter does not use the verb *ktizo* ("to create") but says instead that "long ago by God's word the heavens existed and the earth was formed [*synistemai*] out of water and with water." This verse most likely is a reference to Gen. 1:2, which describes the primordial earth as covered with water (cf. Ps. 104:6–9; Prov. 8:27–29).

The second historical event cited by Peter is Noah's flood. Peter paints it as a type or shadow of what is to come in the final judgment. In Noah's day, God's judgment came in a flood. His second judgment will be with fire. Just as with the earlier example of the rescue of Lot from the judgment of Sodom and Gomorrah, the Flood account gives us a picture of both God's wrath against the wicked and his provision of the ark as a life preserver for the righteous.

Without making too much of the phrase "the world of that time," it seems that Peter may even be offering a

Peter counteracts the naturalism of these heretics and buttresses his argument about the certainty of God's future judgment ... by harkening the reader back to the early pages of Genesis (3:5–7). ... According to Peter, ... if God intervened in the past, then he will most assuredly keep his promise to return for his people and judge the wicked.

qualifier which is more consistent with an interpretation of the Noah narrative as being geographically limited in scope.[15] It is possible that Peter may be trying to distinguish his world (the Roman Empire, stretching at that time from Spain to India) from Noah's world (the Mesopotamian region). Even if the local flood interpretation of verse 6 is faulty, the theological bottom line of the Noah story, according to Peter, is this: if God intervened in the past, then he will most assuredly keep his promise to return for his people and judge the wicked. You can bank on it.

Peter's second argument against the false teachers' scoffing at the "delay" of the Lord's coming stems from Ps. 90:4: "For a thousand years in your sight are like a day that has just gone by, or like a watch in the night."[16] This rationale is a primitive way of recognizing that God does not reckon time the same way that mortals do. Through the lens of modern science, we have gained a more sophisticated understanding of the universe and time. The mathematical theorems of General Relativity demonstrate that all space, time, matter, and energy had a beginning and that the universe needs a transcendent Beginner.[17] These parameters are at least consistent with the picture of God and time described in the Bible. God transcends both this universe and time. Because God stands outside of time, he is not constrained by our universe's linear dimension of time, where time cannot be stopped or reversed. God's return only seems delayed from our limited perspective of this space-time continuum. From God's perspective, time is irrelevant.

This view leads us to a third response to the scoffers' argument. The "delay" of Jesus' second coming is actually a sign of his grace, not his powerlessness or apathy. Once the Day of Judgment comes, all opportunity for repentance is lost. Thus, God patiently waits until all of his people have come to faith.[18] In the meantime, God tolerates the sins of the wicked (cf. Rom. 9:22).

Peter ends this section with a warning for the false teachers (2 Pet. 3:10). The day of the Lord will come suddenly, like a thief in the night. This analogy echoes the teaching of Jesus (cf. Matt. 24:42–44; Luke 12:39) and is used elsewhere in the New Testament as a picture of his second coming (cf. 1 Thess. 5:2; Rev. 3:3; 16:15). Peter vividly describes the ending of this creation. "The heavens will disappear with a roar; the elements will be destroyed by fire, and the earth and everything in it will be laid bare" (2 Pet. 3:10). The "heavens" (*ouranos*) can refer to anything from the sky; to the place of the sun, moon, and stars; and to the abode of God. In combination with verse 13, it would seem that the second definition fits the best.[19] In New Testament times, the "elements" (*stoicheia*) were air, earth, fire, and water.[20]

Peter offers a helpful correction to a number of different errors, prevalent in his day, about the next creation. For example, Aristotle and his followers believed that the universe was eternal. The Epicureans were the naturalists of Peter's day, denying that God intervened in the world and teaching that matter was indestructible and the universe was infinite. The Stoics believed that fire was eternal and that the universe would periodically be resolved into fire and formed again in a cycle of ages.[21] In our own day, the heretical sect known as the Watchtower society (Jehovah's Witnesses) assert that this earth will one day be restored to an Edenic ideal, where humans and animals will live for eternity in peace. The Latter-Day Saints posit the eternal state on planetary homes spread throughout the universe. But Peter corrects all of these errors. This cosmos will one day be rolled up like a scroll (cf. Is. 34:4; Rev. 6:14), making way for a new heavens and new earth (2 Pet. 3:13; Rev. 21:1), where the righteous will dwell.[22]

Concluding Thoughts

2 Peter 3 offers a theology of the beginning and ending of the universe in a nutshell. The author touches on several key themes related to redemptive history, which might be summarized this way:

1. God created the universe.
2. God has intervened at certain key points throughout history.
3. Jesus' return will be sudden.
4. God's future judgment against the sins of the world is certain.
5. God will spare the righteous from eternal judgment.
6. The universe and its elements will one day pass away.

7. God will create a new heavens and a new earth.
8. Knowledge about the end of the world should result in God's people living righteous lives.

We have observed that the author of 2 Peter has a high concern for the historical nature of the Christian faith, which brings us back to consider an answer to our original question: Does the Bible view the early chapters of Genesis, creation in particular, as preserving actual historical events? As we have seen, the author of 2 Peter uses the events of creation and Noah's flood to build his case that God has the power to intervene in his creation at any time. These historical actions in the past provide God's people with the assurance that the Creator will intervene again in the future. Based on this observation, it appears as though the author considers the events in the early chapters of Genesis to not only be historical, but to also provide the very foundation for our eternal hope. In short, the biblical events concerning the beginning of the universe provide the historical and rational foundation to believe in the events for the end of the universe, which in turn provides a practical motivation for the Christian life.

Secondly, creation and Noah's flood, along with the events of the life, death, and resurrection of Jesus all seem to be on the same historical plane for the author of 2 Peter. It does not appear that there is any qualitative difference between believing in the Incarnation and believing in the creation account of Genesis 1 and 2. They are all considered factual events in redemptive history. Conversely, it would seem that removing the historical content of the early chapters of Genesis would undermine our confidence in a literal second coming of Christ at a rather foundational level. After all, if the events of creation and Noah's flood are merely poetry or literary conventions or mythology, then on what basis can we believe that God's intervention in the future will be a literal historical event?

I am not suggesting that efforts like Walton's to probe the parallels between the Genesis creation account and other ancient near eastern myths ought to be discontinued. Such research provides an intriguing window into the historical context of Genesis 1. And it is certainly possible that the ancient Israelites understood the created order in a rather primitive, scientifically unsophisticated way. Maybe they really did believe the sky was a solid dome, as Walton suggests. I am simply asking that scholars exercise caution not to allow the human author's intent to so narrowly define the interpretive possibilities that the supernatural Author's intent becomes obscured. The Bible itself seems to indicate that the biblical authors did not always know the extent of the "mysteries" they were preserving. This point is explicitly stated concerning the events surrounding the life of Jesus (1 Peter 1:10–12). Is it at least possible, then, that even if the author of Genesis was not completely aware of the sophisticated scientific implications of his words, the supernatural Author was?

Certainly, attempts to integrate the Bible with the discoveries of modern science ought to be done with great care and include a high regard toward the author's intent, being careful to take the rules of genre into account. It is a delicate process as the modern reader interacts with the ancient text, its author, and audience, in an attempt to spiral closer and closer to the truth. And the Galileo incident provides a powerful reminder to proceed with interpretive caution. But it is hard to imagine how a Christian would be able to mount any sort of rigorous apologetic for the accuracy of the Bible if it does not contain accurate descriptions of the created order, especially when the Bible itself seems to so closely link history with theology (see 1 Cor. 15:14, 17).

For the author of 2 Peter, however, the events of redemptive history are not "cleverly devised tales," but rather form a primary motivation for holy living.

> Since everything will be destroyed in this way, what kind of people ought you to be? You ought to live holy and godly lives as you look forward to the day of God and speed its coming ... since you are looking forward to this, make every effort to be found spotless, blameless and at peace with him (3:11–14).

Not only are God's people called to guard the correct doctrine of the faith, but they are also called to live mature and holy lives. In a sense, Christians have skipped to the back of the book and we know the end of the story. God calls his people to resist false teachers by growing in their knowledge of Christ and living righteously. And in the meantime, God's people rest in this assurance because of his actions in history. ❋

Notes

[1]"Interview with Simon Conway Morris," *Creation Update* (Pasadena, CA: Reasons To Believe), February 24, 2005.

[2]I had the privilege of discussing these issues in person with Dr. Walton on February 10, 2005, on the campus of Wheaton College. I was interviewing Dr. Walton for a documentary for Reasons To Believe. I found him to be one of the most thought-provoking, well-spoken and gracious people I have ever met. I credit him for making me think more deeply about these issues, which in turn forced me to refine my own views and eventually lead to the writing of this paper.

[3]This issue is thoughtfully discussed, among other places, in Grant Osborne, *The Hermeneutical Spiral: A Comprehensive Introduction to Biblical Interpretation* (Downers Grove, IL: InterVarsity Press, 1991), 366–9; and E. D. Hirsch, *Validity in Interpretation* (Hartford, CT: Yale University Press, 1973).

[4]John H. Walton and Andrew E. Hill, *Old Testament Today: A Journey from Original Meaning to Contemporary Significance* (Grand Rapids, MI: Zondervan, 2004), 54–9, 89, 108–13.

[5]Gordon D. Fee and Douglas Stuart, *How to Read the Bible for All Its Worth: A Guide to Understanding the Bible*, 2d ed. (Grand Rapids, MI: Zondervan, 1993), 45–77.

Recently, there has been increased discussion among New Testament scholars about 2 Peter and Jude being Christian examples of a literary genre called "Testament" which was common during the inter-testamental period. Anonymous writers would use the names of famous Old Testament figures to write death bed declarations. Famous Jewish examples of this type of literature include the

Testament of Adam, Testament of Enoch, Testament of the Twelve Patriarchs, Testament of Job, Testament of Moses and Testament of Abraham. The intent of these writers was not to deceive readers, but rather to pay honor to these great heroes of the covenant. It has been suggested by some scholars that the books of 2 Peter and Jude were written by someone in the early church who was continuing this tradition by writing a letter in the name of the apostles after their death. By writing under a pseudonym, the author would have adopted a popular literary device of the day that people would have immediately recognized for what it was. Although it is certainly possible to hold this view and still affirm that the Bible is without error, this essay is written from the perspective that the author of 2 Peter is the apostle Peter himself, written before his martyrdom in Rome at the hands of Nero (c. AD 64–65). This is primarily because the author cites himself as an eyewitness of Jesus' death (1:13–14) and transfiguration (1:16–18), and the rather pivotal nature of his polemic resting on the issue of eyewitness testimony. For more about the literary genre of "Testament," see J. M. Knight, "Testament of Abraham," in *Dictionary of New Testament Background*, ed. Craig A. Evans and Stanley Porter (Downers Grove, IL: InterVarsity Press, 2000), 1188–9; R. P. Splinter, "Testament of Job," in *Dictionary of New Testament Background*, 1189–92; D. A. deSilva, "Testament of Moses," in *Dictionary of New Testament Background*, 1192–9; H. C. Kee, "Testament of the Twelve Patriarchs," in *Dictionary of New Testament Background*, 1200–5.

[6]Douglas J. Moo, *The NIV Application Commentary* (Grand Rapids, MI: Zondervan, 1996), 41.

[7]Unless otherwise noted, all biblical quotes are from the *NIV Study Bible* (Grand Rapids, MI: Zondervan Publishing, 1985).

[8]Some scholars have argued that 2 Pet. 1:12–15, in addition to other key verses, provides evidence that Peter incorporates literary features consistent with the "testament" genre at least to some degree. See R. J. Bauckham, "2 Peter," in *Dictionary of the Later New Testament & Its Developments*, ed. Ralph Martin and Peter H. Davids (Downers Grove, IL: InterVarsity Press, 1997), 923–4.

[9]For a more complete explanation of this concept, see Krista Bontrager, *Reflections on Mel Gibson's The Passion of the Christ*, audiotape (Glendora, CA: Reasons To Believe, 2004).

[10]Some may question whether Peter could be quoting Jesus in the Olivet Discourse because they think that Jesus' predictions apply only to what will happen at the end of history, right before his second return. Moo argues, however, that although the climax of the discourse does indeed describe Jesus' return in glory (Matt. 24:29–31), the earlier portion describes what will happen before his return. Given that Jesus said that even he did not "know the day or hour" of his return (Matt. 24:36), it is possible that Jesus (in his humanity) did not know how much time would elapse before his advent. See Moo, *The NIV Application Commentary*, 91–2, 95. See also D. A. Carson, "Matthew," in *Matthew, Mark, Luke*, vol. 1 of *Expositor's Bible Commentary*, ed. Frank E. Gaebelein (Grand Rapids, MI: Zondervan, 1982).

[11]Moo asserts that the NIV's translation is too mild. A literal rendering is "'going after flesh in a passionate longing for defilement.' The reference is to sexual sin, probably including, in light of Peter's reference to Sodom and Gomorrah in verse 6, homosexuality." Moo, *The NIV Application Commentary*, 107.

[12]Moo interprets this to mean they are "addicted to sex." Moo, *The NIV Application Commentary*, 126.

[13]Moo points out that the Greek word of "seduce" has its roots in the "world of hunting and fishing; it suggests the bait used to lure a fish to the hook or an animal to the trap." However, by the time of Peter, it had become used generally to refer to any kind of moral temptation. Moo, *The NIV Application Commentary*, 126.

[14]Based on how it is used in other New Testament passages (e.g., John 6:31, Acts 3:13, Rom. 9:5, and Heb. 1:1), the term "fathers" most likely refers to the Old Testament saints, as opposed to first generation Christians as some have argued. Additionally, what the NIV translates as "death" literally means "fell asleep" which is a New Testament metaphor for the death of believers (cf. Acts 7:60; 1 Thess. 4:13–14).

[15]Hugh Ross, *The Genesis Question: Scientific Advances and the Accuracy of Genesis*, 2d ed. (Colorado Springs, CO: NavPress, 2001), 147.

[16]Although some scholars have tried to use Ps. 90:4 and 2 Pet. 3:8 to support the perspective that the "days" in Genesis 1 could be longer than 24 hours, this assertion may be groundless. While Ps. 90:4 and 2 Pet. 3:8 mention the word "day" as being a thousand years, the frame of reference seems to be from God's point of view in the heavenly realm. In contrast, day-age creationists such as Hugh Ross argue that the frame of reference in Genesis 1 is from the perspective of a person on the surface of the earth (verse 2). These differing frames of reference may make Ps. 90:4 and 2 Pet. 3:8 exegetically irrelevant to Genesis 1.

[17]Hugh Ross, *The Creator and the Cosmos: How the Greatest Scientific Discoveries of the Century Reveal God*, 3rd ed. (Colorado Springs, CO: NavPress, 2001), 23–4.

[18]This verse has been the source of debate between Calvinists and Arminians. The way that I have phrased my understanding of this verse tips my hand as to my personal leanings toward Calvinism.

[19]Moo, *The NIV Application Commentary*, 189–90.

[20]Jerome H. Neyrey, *2 Peter, Jude: A New Translation with Introduction and Commentary* (New York: Random House, Anchor Bible, 1993), 243.

[21]Craig S. Keener, *The IVP Bible Background Commentary: New Testament* (Downers Grove, IL: InterVarsity Press, 1993), 731.

[22]It is difficult to understand how Henry Morris's view that the stars will be eternal harmonizes with this interpretation of 2 Pet. 3:13. Even more curious is his apparent belief that Christians will abide with the stars in eternity. He says:

> Evolutionary astronomers believe that stars evolve through a long cycle of stellar life and death, but this idea contradicts God's revelation that He has created this physical universe to last forever. Speaking of these stellar heavens, the majestic 148th Psalm, centered on God's creation, says that God "hath also stablished them for ever and ever: He hath made a decree which shall not pass" (Ps. 148:6) ... In fact, the earth and its atmospheric heaven (not the sidereal heaven) one day will "pass away" (Matt. 24:35), and then will be transformed by God into "new heavens and a new earth" (2 Pet. 3:13) which will never pass away. But the infinite cosmos of space and time, created in the beginning by God, was created to last forever ... The stars are innumerable, each one unique, each one with a divine purpose, and they will shine forever. We can never reach them in this life, but in our glorified bodies, we shall have endless time to explore the infinite heavens.

See similar statements in: Henry M. Morris, "The Stars of Heaven," *Impact*, no. 10 (January 1974); ____, "The Remarkable Re-Birth of Planet Earth," *Impact*, no. 63 (September 1978); ____, "The Stars Forever," *Days of Praise* (April 28, 1996); ____, "The Coming Big Bang," *Back to Genesis*, no. 101 (May 1997); and ____, "Forever and Ever," *Days of Praise* (December 27, 2003).

ASA to Meet with CiS

The American Scientific Affiliation will meet with the Christians in Science (CiS) at the University of Edinburgh, Edinburgh, Scotland, on August 3–5, 2007. The theme of the joint meeting is "New Frontiers in Science and Religion."

Members of the CiS organizing committee are: John Bryant, chairman; Denis Alexander, Ruth Bancewicz; Caroline Berry; and Hugh Reynolds.

Mark your calendar.
Watch for more details.

Book Reviews

ANTHROPOLOGY & ARCHEOLOGY

WHO IS ADAM? by Fazale Rana and Hugh Ross. Colorado Springs, CO: Navpress, 2005. 287 pages, index. ISBN: 1576835774.

Rana is a Ph.D. biochemist (Ohio University) with postdoctoral studies at the Universities of Virginia and Georgia and seven years industrial experience with Proctor & Gamble. Ross has a Ph.D. in astronomy from the University of Toronto with several years of postdoctoral research experience in astrophysics at the California Institute of Technology. This book addresses a subject, human origins, of continuing interest to the members of the American Scientific Affiliation. The most recent article on this subject in *Perspectives on Science and the Christian Faith* was entitled "Establishing Adam," by David L. Wilcox in the March 2004 issue.

The positions of various writers on this volatile issue are typically related to their placement in one of four general categories defining the broader subject of origins (Schaefer, *Science and Christianity: Conflict or Coherence*, 2003):

1. *Naturalistic Evolution.* Impersonal processes, e.g., natural selection, mutations, chance, or some combination of these, account for all forms and species of life. Whether emerging gradually (Dawkins) or appearing suddenly (Gould), humankind is the product of unthinking, nonpurposive forces.
2. *Theistic Evolution.* God as immanent Agent sustains and directs the natural processes that shape the evolution of life. This position is scientifically indistinguishable from the first, but presupposes the sovereign activity of God in planning and executing the evolutionary process.
3. *Progressive Creation.* God immanently directs an extensive development of species. God acts transcendently at special stages of this process to create the main biological orders of being. Humankind is not dependent physically on any intermediate species. The age of the universe is about 13.8 billion years, and the age of the Earth is about 4.7 billion years.
4. *Recent Creation.* All life forms are created "*de novo*" by supernatural Agency. No late orders of creation are dependent on earlier kinds of being. The age of the Earth is not more than 10,000 years.

Although their aggregate has decreased in recent years, the ASA still includes a significant number (perhaps 5% of its members) of recent creationists. For the past 30 years the dominant group within the ASA has been the Theistic Evolutionists. However, my sense (wishful thinking?) is that the fraction of Progressive Creationists is increasing yearly. There are, of course, a vast number of origins positions intermediate between the four main views stated above. I remember my friend David Cole (Professor of Biochemistry at Berkeley) telling me some years ago that on the scale of 1 to 4 he was a 2.5.

In their book *Who is Adam?* Rana and Ross provide the first book-length examination of the question of human origins from the Progressive Creation perspective. With 681 references, many from the prestigious journals *Science* and *Nature*, this is a serious scholarly endeavor. In light of its uniqueness, I strongly recommend this book to all members and friends of the ASA. I do think the book is a bit harsh on the Recent Creationists (my wife is one!), but this is a minor criticism. The great strengths of the book are its careful and respectful critique of positions 1 and 2 above, and its exposition of a detailed and testable model for the (sometimes) previously vague Progressive Creation position. From a theological perspective, the book is consistent with the fine "Genesis" commentary of the late James Montgomery Boice.

Win, lose, or draw, I think *Who is Adam?* is the most important contribution to the human origins debate to appear during the past fifty years. The book will generate enormous controversy, but for the best of reasons. Love it or hate it, I encourage you to read this book.

Reviewed by Henry F. Schaefer III, Graham Perdue Professor of Chemistry, University of Georgia.

BONES OF CONTENTION: A Creationist Assessment of Human Fossils by Marvin L. Lubenow. Grand Rapids, MI: Baker Books, 2004. 400 pages, seven charts and tables, endnotes, three indices. Paperback; $21.99. ISBN: 0801065232.

Lubenow is professor of Bible, theology, and apologetics at Southern California Bible College and Seminary in El Cajon, California. He has spent more than thirty-five years researching the human fossil issue and frequently speaks and writes to defend the creationist position.

As the subtitle asserts, Lubenow's book is an unabashedly creationist assessment of hominid fossil remains. (Henry Morris, Tim LaHaye, and Ken Ham enthusiastically endorse it.) It is also, as the title suggests, contentious.

Lubenow begins by criticizing the field of paleoanthropology in general:

> This field is the scene of much prejudice, subjectivity, and emotionalism in the interpretation of human fossils and in the construction of phylogenetic trees. The professionalism and objectivity found in other areas of science have been conspicuously absent in this area (p. 34).

He goes on to consider Neanderthal (*Homo neanderthalensis*), Lucy (*Australopithecus afarensis*), Java Man (*Pithecanthropus*), *Homo erectus*, *Homo habilis*, and lesser-known hominids. Lubenow finds fault with the conclusions and hypotheses of paleoanthropologists regarding the dating of remains, reconstruction of anatomy, and hypothesized family trees for the various hominid species.

Lubenow's position regarding hominid fossils can be summed up briefly. He does not like the term hominid: the fossils studied by paleoanthropologists represent

either nonhuman species or man himself. He thus labors to show that Neanderthal, Java Man, and *Homo erectus* were true humans, descendants of Adam; the other hominid species were either nonhuman primates (Lucy) or did not actually exist (Piltdown Man, *Homo habilis*, others). A determined critic of the Out of Africa model of human origins, Lubenow believes that all of these remains are less than 10,000 years old; he cites generally accepted dates, but points out time and again that he does not accept them.

Readers of *PSCF* who are not young earth creationists (YEC) or special creationists might be tempted to skip this read. I (who am not a YEC or special creationist) would recommend that they think again. There is valuable material in *Bones of Contention*. Some of Lubenow's criticisms are trenchant, and should warn anyone not to accept hypothetical reconstructions and family trees to be established facts. The charts at the end of the book are excellent comprehensive summaries of the extant fossil remains for various hominid species. And the uniqueness and spiritual nature of *Homo sapiens* cannot be denied by any Christian who takes the Bible to be the Word of God, nor can those features be regarded as having evolved. In maintaining these truths, Lubenow does a valuable service to the church and the world, even though many of his specific criticisms do not hold water.

Bones of Contention first came out in 1992. The present work is a revised and updated version of the first edition. A perusal of the endnotes indicates that about a quarter of the references were published after the first edition. Unfortunately, the book lacks a bibliography.

Reviewed by Robert Rogland, Science Teacher, Covenant High School, Tacoma, WA 98465.

Environment

THE SPLENDOR OF CREATION: A Biblical Ecology by Ellen Bernstein. Cleveland, OH: The Pilgrim Press, 2005. 145 pages. Paperback; $16.00. ISBN: 082981664X.

Bernstein is the founder of the first national Jewish environmental organization (Shomrei Adamah). She is also the author of *Ecology and the Jewish Spirit: Where Nature and the Sacred Meet*. This present book is divided into seven chapters, based on the days of creation, with endnotes and no index. Bernstein deals with her subject from a devotional rather than a scientific angle. I found only one misspelled word: "abscence" (p. 30).

Although she has taught high school biology, Bernstein's perspective in this book comes from her religious values: "I have chosen Judaism as the path I walk and the Bible as the sacred text I contemplate along the path" (p. x). To Bernstein, ecology and the Bible use different words to describe the same thing (p. xi), and Genesis 1 is the world's first environmental epic. In *The Splendor of Creation*, she draws upon wisdom from tradition, rabbis, scientists, philosophers, and poets. But perhaps her most salient sources are her Judaism and personal experiences (p. 58).

In campaigning for environmental sanity, Bernstein gives some interesting and relevant data. For example, on a sunny day, an acre of trees transpires 3,500 gallons of water into the air (p. 28). During the past forty years, Pennsylvania has lost more than four million acres of farmland to sprawl, an area larger than Connecticut and Rhode Island combined (p. 43). This is due to the increase of home sizes by 26% and the increase of land development by 80%.

To make her points, many of which are certainly valid, Bernstein may sometimes use hyperbole. At least, she gives no supporting evidence for such statements as "most people seemed unmoved" by the destruction of nature (p. xi); "for most of us, the idea that our land, waters, and air are manifestations of the Sacred has disappeared from our mental vocabulary" (p. 2); most sprawl development has no town centers, no sidewalks, no corner stores, and no place to walk and congregate (p. 44); speed and efficiency are our primary values (p. 57); "we feel more stress and have less leisure than any other society in history" (p. 57); we imagine "that the more we have, the more we are" (p. 58); "we rarely approach time as a gift" (p. 64).

Bernstein offers some trenchant observations and opinions. For instance, "electric lights altered the daily rhythm of time forever. And this is a tragedy" (p. 63). The environmental crisis is a spiritual crisis which signifies a separation from nature and ourselves (p. 13). Pollution, sprawl, and climate change is frightening and overwhelming. Bernstein quotes Terry Tempest: "If we look too closely or feel too deeply, there may be no end to our suffering" (p. 30). Genetically modified crops are the most frightening threat to species diversity (p. 40). Urban centers are the greatest hope for combating sprawl (p. 46).

Obviously, Bernstein feels strongly about the degradation and condition of the environment. Her book joins a host of others lamenting the way humans treat God's creation. This is an important contribution to help readers understand the wonder and greatness of creation and what they can do to improve the environment. "The blessing of mastery over the earth calls us to exercise compassion and wisdom in our relationship with nature so that the creation will keep on creating for future generations ... the power is in humanity's hands" (p. 114).

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

Ethics

THE CHEATING CULTURE: Why More Americans Are Doing Wrong to Get Ahead by David Callahan. Orlando, FL: Harcourt, Inc., 2004. 366 pages, sources, endnotes, index. Paperback; $14.00. ISBN: 0156030055.

In Micah 6:8, we read: "*He has showed you, O man, what is good. And what does the LORD require of you? To act justly and to love mercy and to walk humbly with your God.*" Three things the prophet enjoins upon us. This book addresses the first. What does "acting justly" mean to a modern day Christian citizen of the United States?

Callahan, author of five previous books, cofounder of the public policy center, Demos, writes in *The Cheating Culture* that ethical lapses (a polite way of defining "cheat-

ing") are so endemic in our culture that it is questionable if we can survive. The author skewers us all—the corporate CEO approving false earnings reports, the politician supporting public policies that favor those who support his campaigns financially, and the sports "hero" who attains his records through drugs. Then there is the white collar worker who pads his expense reports, the carpenter who takes materials from the job site, the waiter who reports a fraction of tips. And the college student who cribs a test, the high schooler who downloads "free" music from the net, the grade schooler who copies from his friend across the aisle. And all the rest of us. "Creative" tax accounting. Migrating company office supplies. "60 mph really means 65 or even 68." And on, and on, and on.

This is a difficult book to read. Well written, interesting, sometimes shocking, the "question" keeps coming up. Is it I, Lord? Am I included in this indictment?

Callahan finds the cheating culture pervasive; he attributes it to the competitive climate of the last few decades. Economic inequality has created two classes of people, the "winners," where cheating without consequences has created a separate moral reality, and the "anxious," people who cheat because they see that choosing otherwise would cancel their only (slim) chances of success. The book is well researched and thoughtful. It will make you angry. And almost certainly ashamed. Callahan recommends some structural changes; some sound reasonable. One does not. He suggests the SEC should be able to "eat what it kills." Bad idea; it would simply lead to cheating incentives within the SEC.

How does one avoid the cheating culture? Callahan provides two simple rules: (1) Can you tell your mama about what you are doing? (2) Be a chump anyway. Even if 85% of your colleagues pad their expense accounts, fill out yours as accurately as possible. Even if "everybody else" is doing it—you do not have to. Does your job require you to cut corners? Quit. Or blow the whistle.

I recommend the reading of Stephen Carter's book, *Integrity*, along with this one. The two together just might change your life.

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

EVOLUTION AND ETHICS: Human Morality in Biological & Religious Perspective by Philip Clayton and Jeffrey Schloss, eds. Grand Rapids, MI: Eerdmans, 2004. 339 pages. Paperback; $32.00. ISBN: 0802826954.

If right and wrong is just a matter of personal preference, we might expect moral values to be as varied as favorite flavors of ice cream. However in practice there is considerable human consensus. Many moral convictions such as that one should not eat one's family members or torture babies for fun, are widespread. Can that consensus be explained by evolutionary advantage or side effect? If it can, does that have implications for the import of those convictions?

This anthology offers a collection of thoughtful and erudite essays that address that question and related ones. The editors are Jeffrey Schloss, an ASA member and professor of biology at Westmont College, and Philip Clayton, the Ingraham Professor of Theology at Claremont. They have gathered eighteen scholars who agree that human beings have developed through a process of physical and cultural evolution. In each chapter an author tests what implications that has for the character, persistence, and validity of human morality. The authors vary in their conclusions, but interact with each other's arguments much more than one often sees in anthologies. The reader could guess that most of the contributors spent time together. They did: they had a month together at Calvin College in conversation about the involved issues. They reach consensus that moral life is grounded in our physical form, yet is more than biologically driven. What the moral life includes beyond biology is ably contested from multiple perspectives.

In the introduction, Jeffrey Schloss parses out the array of involved questions with nuance, courtesy, and thorough bibliography. This chapter alone is already worth the price of the book if one needs a source to get up to speed quickly on the discussion. From there Michael Ruse and others describe biological perspectives on the evolution of ethics. Loren Haarsma (ASA member) has the first chapter in the second section. There he and others test if religious and evolutionary ethics are compatible. In the third and final section, Mark Heim begins the discussion of how theology might evaluate and critique the ethics of evolution. Clayton wraps up the book with a phenomenological and compatibilist description of human nature. For Clayton religious belief and explanation adds an important dimension to the understanding of human morality. Considering both biological and religious perspectives on human morality offers a more complete description than either one is able to provide alone.

Schloss and Clayton have gathered together an anthology which is as open, honest, and as fair as it is thorough. May we see more works like it at the intersection of theology and science.

Reviewed by James C. Peterson, R. A. Hope Professor of Theology, Ethics, and Worldview, McMaster University Divinity College, Hamilton, ON L8S 4K1.

FAITH & SCIENCE

FIFTY YEARS IN SCIENCE AND RELIGION: Ian G. Barbour and His Legacy by Robert John Russell, ed. Burlington, VT: Ashgate Publishing Company, 2004. 353 pages; bibliography, index of authors, index of subjects. Paperback; $24.95. ISBN: 075464118X.

This book is a *Festschrift* dedicated to Ian Barbour, widely acknowledged to be the founder of academic interdisciplinary studies in science and religion in this country. A physicist by training, Barbour began his career at Kalamazoo College, teaching and studying cosmic rays. He took a two-year leave to study theology at Yale. After Yale, he accepted a position at Carlton College teaching both physics and religion. Within a few years, he secured permission to organize a religion department at Carlton; he remained there for over forty years. In 1999, he won the Templeton Prize for Progress in Religion for his work in advancing the study of science and religion.

One should know something about Ian Barbour's methodology and theological outlook before reading this book to profit from it. First of all, Barbour practices what he calls *critical realism*. He is a *realist* in that he believes that both the world and God existed well before us and that they have an objective existence; hence our views of the world and God are not simply pragmatic or instrumental. He is *critical* in that he does not naively believe that our views of the world and of God are mirrors of reality. Readers of *PSCF* will not find this approach controversial; they may be surprised to learn that Barbour introduced it in the academic science-religion dialogue in the 1960s.

Secondly, Barbour frankly acknowledges a debt to *process* theology, an approach first popularized by Alfred North Whitehead. Process theology bears a resemblance to the open theism currently enjoying some influence in evangelical circles. Process theology does not view God as totally sovereign, omnipotent, or omniscient; rather, it sees God as interacting with his creation and changing as a result of that interaction. Barbour is definitely not an evangelical Christian, though he identifies himself as a Christian *simpliciter*.

Thirdly, Barbour sees science and religion interacting in four basic ways: conflict, independence, dialogue, and integration. He believes that process theology allows one to achieve maximum integration (his preferred mode of interaction) of science and religion.

Fifty Years in Science and Religion contains nineteen essays dealing with Barbour's contributions to methodology and to theological and ethical issues, as well as giving varied theological perspectives on his work. Four of the contributors are scientists and three are Europeans; the other contributors are American professors of theology. Of the theologians, two give a Roman Catholic and two a Buddhist perspective; the others are Protestants.

The titles of the essays will give the *PSCF* reader a good idea of the topics covered. Reflecting on Barbour's contributions to methodology are "Ian Barbour's Methodological Breakthrough," "Barbour's Way(s) of Relating Science and Theology," and "Critical Realism and other Realisms." The section dealing with Barbour's contributions to theological and ethical issues is broken down into subsections: God and Nature, Physics and Cosmology, Evolution, Anthropology, and Neuroscience, and Technology and the Environment. This section constitutes almost half the book. The final section, giving theological perspectives on Barbour's work, includes contributions from process theologians, Roman Catholics, and Buddhists.

The academic dialogue on science and religion is quite different from the kind of science-Christian faith dialogue carried out in *PSCF*. The two dialogues deal with few of the same issues, and the theological perspective(s) manifested in the academic dialogue are not evangelical. (The only identifiable evangelical contributor to this volume is Nancey Murphy of Fuller Theological Seminary.) I doubt that many *PSCF* readers will resonate either with process theology or with the theological viewpoints of the essayists. But many of us have acquaintances and colleagues in the sciences who have some kind of religious perspective, albeit not an evangelical one, and we would like to dialogue with—even witness to—them. I would recommend *Fifty Years in Science and Religion* to those who want to know what religion-science issues and viewpoints the broader academic religious community wrestles with.

Reviewed by Robert Rogland, Science Teacher, Covenant High School, Tacoma, WA 98465.

TWO REVELATIONS: A High View of Science and Scripture by Lawrence Olsen. Longwood, FL: Xulon Press, 2005. 174 pages. Paperback; $13.99. ISBN: 159781041X.

This book covers its topic in eight succinct chapters with an annotated list of suggested readings in less than two hundred pages. Olsen, professor of earth science and chemistry at Asbury College, has also taught high school and worked in private industry. He is an environmental education advocate who spends his spare time swimming, climbing mountains, and studying history.

Olsen thinks Christianity and science should be able to adhere to their positions without compromise. Most of what science and the church teach is acceptable to Olsen. However, he thinks a re-examination of the vocabulary and methods of science and a rediscovery of the basic beliefs of Christianity may result in more congruence between the two.

Olsen notes that he was a scientist before he was a Christian, and "from the start it was obvious that there were areas where my scientific training and church teachings were in conflict" (p. ix). This awareness propelled him to write a book where answers to this conflict were easily available. He intends his book for Christians and non-Christians.

Christian "agenda items" (evolution, multiculturalism, hate crime legislation, sex education, capitalism) have two sides, Olsen thinks. Christians who turn their opinions on these issues into policy, policies into doctrine, and doctrine into dogma may set up stumbling blocks for unbelievers (p. 18). Olsen shows his hesitancy to do this in his discussion of abortion. He writes: "I am not pro-choice, but I am prepared to compromise" (p. 21). He continues: "We should not accuse people who chose abortion of murder—abortion is not against the law" (p. 21).

Olsen discusses many controversial issues with even-handedness and common sense. These include ecology, drug users, AIDS victims, single mothers, homeless alcoholics, civil rights, integration, and economic justice. On such issues, the author thinks the church is often mute, indifferent, or impractical (pp. 21–2).

Salient observations by Olsen are made on many other topics. They include: many Christians ignore natural revelation (p. 23); dispensational theology sees the physical creation as a secondary concern (p. 24); some scientists see nothing useful in religion (p. 32); some people ignore facts and logic (p. 35); scientists never prove a theory (p. 42); nonpharmaceutical advertisers can say anything without risk of litigation (p. 48); Michael Bethe and Carl Sagan have done more harm than good (p. 55); some of the details in Old Testament accounts are open to question (pp. 83–4); Paul never claimed his writings were Scripture or that the Old Testament was inerrant and infallible (p. 84); the intelligent design movement as currently practiced is unacceptable (p. 101); the Bible is not clear as to the

how and who of justification (p. 156); and, finally, "The problem of reconciling science and Scripture disappears if we move away from a literal and historical reading of the Bible" (p. 168). Olsen also explains and comments on carbon dating, the genetic code, inspiration of the Bible, miracles, and dualism. Educators may find this volume useful as a text or supplementary reader.

I liked this book a lot, and I predict you will, too. With this book, readers can expand their understanding and appreciation of the relevant issues and thus advance the cause of truth. Olsen has made a great contribution to the science/theology debate and interface. He is a knowledgeable, analytical, open-minded, clear thinking scientist and Christian. Olsen deserves hearty thanks from both the scientific and religious communities for sharing his wisdom, piety, learning, and commitments.

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

SPIRITUAL INFORMATION: 100 Perspectives on Science and Religion by Charles L. Harper, Jr., ed. West Conshohocken, PA: Templeton Foundation Press, 2005. 602 pages. Paperback; $39.95. ISBN: 1932031731.

Sir John Marks Templeton, international financier and philanthropist, has supported scientific research in a variety of fields through the John Templeton Foundation (JTF). This collection of one hundred solicited essays was created in honor of Sir John's ninetieth birthday in 2002 and edited by Charles (Chuck) Harper, Jr., Senior Vice President of JTF and planetary scientist. The essays reflect the exceedingly wide range of Sir John's philanthropic and research interests and summarize research that has been conducted under JTF funding as well as research funded by others.

The professional backgrounds of the contributors span anthropology, astronomy and astrophysics, biology, economics, education, ethics, geology, history, history and philosophy of science, mathematics, medicine, philosophy, physics, political science, psychiatry, psychology, sociology, theology, and religious studies. Sixty-three of the contributors are at institutions or organizations in the United States, eleven from the UK, six from France, and the remaining twenty contributors are associated with institutions or organizations in Australia, Canada, Denmark, Germany, India, Israel, Italy, Netherlands, New Zealand, Poland, South Africa, and Switzerland. Several contributors have won prestigious awards from the scientific or social science communities and quite a few are current or former advisors to JTF. Many contributors, e.g., Robert Barro, Peter Berger, George Gallup, Martin Marty, Michael Novak, and Robert Wuthnow, are well-known social commentators and thought leaders. Others are outstanding (primarily physical) scientists whose names are associated with fundamental discoveries or theories in the sciences. Several Templeton Prize winners are among the group as well as winners of various international science awards. Consistent with Sir John's mandate for JTF, the contributors represent a wide range of religious and theological perspectives including atheism, Buddhism, Hinduism, Judaism, panentheism, Roman Catholicism, and evangelical Christianity.

Ten sections comprise the volume dealing respectively with spiritual capital and spiritual information (two terms favored by Sir John), the history and future of science and religion dialogue, cosmology and physics, quantum mechanics and mathematics, evolution and purpose, sociology and ethics, religion and health, contemplation and the virtues, theology and philosophy, and world religions. A typical essay is five pages long and includes a brief bibliography. Many essays admirably summarize selected key recent developments within a field and show their value to core concerns about spiritual realities (as Sir John terms them) such as unlimited love, accelerating creativity, worship, and the benefits of purpose in persons and the cosmos. ASA readers will find insightful ideas in topics of interest to them and stimulating reading in areas well beyond their own fields of expertise. The overall quality of entries is excellent and good editing has resulted in a smooth flow to most essays despite the wide range of cultures, native languages, and disciplines included in this unique volume. Charts, diagrams, tables, and other illustrative material are incorporated in selected essays when warranted by the topic or the discussion. Paragraph biographies of each contributor appear at the end of each respective essay and an alphabetical list of all contributors and their institutional affiliations appears at the end of the book. It is regretful that an index was not produced but the organization of the entries by topics makes up somewhat for this decision. This is an important addition to a personal or institutional library on science and religion.

Reviewed by Dennis Cheek, Adjunct Professor of Science Education, Penn State Great Valley School of Graduate Professional Studies, Malvern, PA 19355.

COMING TO PEACE WITH SCIENCE: Bridging the Worlds between Faith and Biology by Darrel R. Falk. Downers Grove, IL: InterVarsity Press, 2004. 234 pages, index. Paperback; $17.00 ISBN: 0830827420.

This book is a scientific sandwich on evangelical bread. Books on theistic evolution frequently give theological issues scant attention, insufficient to satisfy the typical evangelical who believes that the biblical creation story is irreconcilable with Darwin's theory. Falk, a geneticist, evangelical Christian, and ASA member, has "sandwiched" a well-reasoned defense of evolution between an equally well-reasoned theological "bun." *Coming to Peace with Science* is more than Falk's personal testimony. It is a convincing argument that theistic evolutionism is not necessarily the first step towards liberalism, but rather a belief consistent with Scripture.

First, Falk describes his past conflict between his evangelical upbringing and his scientific career. He argues for a nonliteral interpretation of Genesis, citing the works of Augustine, Calvin, John Wesley, Henri Blocher and J. I. Packer, but also agrees with Phillip Johnson on anti-theistic bias in science. For Falk, atheists who use science to eliminate God are misguided, but believers focused on a literal Eden are even sadder, blind to both Genesis' spiritual significance and the beauty of God's "gradual creation."

The "meat" of the sandwich comes in the next four chapters, where Falk defends the evidence for an old earth, transitional fossils, speciation, and common ancestry.

Scientific principles are presented straightforwardly, with carefully chosen analogies understandable to nonscientists. Falk emphasizes the strengths of mainstream science, not the faults of scientific creationism. Either biological evolution occurred over millions of years or core principles of multiple scientific disciplines are fatally flawed. But, Falk never removes his "spectacles of faith," presenting science as not a threat to Christianity but rather as a God-given privilege.

Falk tops his sandwich with a final bit of theological "bread." He addresses common concerns like death before the Fall with not only his opinions but also those of C. S. Lewis and James Orr, among others. Certain essential doctrines of Christianity, such as the power of prayer, are beyond the scope of science, but Falk argues that the natural history of life is not, and therefore is something on which believing Christians can disagree. Evangelicals are exhorted to respect evolution-believing Christians as equals within the church and to stop pushing a sudden creationist view in science classes because "it is contrary to almost all of science" (p. 232).

Falk steadfastly avoids standard labels like "young earth creationism," preferring to let his readers choose between three possibilities: special creation of all species, special creation of prototypes, or evolution with common descent. Falk demonstrates that only the last is consistent with scientific data, effectively refuting scientific creationist positions without naming names. He treads more carefully around intelligent design, although he clearly is no proponent. He cautions against giving "undue attention to that aspect of Christian apologetics that tries to prove by scientific arguments that there is a Designer" (p. 59). For Falk, creation occurred gradually and with subtlety. Science is like analysis of brush strokes of a painting, and "scientists may not be able to recognize that there was a hand guiding the brush" (p. 206). Contrast this to Johnson's view that God "left his fingerprints all over the evidence" (Phillip E. Johnson, *Defeating Darwinism by Opening Minds*).

Falk's extreme avoidance of labels is laughably apparent in his reluctance to use the e-word, theistic or otherwise; his preferred alternative is "gradual creation." Phrases like "gradual modification of preexisting species" (p. 154) abound, but textbook terms like "evolution" and "natural selection" are rare. The Galapagos are conspicuously absent from the chapter on island speciation, and there is little mention of Darwin, who does not even rate an entry in the index. For Christians who have developed a conditioned aversion to those words, this could be a good thing. However, these omissions could reinforce the notion Falk wishes to dispel: that there is a problem with Christians accepting those concepts. Another weakness is the absence of any discussion of Noah's flood and how a nonliteral interpretation of that story fits into an evangelical Christianity.

As one of the few theistic evolution books directed at an evangelical audience, *Coming to Peace with Science* should prove an invaluable resource for Christians torn between biblical teachings and science and for pastors hoping to make their churches accessible to evolutionists. Although its openly evangelistic tone is unsuitable for required reading in a public school, it is a good recommendation for Christian students who raise religious objections to the theory of evolution and a book teachers could read themselves to understand more about the conflicts many Christian students perceive in today's science classes.

Reviewed by Louise M. Freeman, Assistant Professor of Psychology, Mary Baldwin College, Staunton, VA 24401.

HOW TO RELATE SCIENCE AND RELIGION: A Multidimensional Model by Mikael Stenmark. Grand Rapids, MI: William B. Eerdmans Publishing Company, 2004. 287 pages, index. Paperback; $28.00. ISBN: 080282823X.

Stenmark is professor of philosophy of religion at Uppsala University in Sweden. His other books include *Scientism: Science, Ethics, and Religion* (2001) and the Templeton Prize-winning book *Rationality in Science, Religion, and Everyday Life: A Critical Examination of Four Models of Rationality* (1995).

In the first chapter, Stenmark introduces three basic views about the relationship between science and religion: the independence or restrictionist view (exhibited by Stephen Jay Gould); the monist view; and the contact view. These three perspectives are compared with Ian Barbour's fourfold typology of conflict, independence, dialogue, and integration in the last chapter of the book. Stenmark argues that Barbour's dialogue and integration views should be interpreted as two different versions of the contact view. He also introduces two additional views: the complete scientific expansionist view and the complete religious expansionist view. Edward O. Wilson and Richard Dawkins are cited as examples of the scientific expansionist view while Alvin Plantinga is identified as a proponent of the religious expansionist view. These five possibilities serve as the first level of analysis in Stenmark's multidimensional model.

Several chapters are devoted to an extensive explanation of four other dimensions of science and religion interactions. The first to be discussed is the social dimension, as Stenmark argues that science and religion are both social practices performed by people in cooperation within a particular historical and cultural setting. The second is the teleological dimension which addresses the goals of scientific and religious practice. The third is the epistemological or methodological dimension which centers upon the means developed and used to achieve the goals of science and religion. The fourth is the theoretical dimension which includes the beliefs, stories, and theories that are generated by the practice of science and religion. These four dimensions serve as an additional level of analysis in Stenmark's multidimensional model.

In chapter seven entitled "A Science Shaped by Religion," Stenmark discusses the perspectives of religious expansionists and ideological expansionists (combined under the umbrella term of worldview expansionists). Examples of religious expansionism include theistic or Augustinian science and Islamic science. Examples of ideological expansionism include left-wing science and feminist science. The basic idea behind worldview expansionism is that actual scientific practice is not worldview-neutral but filled with ideological and religious partisanship and bias. Worldview expansionists believe that the most appropriate strategy to adopt is to be explicit

about what "ideology-plus-science" one defends, and therefore talk openly about Augustinian science, Islamic science, left-wing science and feminist science.

The chapter which follows attempts to answer the question "Should Religion Shape Science?" In this chapter, Stenmark suggests that worldview expansionists are right in arguing that it is unrealistic to think that no faith or ideological commitments enter into the fabric of science. He does, however, suggest that one aspect of the scientific enterprise be kept free from worldview partisanship. Four different aspects of scientific practice are described: the problem-stating phase, the development phase, the justification phase, and the application phase. While he acknowledges that worldview partisanship is acceptable in the problem-stating, development, and application phases of scientific practice, Stenmark argues that the justification phase should be worldview-neutral. He writes:

> Ideologies or religions ought not to be among the ground for accepting and rejecting theories in science. Theories should be accepted by the scientific community only in the light of considerations that involve empirical data, other accepted theories, and cognitive values such as consistency, simplicity, and explanatory power. Ideological or religious considerations are therefore illegitimate ways of deciding between scientific theories (p. 231).

Stenmark ends this chapter with a plea for the transformation of scientific education. He believes that scientific education should include the study of examples of worldview influences on past and present scientific research. This would provide scientists with a better understanding of how their own worldview commitments and the worldview commitments of others interact with scientific practice at different levels.

This book is not written for those who might be investigating the growing field of science and religion for the first time. It is primarily a book for serious philosophers of religion, philosophers of science, and others who are intimately acquainted with recent science-religion dialogue and debate. Within these circles, Stenmark's book deserves widespread readership and discussion as it is a well-written, innovative, and thought-provoking analysis. He argues convincingly for a multidimensional model of science and religion that refuses to give automatic priority to either discipline.

Reviewed by J. David Holland, 868 Oxford Drive, Chatham, IL 62629.

HOW TO RELATE SCIENCE AND RELIGION: A Multidimensional Model by Mikael Stenmark. Grand Rapids, MI: Eerdmans Publishing Company, 2004. 287 pages, index. Paperback; $28.00. ISBN: 080282823X.

Stenmark is a professor of philosophy of religion at Uppsala University in Sweden and a practitioner of the Christian faith. The purpose of this book is to examine the epistemologies of both science and religion through the analysis of shared and contrasting characteristics.

Stenmark begins by asserting that science and religion can be viewed as interacting in three ways: the independence view; the monist (unified) view; and the contact view. During his discussion of these views, Stenmark focuses on the approaches of what he terms "scientific and religious (or ideological) restrictionists and expansionists." Essentially, these terms describe those who advocate for either complete separation of the domains of science and religion (e.g., Stephen Gould's proposal of NOMA, or non-overlapping magisteria), or those who would relate the two completely, using one domain to dictate the characteristics of the other.

After examining the characteristics of these various viewpoints, as described by the work of scholars in those domains, Stenmark offers a model that attempts to account for four dimensions of science and religion:

> (1) The social dimension—science and religion as social practices performed by people in cooperation within a particular historical and cultural setting; (2) The teleological dimension—the goals of scientific and religious practice; (3) The epistemological or methodological dimension—the means developed and used to achieve the goals of science and religion; and (4) The theoretical dimension—the beliefs, stories, theories, and the like that the practice of science and religion generates (p. 268).

Stenmark spends five of the ten chapters in the book developing his definitions of these dimensions. He uses evidence from the published literature to demonstrate the goals and methodologies that are used in the work of science and religion, and does what I think to be a good job articulating the similarities and differences between the practices of science and religion. He then uses three chapters to address the issues of overlap between the two. His discussion revolves around the question of worldview-neutral or worldview-partisan science. He breaks the practice of science down into four phases of operation: problem-stating, development, justification, and application. Within each phase, he demonstrates, through examples, how science would operate as worldview-neutral or worldview-partisan, and offers arguments for and against the appropriateness of these modes of operation.

This detail of analysis into the workings of science and religion constitutes the multidimensional perspective that he advocates. As these various dimensions are considered, Stenmark suggests that they can be related on five levels of analysis. These levels are laid out in detail and are too complex to summarize in this review, but they are intended to augment or supplant the four-fold typology articulated by Ian Barbour (conflict, independence, dialogue, and integration). Stenmark proposes that attempts to relate science and religion must remain fluid and be continually re-articulated over time as new information becomes available. In other words, there must be continual dialogue among practitioners concerning the possibility of separation or overlap of the two paradigms.

From an educational theory perspective, I found the book intriguing because of Stenmark's apparent fluency with knowledge of learning theory and cognition. He frequently brings his discussion back to an analysis of how people learn and think about these topics. At first glance, the title implies an answer to the question of how to relate science and religion. Instead, Stenmark has offered a complex model of analysis, or a toolkit, for guiding the way one examines work in these two areas.

I found this book to be quite scholarly in nature. It is well-referenced and footnoted, with a bibliography of over 170 entries. Stenmark examines a variety of philosophical stances in both science and religious scholarship, from a variety of American and European sources. While his focus is primarily on the relationship in thought between science and Christianity, he periodically addresses the implications for other theistic religious views as well. The book is most accessible to those already familiar with the nuances of the science-religion interface. I recommend it, especially for those engaged in the work of various approaches to the harmonization of science and Christian faith. This book has the potential to provide a useful framework for engaging the scientific and religious communities in useful dialogue.

Reviewed by Steven Owens, Science Teacher, Northglenn High School, Northglenn, CO 80234.

HISTORY OF SCIENCE

A SHORT HISTORY OF PROGRESS by Ronald Wright. New York: Carroll & Graf Publishers, 2004. 132 pages, notes, bibliography, index. Paperback; $14.95. ISBN: 0786715472.

This slim volume is a must read. The author, an award-winning historian, writes a cohesive history of the technological world since the times of prehistoric humanity. Superbly written, tightly argued, Wright's theme is how our species has, again and again, fallen into the trap of over consumption. The results have been the collapse of empires as great as the Maya, and as small as the kingdom of Easter Island. Wright is cautiously optimistic about our own civilization, arguing that by understanding past patterns we may be able to modify our ways (in some instances quite drastically) and continue into a rich and prosperous future. He is adamant in his view that to continue as we are now is to ensure civilization's collapse.

Wright begins with Paul Gauguin's three "childlike" questions: "Where do we come from? What are we? Where are we going?" He addresses the last of these, by expertly analyzing the first two. For over 10,000 years humanity has "progressed," and "progress has become an icon, a secular religion" (p. 5). "The myth of progress has sometimes served us well—those of us seated at the best tables, anyway—and may continue to do so. But I shall argue ... that it has also become dangerous ... [it] has an internal logic that can lead ... to catastrophe."

Wright looks at six ancient societies: Egypt, China, Sumer, Rome, the Maya and Easter Island. The first two have survived (tenuously) over 3,000 years; the last four collapsed in disaster in less than 1,000. The story of Easter Island is perhaps the most interesting (and scary). Rapa Nui (the Polynesian name) was settled in the fifth century. With sixty-four square miles of incredible verdant soil and forest, the population quickly exploded to 10,000 people by the year 1000. Each generation grew bigger, each generation cut more forest; by 1400 AD the last tree was gone. By 1722, when Captain Cook visited the island, civilization had collapsed. The word for wood, "*raku*," was the dearest in their language. About 2,000 islanders still survived, and in the next fifty years after Cook's visit they were able to perfect their weapons of war and fight one another for the scraps remaining. In that fifty years, they also found the time to topple their religious icons, the 1,000 giant statues. Does their story pose a challenge for our civilization? Wright thinks so, and his reasoning is persuasive.

This is a book arguing for change. Wright writes:

> The case for reform ... is not based on altruism ... The most compelling reason ... is that the system is in no one's interest. It is a suicide machine ... Things are moving so fast that inaction itself is one of the biggest mistakes ... The reform that is needed is not anti-capitalist, anti-American, or even deep environmentalist; it is simply the transition from short-term to long-term thinking (p. 131).

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

THE GRAND CONTRAPTION: The World as Myth, Number, and Chance by David Park. Princeton, NJ: Princeton University Press, 2005. 331 pages, index. Hardcover; $29.95. ISBN: 0691121338.

David Park, an Emeritus Professor of Physics at Williams College in Massachusetts, has produced a wonderful story of human attempts over the past four millennia to make sense of the world within the cosmos, in relation to its physical nature, and in regards to its inhabitants – both real and imagined. He displays his talents as a storyteller in a manner consistent with his earlier acclaimed books such as *The Fire within the Eye* and *The How and the Why*. He uses as his principal organizing metaphor the idea of the natural world as some kind of mechanism. He employs extensive quotations from period authors because he believes quotes readily convey people's thought processes, highlight their assumptions, demonstrate what they considered to be evidence in support of their views, and reveal their personalities. He ends the book with current ideas in cosmology and geology but is very careful to point out the tentativeness of contemporary scientific understandings in light of all that has come before and that which will likely arise in the future.

The book opens with a tour of ancient beliefs about the world and the cosmos as represented by the Hebrews, Sumerians, Greeks, and Egyptians. For the six-page opening devoted to the Hebrews he quotes the *Genesis* text and then draws upon Rabbinic sources and the apocryphal *Apocalypse of Paul* from the middle of the third century. He moves on to consider Sumerian ideas from the *Enuma elish* and the *Gilgamesh* epic that then leads him to Homer and the ancient Greeks before passing on to the Egyptians. He continues this basic format moving back and forth among various ancient peoples for the remainder of the discussion regarding ancient views of the Earth and the cosmos. He takes up ancient views of the earth and its relationship to the heavens and time, the origin and destiny of the universe, and stars and other celestial objects.

The middle portion of the book summarizes developments from the high Middle Ages through Copernicus and Galileo and then to Isaac Newton. The final four chapters are devoted to the modern period and attend to theories of

matter, the age of the Earth, the descent of man, the cosmos in motion, the Big Bang, and the search for other worlds and extraterrestrial intelligence. He employs many telling metaphors such as using a 900-page Book of the World with each page representing about 5 million years. Algae appear by page 450, page 780 finds the first marine animals, dinosaurs appear around page 865, and the first hominids on page 899. He writes extremely well with a very good command of both the English language and the reader's likely patience and interest. This is surely one of the best books for general readers to appear in recent years that survey the history of human thinking about the Earth and the cosmos. Extensive period illustrations, quotations from primary resources rendered into English, and endnotes to follow up key arguments in more detail along with an extensive bibliography and index add to the overall worth and attractiveness of the volume. ASA members will enjoy this book and undoubtedly recommend it to others.

Reviewed by Dennis Cheek, Adjunct Professor of Science Education, Penn State Great Valley School of Graduate Professional Studies, Malvern, PA 19355.

NATURAL SCIENCES

ON HUMAN NATURE by Edward O. Wilson. Cambridge, MA: Harvard University Press, 2004. 260 pages, index. Paperback; $18.95. ISBN: 0674016386.

Wilson is Pellingrino University Research Professor Emeritus and Honorary Curator in Entomology of the Museum of Comparative Zoology at Harvard University. He has won many scientific awards and published numerous books including *The Diversity of Life, Consilience: The Unity of Knowledge, In Search of Nature,* and most recently, *The Future of Life. On Human Nature* is the twenty-fifth anniversary edition of the Pulitzer Prize-winning book that was originally published in 1978. The only difference between this edition and the original book is the inclusion of a new preface.

In this new preface, Wilson explains how he came to write this book back in 1977–1978. His original focus on the biology of ants eventually led him to write a book entitled *The Insect Societies* (1971), in which he proposed that "a coherent branch of biology might be constructed from a synthesis of social behavior and population biology." He suggested that this new discipline of "sociobiology" would for the first time bind together knowledge of social insects and social vertebrate animals. In 1975, he expanded upon this concept in a 697-page book entitled *Sociobiology: The New Synthesis.* In the final chapter of this book, Wilson argued for a similar approach to the study of human social behavior. Realizing that the last chapter of *Sociobiology* should have been a book-length exposition, he sat down to write *On Human Nature* two years later.

On the very first page of chapter one, Wilson writes that "we are biological and our souls cannot fly free. If humankind evolved by Darwinian natural selection, genetic chance and environmental necessity, not God, made the species." *On Human Nature* is first and foremost a description of human social behavior from the perspective of a scientific materialist. Human behavior, according to Wilson, can only be understood through the lens of human sociobiology (evolutionary psychology). The brain exists because it promotes the survival and multiplication of the genes that direct its assembly. In order to understand human behavior, it is necessary to dissect the machinery of the brain and to retrace its evolutionary history. Innate sensors and motivators exist in the brain that deeply affect our ethical premises and from these roots, "human morality evolved as instinct." Religions, like other human institutions, have also evolved "so as to enhance the persistence and influence of their practitioners." The supernatural is denied, the spiritual does not exist, and there is no place for God in Wilson's naturalistic approach to the understanding of human behavior.

In addition to explaining human social behavior from an evolutionary perspective, (with chapters on heredity, development, emergence, aggression, sex, altruism, and religion), Wilson also argues for the blending of biology and the social sciences. This desire to cultivate more intensely the relationship between the natural sciences and the humanities is introduced in the first chapter of the book and further explained in the last chapter. Wilson writes that "by judicious extension of the methods and ideas of neurobiology, ethology, and sociobiology a proper foundation can be laid for the social sciences, and the discontinuity still separating the natural sciences on the one side and the social sciences and humanities on the other might be erased" (p. 125). Once this union is established, it will then be possible to "fashion a biology of ethics, which will make possible the selection of a more deeply understood and enduring code of moral values" (p. 196). Wilson's ultimate goal is to see that the presuppositions of scientific materialism, accompanied by the rigors of the scientific method, impact the social sciences and humanities in ways that will have far reaching effects upon "the high culture of Western civilization."

Having taught biology courses at the college level for a number of years, I have come in contact with Wilson's writings on a number of occasions. I have always been impressed by his vast knowledge of zoology, his passion for exploration and discovery, his concern for the preservation of biological diversity, and his support for the worldwide conservation movement. My Christian faith, however, is clearly at odds with the scientific materialism that provides the foundational epistemology for all of Wilson's writings. Although he claimed twenty-five years ago, in the last chapter of *On Human Nature,* that he did not want scientific materialism to become an alternative form of organized formal religion, his subsequent writings suggest otherwise. Several recent books on science and religion classify Wilson as an example of a scientific expansionist or one who not only wants to see science explain religion, but also replace traditional religious beliefs with a new religious mythology that is based upon an evolutionary epic.

While I have admiration for Wilson's work as a zoologist and conservationist, I am troubled by his belief that true knowledge can only be acquired by science, and that human beings are nothing more than biochemical machines, regulated by their genes and their evolutionary history. Readers of this journal can appreciate Wilson's contributions to the discipline of biology. At the same

time, we should be genuinely concerned about his desire to undermine the foundations of Christian theology.

Reviewed by J. David Holland, 868 Oxford Drive, Chatham, IL 62629.

ORIGINS & COSMOLOGY

EVOLUTION VS CREATIONISM: An Introduction by Eugenie C. Scott. Westport, CT: Greenwood Publishing Group, 2004. 272 pages. Hardcover; $49.95. ISBN: 0313321221.

At last—a book that both Henry Morris, of the Institute for Creation Research, and Niles Eldredge, a prominent scientist, can agree upon! Eugenie Scott, executive director of the National Center for Science Education, is an articulate and engaging author. She has written a book suitable for a wide audience: high school and college students, teachers, and nonspecialized general readers. The book is comprehensive, treating scientific evidences for evolution, religious views, and a history of the so-called "evolution-creation" controversy. It is a "best buy" for school and college libraries; its stiff price may preclude an appeal to a private library.

Scott makes the point early that the so-called "creation-evolution" controversy is *not* a scientific one but one confined entirely to social debates. She writes:

> Students are ill-served if in the name of "fairness" ... they are misled into believing there is a controversy in the scientific world over whether evolution occurred. There is none ... It would be dishonest ... to pretend that a public controversy ... is also a scientific controversy ... (p. xx).

Scott writes well, but unevenly; some sections are high school level, a few are too technical, particularly those on her own specialty of biology. She is very careful to define terms clearly. For instance, in her Introduction (p. xxii), she carefully separates the two components of evolution: (1) descent from common ancestors; and (2) natural selection as the major cause. Sometimes she "talks down" to the reader; phrases such as "you will learn about" suggest her primary target audience is the young scholar. This is annoying but understandable.

In writing this book, and selecting contrasting articles, Scott received courteous cooperation from the two primary Young Earth Anti-Evolution organizations, Institute for Creation Research (ICR) and Answers in Genesis (AIG). She also found Phillip Johnson to be cooperative; however, the Intelligent Design people at the Discovery Institute refused to participate. Scott refers disparagingly (p. xviii) to their "my way or the highway" response! As a result, the special creationists speak for themselves but the discussions of Intelligent Design Creationism (IDC) are those of Scott. There is no direct mention of the ASA, but there is a reference to ASAer Glenn Morton's "delightful" web site (p. xxi) in the Introduction. Also, there is a citation of Roger Weins' paper "Radiometric Dating: A Christian Perspective" as accessed on the ASA web site (p. 157). ASAer Richard Dickerson's 1992 article, "The Game of Science," from the *Journal of Molecular Evolution* (1992), is reprinted on pages 252–4; a version of this article also appeared in *PSCF*.

Eldredge has written a Foreword, "The Unmetabolized Darwin," setting forth the reasons for the book. First, he writes, evolution "still does not sit well with an awful lot of (people) ..." (p. ix). Second, social discourse on origins "has been stuck in a rut since ... (1859)." Third, "it is because creationism transcends religious belief and is openly and aggressively political that we need to sit up and pay attention ... Creationists persistently and consistently threaten the integrity of science teaching in America—and this, of course, is of grave concern" (p. xii). Like it or not, Eldredge argues, one *must* enter the political arena to combat creationism.

The book is divided into three sections: three chapters on science, evolution, religion and creationism; three chapters on the history of the controversy; and six chapters containing contrasting literature selections. The areas of cosmology, astronomy, and geology are the chief focus. Legal, educational, and religious issues each have their own chapter, as does a discussion on the nature of science. This third section is poorly edited; literature selections appear abruptly, with citations following; this causes some confusion. Generally, the literature selections are appropriate; in one or two cases, however, the excerpts criticizing a preceding creationist argument are much too technical for a general audience.

In sum, this is a book I definitely recommend, even though its price is high, and it is not done "perfectly." Scott, no Christian, does a fair job of representing the religious positions. This may be a book to give to a young relative who is struggling with the issues and, perhaps, too much influenced by ICR, AIG, James Kennedy, or other Christian preachers who base their theology on young earth anti-evolution arguments.

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

EVOLUTION: The Disguised Friend of Faith? Selected Essays by Arthur Peacocke. Philadelphia, PA: Templeton Foundation Press, 2004. 287 pages. Paperback; $24.95. ISBN: 193203172.

The theme of this book is the challenge of science to traditional Christian beliefs. The author, formerly a distinguished biochemist, has the credentials for this task, both as a scientist and as an Anglican priest. The book comprises a selection from previously published articles and essays. The relatedness he saw in nature led Peacocke to recognize the need to integrate his understanding of evolution with a transformed and clear comprehension of his Christian beliefs. Peacocke received the Templeton prize in 2001 for his scholarly inquiry.

Peacocke has conveniently arranged these previously published materials in three parts. In the first part, he considers the theological consequence of issues related to the evolution of living things in nature. In part two, he amplifies his views about how humans, psychosomatic unities, should regard themselves in relation to God the Creator. In part three, Peacocke discusses the implications these findings may have in the reshaping of our beliefs. The epilogue briefly introduces the reader to medieval thinker Robert Grosseteste. Peacocke makes extensive use of the writings of others which is reflected in his twenty pages of notes.

For some Christians, a degree of uncertainty exists as to how to integrate this plausible mechanism, Darwinian evolution, with their faith. The author pursues this quest with an intellectual integrity, exploring the relationship of nature, humanity, and God. There is a relatedness of all living things within nature, imaged in their DNA profiles. These fundamental similarities in nature, in the opinion of the author, do not challenge the basic tenets of theology.

Peacocke accepts that what is true in science actually enhances and clarifies our understanding of God and of God's relationship to the creation, including humanity. The Hebrews considered the person to be an animated being, a unity, not an incarnated soul. Science can now demonstrate that humans are continuous with the material universe out of which they have evolved. The Christian understanding is that a transformed humanity, redeemed by God through Jesus Christ, will continue to live in the presence of God.

The Scriptures affirm that in Jesus we encounter the Incarnation of the transcendent God where Sonship is an ontological, not a biological concept. The author emphasizes the oneness of God and explains the postulates of panentheism, the Being of God penetrating the whole cosmos. Here God's interactions with the world occur from within, not from outside our world. The author says that in the fourth Gospel "pre-existence" does not imply divinity. Peacocke has achieved his aim in offering a synthesis of science and religion. In addition, he encourages Christians to use these findings of science in integrating their cosmology with their beliefs based on a correct understanding of the Scriptures. Peacocke identifies new realities that are emerging and that need discussing.

The book is a pleasure to read with its lucid style. Peacocke defines clearly his terminology. The book's cover is very attractively done; the typeface is large and reader friendly. There are thirteen chapters including the epilogue and an index.

Reviewed by Ken Mickleson, 105 St. Andrews Road, Epsom, Auckland 1003, New Zealand.

GOD, THE MULTIVERSE, AND EVERYTHING by Rodney Holder. Aldershot, England: Asgate Publishing Inc., 2004. 211 pages. Hardcover; $84.95. ISBN: 0754651169.

Is the fine-tuning of the universe more consistent with a realm created by God or by random chance? Holder, Priest-in-Charge of the Parish of the Claydons, builds a compelling argument for God's existence being statistically more likely, and philosophically more satisfying, than the theory of multiple universes. Holder has a D. Phil. in astrophysics from Cambridge University, is a Fellow of the Royal Astronomical Society and of the Institute of Mathematics and Its Applications, and is a member of the Institute of Physics. He has published several articles on science and religion and a book *Nothing But Atoms and Molecules? Probing the Limits of Science* which critiques reductionism.

Dramatic pictures of galaxies beamed down from the Hubble telescope inspire awe and wonder. Carl Sagan, Richard Dawkins, and others assure us this confirms the wonder of humanity's chance existence. Holder not only thinks otherwise but uses recent discoveries in cosmology to show the much greater likelihood of a universe created by God. The book moves from an introduction to big bang cosmology and the fine tuning of the universe, to the inferences raised by design (chapters 1–4),and then discusses the central statistical evaluation of the origin of the universe (chapters 5–9).

Quotations are liberally used throughout to effectively differentiate science from metaphysics, particularly in connection with evolution of the universe at the very earliest stages, $<10^{-32}$ seconds, when particle physics is most speculative. For example, "Barry Collins and Stephen Hawking showed that the probability that something like our universe would develop from arbitrary initial conditions, as proposed by chaotic cosmologies, is vanishingly small. They gave this explanation of why the universe is so isotropic (i.e., looks the same in every direction):

> The fact that we have observed the universe to be isotropic is therefore only a consequence of our own existence. ... It is of course complete nonsense. As Mullin remarks, "But surely a necessary condition cannot function as an explanation" (p. 31).

The central statistical approach of the book is the use of Bayes's theorem to compare the likelihood of a designer with the brute-fact existence of the universe or the possibility of a multiverse (a multiplicity of universes). Holder states:

> Physics can tell us what the laws are but cannot explain why they are the way they are. The design argument says they were deliberately chosen by God, who assigned values to the parameters expressly in order that the universe give rise to intelligent creatures at some point in its history (p. 11).

Holder deftly weaves statistical analyses throughout the middle of the book (chapters 6–9), relegating a thorough statistical treatment to five appendices which have a total of twenty-nine pages. Although a critique of the statistical analysis is beyond this reviewer, the basic arguments are not too difficult to follow, with several key ideas being previously published in articles indexed in the bibliography.

Holder has crafted an excellent response to the multiverse theory in which one habitable universe is ensured by considering an infinite number of possibilities. The extensive cross-examination of ideas through liberal quotation elevates a potentially boring statistical analysis to an engaging, and yet demanding book. Only at the end of the book is the nature of God, the stated Designer, revealed.

> But the design argument gives us only limited information about God – that he exists, that he is glorious and powerful ... [W]ould it not now be equally rational to investigate much more deeply what that Designer is like? That is of course another story, which will take us into the realms of Revelation, where we may hope to find "... the light of the knowledge of the glory of God in the face of Jesus Christ" (p. 159).

Statisticians and intelligent design advocates will find this an indispensable contribution in support of a statistical defense of God's existence and creation.

Reviewed by Fraser F. Fleming, Associate Professor of Chemistry, Duquesne University, Pittsburgh, PA 15282.

Book Reviews

BY DESIGN OR BY CHANCE? by Denyse O'Leary. Minneapolis, MN: Augsburg Books, 2004. 336 pages, notes, index. Paperback; $15.99. ISBN: 0806651777.

Denyse O'Leary is a freelance journalist based in Toronto who specializes in writing on topics related to science, religion, and faith. She has authored several previous books and articles, and writes a faith and science column for *Christian Week*.

By Design or by Chance? is an investigation of the relative merits of Darwinian evolution and Intelligent Design (ID). In the Introduction, O'Leary states where she is going and briefly defines the Big Bang, evolution, Darwinism, Young Earth Creationism, and ID. She subsequently takes up the existence of the universe itself (Part One), the origin of life and Darwinism (Part Two), creationism (Part Three), and design (Part Four).

In Part One, O'Leary describes the Big Bang hypothesis and the Anthropic Principle in layperson's terms, concluding that they suggest we live in a universe of finite age that is fine-tuned for life (chap. 1). In chapter 2, she discusses what she considers "the best argument against design," the many universe hypothesis, and in chapter 3 she briefly outlines "the best argument for design," the irreducible complexity of the living cell and its parts.

Part Two gives a history of Darwinism, from Darwin up to the present day. O'Leary discusses Darwin himself, the nineteenth century reaction to Darwin, the Scopes trial, the neo-Darwinian synthesis, and differences among contemporary neo-Darwinians (chiefly, Dawkins and Gould). She deals as much with the religious and philosophical positions of Darwinians and anti-Darwinians as she does with the science.

Part Three begins with a brief history of creationism as a reaction to the Darwinian revolution and goes on to young-earth creationism, the ASA (!), and old-earth creationism. O'Leary also tries to answer the question: Why has creationism been growing?

Part Four surveys traditional design arguments, design and information theory, and the detection of design; it also describes the work of ID luminaries like Phillip Johnson, William Dembski, and Michael Behe (chap. 13). Chapter 14, "Is ID Good Science? Is It Science at All?" is perhaps the pivotal chapter in the book. One by one, O'Leary takes up the formal, publicly stated arguments against considering ID to be science and refutes them. She concludes that opposition to ID is primarily philosophical: a commitment to naturalism (whether philosophical or methodological), leads one to the belief that ID cannot *in principle* be science. Chapter 15 looks at "theological" arguments against design, arguments advanced even by the nonreligious. Chapter 16 explores the possible futures of the ID movement.

The Afterword summarizes the opinions the author finally came to regarding the Big Bang, evolution, theistic evolution, YEC, "mainstream science," what should be taught in the schools, textbooks and "teaching the controversy," and ID. O'Leary is a Christian, but when she began her research, she had no clear convictions regarding the relative merits of evolution and ID. O'Leary concludes that "evolution happened but ... Darwinism is an inadequate explanation" (p. 237). What is missing from Darwinism is design. Through reading, study, arguments, and interviews, she came to conclude that, "it appears that the whole universe is screaming DESIGN!" (p. xi). Hence, the *leitmotif* of the book is, "the slow, sure—and strongly opposed—reorganization of sciences around the theme of design, as opposed to no design."

By Design or by Chance? took first place in its category in the 2005 *Write! Canada* awards, a Canadian competition similar to the Christie awards in the US. It is not hard to see why: the book is a delight to read. O'Leary writes in a clear, vivid style. She defines technical terms in a way the intelligent layperson can understand. Her characterizations of the various positions advocated by those engaged in the controversy are accurate and fair. Whether you are pro-ID, anti-ID, uncommitted, or uninformed, *By Design or by Chance?* is worth reading for yourself; it also would provide an excellent introduction to the ID controversy for your nonscientific friends.

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

THE EVOLUTION-CREATION STRUGGLE by Michael Ruse. Cambridge, MA: Harvard University Press, 2005. 288 pages, notes, bibliography, index. Hardcover; $25.95. ISBN: 0674016874.

Ruse is a professor of philosophy at Florida State University, a prolific and well-respected writer of books on evolution. He takes on the philosophical struggles between the scientific establishment, the creationists of our modern times, and the "religious evolutionists" (such as Richard Dawkins) who preach incessantly the message that science is the only path to realistic thinking and that all religious thinking is a sham.

Ruse argues that both evolutionism (the religion) and creationism have common roots in the Enlightenment, when the "crisis of faith" emerged so strongly. He points out what should be obvious (but are not, at least until he discusses them) similarities in creationist and evolutionist arguments.

Ruse positions his arguments in an eschatological framework, arguing that evolutionists think in terms of postmillennial thought, creationists in terms of premillennial. But it is not so much biblical issues being argued, as much as moral ones; the two sides expect their adherents to behave quite differently. Ruse treats the subject historically, from early eighteenth century, spending much time on late twentieth-century thinkers: Wilson, Dawkins, Gould, Henry Morris, Conway Morris, Plantinga, Behe and Dembski. He treats with gentle sarcasm the underlying religious commitments of evolutionists, arguing that those most hostile to religion are actually fundamentalists of another kind. He also criticized the ID movement:

> ... even if Plantinga is right, and even if ID theory does give us "an important part of a serious and profound knowledge of the universe," that knowledge is not scientific knowledge. It cannot replace the understanding of life gained through contemporary evolutionary theory (p. 280).

One example from the book will illustrate the above. Ruse writes:

> As we would expect, academic evolutionists deny any religious associations in their field—after all, they are scientists who have only recently dragged themselves up to full professional status, and would just as soon forget evolution's checkered past (p. 202).

He then quotes Dawkins from *The Humanist* 57 (1997), who wrote that faith is one of the world's great evils, that science has many of religion's virtues and none of its vices; that religious faith "not only lacks evidence, its independence from evidence is its pride and joy ..." Ruse then skewers Dawkins, Wilson (and others) as he shows (convincingly, I think) the innate religiosity of many evolutionists. On pages 212-3, he writes: "The real issue is whether some evolutionists use the supposed progressiveness of evolutionary theory to promote social and ethical programs. And indeed they do ... [evolutionism] continues to function as a kind of secular religion."

The book, while written "sharply," is not at all polemical. Ruse writes clearly, to the point, and in a manner which is understandable to the informed nonscientist. Highly recommended, it has "keeper" status in my own library. It should be read along with Eugenie C. Scott's recent book, *Evolution Vs. Creationism*. Neither author is a Christian, but unlike many non-Christian writers, both appear to understand Christianity reasonably well and treat it with respect.

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

CREATION by Alister McGrath. Minneapolis, MN: Augsburg Fortress Publishers, 2005. 90 pages. Hardcover; $15.00. ISBN: 0800637003.

This short book has seven chapters, titles of twenty-three books for further reading, and seven beautiful illustrations in color. The illustrations are beautiful paintings by some of the world's leading artists including Vincent van Gogh, Michelangelo, Pieter Bruegel the Elder, and William Blake. The illustrations are intended "to stimulate and inform both the believing mind and imagination" (p. vii).

The book's purpose is to explain, in simple language, creation. With words and images, it aims to produce a rich tapestry of Christian faith by going to the beauty of faith's depths. C. S. Lewis' famous quote concisely sets McGrath's book in context: "I believe in Christianity as I believe that the Sun has risen—not only because I see it, but because by it, I see everything else" (p. 2). Trenchant quotes from other writers adorn the book. In developing his theme, McGrath stresses such ideas as humanity's obligation to care for creation, future renewal and transformation of creation, understanding creation through parables and miracles, people's place in creation, and the ruin and final restoration of humanity.

This is a wonderful book to read as a devotional and spiritual stimulus. Far from being a dry theology, its well-chosen words and pictures have the potential to motivate and inspire. It has the merits of being brief and beautiful, and it would make a wonderful gift.

Alister McGrath, professor of historical theology at Oxford University, is a well-published author with a Ph.D. in molecular biophysics. His books include *Dawkin's God: Genes, Memes, and the Meaning of Life* and *The Science of God: An Introduction to Scientific Theology*. *Incarnation* is a companion volume to *Creation*.

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

PHILOSOPHY & THEOLOGY

THE PROBLEM OF EVIL AND THE PROBLEM OF GOD by D. Z. Phillips. Minneapolis, MN: Augsburg Fortress Publishers, 2005. 280 pages. Paperback; $20.00. ISBN: 0800637755.

Some readers might look at the title of this book and ask "where is the problem"? The answer to that question goes back at least to the fourth century BCE when Epicurus phrased it this way: "Is God willing to prevent evil, but not able? Then he is impotent. Is God able, but not willing? Then he is malevolent. Is God both able and willing? Whence then is evil?"

Apologists and theodicists offer many possible answers to this quandary. Phillips finds them all unsatisfactory. What is the distinction between an apologetic and a theodicy? A theodicy claims to know why God allows evil while an apologetic does not but insists there must be an ultimate good. Phillips sees the crux of the problem in the disagreement over the apologists' and theodicists' belief that God is a moral agent who shares a moral community with humans. Here again, Phillips disagrees. When the defenders of evil put forth that God's ways are not our ways, they have conceded that God does not share a moral community with us, contends Phillips. He thinks consequentialism dominates their arguments which makes them blind to "common moral reactions" (p. 35). Phillips rejects the "God of the theodicists" (p. 134).

The book is divided into three sections. In the first one, Phillips argues that the philosophical confidence that the logical problem of evil has been solved is misplaced and has become "our problematic inheritance" (p. 5). He discusses about a dozen of these suggested solutions to evil and seeks to logically disarm each one. The second section is entitled "Where Do We Go From Here?" Phillips seems to agree with other philosophers that apologists for religion should not try "to tidy up reality" and "what's ragged should be left ragged" (p. 141). In the last section, Phillips aims "to show a conception of human life found in Christianity ... that avoids the pitfalls of theodicy ... (and) shows the possibility of a response to the contingencies of life that is other than the celebration of the terrible, or a rebellious response to a God of caprice" (p. 141).

Whether Phillips succeeds in his goals to disarm theodicies and offer an alternate explanation, each reader will have to decide. Most likely the apologists and theodicists will attack some of Phillips' logic, and the debate will go on, as it has for thousands of years. To apply an early Christian apologist comment on the author of Hebrews to this debate seems apt: "Only God knows for sure." And so far, God is not telling.

Phillips, a philosopher of religion, teaches at Claremont Graduate University in California and the University of

Wales in Swansea. He is editor of the journal *Philosophical Investigations*. Recent books he has written include *Religion and the Hermeneutics of Contemplation* (2001) and *Religion and Friendly Fire* (2004).

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

THE BEAUTY OF THE INFINITE: The Aesthetics of Christian Truth by David Bentley Hart. Grand Rapids, MI: Eerdmans, 2003. 446 pages. Paperback; $35.00. ISBN: 080282921X.

The category of beauty, a name for God according to Dionysus, is far more important in the theology of the Orthodox Church than it is in the West. Also, the concept of infinity is one of the first attributes associated with the divine, so much that it became the designation of the divine at the dawn of theology (cf. Anaximander). Therefore, much could be expected if an Orthodox theologian announces in the title of his book that he wants to tackle the problem of beauty and infinity at the same time. But disappointment rather quickly settles in.

Part 1 of the book is an unilluminating discussion of equally unilluminating views of postmodernists: Derrida, Lyotard, et al. The author also feels obligated to give a presentation of the views of Nietzsche that concludes with a somewhat frivolous remark: "The most potent reply a Christian can make to Nietzsche's critique is to accuse him of a defect of sensibility—of bad taste ... Nietzsche had atrocious taste" (p. 125).

Part 2 presents some discussion of the trinity, creation, salvation, and eschatology. It is unclear from one page to another where the author derived his ideas and where he wants to go. Probably he best summarized his presentation of a series of theses by saying that "perhaps on account of some perversity of authorial temperament ... there is no systematic or deductive sequence to those theses" (p. 154). The role of beauty and infinity in Orthodox theology is presented in a most unclear manner. This is also done in a pompous, stilted style which is particularly exasperating in a book on aesthetics. It is hardly enlightening to read that "being is not a welter of images from which essences must be wrested in an action of noetic rarefaction on the one hand, nor a chaos of the unthematizable on the other, but is an unmasterable beauty boundless in its variations" (p. 141) or that "hell is the experience ... of divine glory not as beauty, but as a formless sublimity; it is the rejection of all analogical vulnerability, the sealing of the 'self' (or the cosmos) in univocal singularity, the 'misreading' of creation as an aboriginal violence" (pp. 399–400).

The book is at its best when it discusses patristic theology, in particular, Gregory of Nyssa, Augustine, and Maximus. However, such moments are infrequent. The author acknowledges influence of Russian thinkers (p. 29), but this is rarely visible in his book. It is also puzzling that there is no reference to Evdokimov's exemplary book on theology of beauty. This is the book which the reader should utilize in order to see how important beauty is in Orthodox theology. Hart's long-drawn verbose treatise offers little reward in that respect.

Reviewed by Adam Drozdek, Duquesne University, Pittsburgh, PA 15282.

Religion & Biblical Studies

THE UTTERMOST PART OF THE EARTH: A Guide to Places in the Bible by Richard R. Losch. Grand Rapids, MI: Eerdmans, 2005. 260 pages. Paperback; $16.00. ISBN: 0802828051.

This is not a book you would sit down and read from beginning to end. It is a reference guide to inform you about Bible geography. If you have ever wanted to know the pronunciation, history, and location of some place referred to in the Bible, this book may help. It has five maps, numerous pictures, an index, some archaeological references, and a guide to pronunciation. Most of Losch's information was culled from books, which he identifies, and some came from the Internet.

After Losch gives a brief history of the Holy Land, he presents in alphabetical order seventy-six locations of places found in the Old and New Testaments. He concentrates on the Roman Empire, the setting of the New Testament, but he also describes significant places not mentioned in the Bible (e.g., Sepphoris) but nevertheless influential in biblical events. From Ai to Ur, Losch informs about past history and in some cases gives the location's present name and condition. It was not the author's intentions to be encyclopedic, and he is not. Some important locations are omitted such as Neopolis, Troas, Lystra, Crete, and Cyprus. Losch calls his selections "a collection of information for the curious" (p. ix).

If you do not have access to *Cities of the Biblical World* by DeVries, *Baker Encyclopedia of Bible Places* by Bimson, or the *Interpreter's Dictionary of the Bible*, or if you do not want to be overwhelmed with more than you want to know, this book is an excellent selection. It will serve well the layperson, the Sunday School teacher, or just the plain curious. It will enrich your knowledge of biblical sites and thus make the Bible more understandable and interesting. For these reasons, and its reasonable price, I highly recommend it.

Losch, retired rector of St. James' Episcopal Church in Livingston, Alabama, is also the author of *The Many Faces of Faith: A Guide to World Religions and Christian Traditions*.

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

THE WOMEN WHO DANCED BY THE SEA: Finding Ourselves in the Stories of Our Biblical Foremothers by Marsha Mirkin. New York: Monkfish Book Publishing Company, 2004. Paperback; $16.95. ISBN: 0974935905.

Mirkin, a Boston-based clinical psychologist, has taught at several medical schools, and is a resident scholar at Brandeis University. Her book is described as the first of its genre to view the lives of biblical women through the eyes of contemporary psychological theories. It is intended "for anyone who is in search of spiritual meaning and guidance in an increasingly unstable and dangerous world." Therefore, it will perhaps appeal to *PSCF* readers (psychologists, Bible teachers, preachers, and laypersons) who are interested in the lives of Eve, Sarah, Rebecca,

Miriam, Hannah, Ruth, and others evaluated by a clinical psychologist.

In eight chapters, the author examines how each of these women gained wisdom to relate better to self, others, and God, while coping with depression, eating disorders, infertility, sibling rivalry, and favoritism. The essence of each chapter is contained in its title, such as "Rebecca: Envisioning Our Relationships." Interspersed with the biblical narratives, vignettes describe predicaments faced by some of Mirkin's clients.

The author is well-acquainted with the Hebrew Bible and writes from a Jewish background. She is convinced that people today, many of whom she has met in her clinical practice, can learn from the struggles ancient biblical women encountered. Mirkin draws helpful advice from the lives of people from the past and present.

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

444 SURPRISING QUOTES ABOUT THE BIBLE by Isabella Bunn, ed. Grand Rapids, MI: Baker Publishing House, 2005. 190 pages. Paperback; $9.99. ISBN: 0764300690.

This is a terrific little book for people who lecture, sermonize, or write. It can provide just the right quote to illustrate a trenchant point. Its seven chapters direct the reader to the power of the Bible to influence various areas of life.

A section of special interest to *PSCF* readers is the Bible's power to "Reveal Truth." Here are a few quotes that apply to science.

> All human discoveries seem to be made only for the purpose of confirming more and more strongly the truths contained in Sacred Scripture (William Herschel).
>
> I have been suspected of being what is called a Fundamentalist. That is because I never regard any narrative as unhistorical simply on the ground that it includes the miraculous (C. S. Lewis).
>
> No sciences are better attested than the religion of the Bible (Sir Isaac Newton).

Finally, the fiery evangelist Billy Sunday put science in its place with this quote: "When the consensus of scholarship says one thing and the Word of God another, the consensus of scholarship can plumb go to hell for all I care."

There are some wonderful quotes from the chapter on the power of the Bible to shape civilizations like this one from Victor Hugo: "England has two books, the Bible and Shakespeare. England made Shakespeare, but the Bible made England."

"The Bible is for the Government of the People, by the People, and for the People" (John Wycliffe wrote this five hundred years before Abraham Lincoln used this line in his 1863 Gettysburg Address).

And how about this one from Desmond Tutu: "Don't give up! I have read the end of the book! We win!"

Isabella Bunn is a lawyer, theologian, and employee of Oxford University. She owns a collection of more than four hundred quotation books and spiritual anthologies. In this book she provides a bibliography and index of sources. She indicates another volume like this is in preparation and invites readers to contribute.

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

THE EMPTY TOMB: Jesus Beyond the Grave by Robert M. Price and Jeffery Jay Lowder, eds. Amherst, NY: Prometheus Books, 2005. 545 pages. Hardcover; $30.00. ISBN: 159102286X.

The question addressed in this collection of essays is "Did Jesus rise from the dead?" The authors examine such questions as "What did the New Testament writers mean?" "Does historical evidence establish Jesus' resurrection?" "Why would God raise Jesus?" "Was there an empty tomb?" and "What is the significance of the appearance stories?" In dealing with these questions, the authors examine the arguments of Christian apologists and theists. In summary, the authors of this book challenge the traditional orthodox view that Jesus Christ was bodily raised from the dead.

For the most part, the arguments against a literal, physical resurrection of Jesus are not new. Here are some of them: the Gospel accounts are unreliable, the eye-witnesses were partisan, it is contrary to naturalism, it is contrary to logic, it is contrary to history, it is contradictory, it is improbable, it is legendary and mythical, it is absurd, it is unscientific, it has no collateral support, it is inconsistent with the atonement, 1 Corinthians 15 is post-Pauline, much of its evidence is apocryphal, it is based on visions and dreams, it copies pagan resurrection stories, Mark's empty tomb was misinterpreted, hallucinations occurred, the relocation hypothesis is probable, resurrection refutation was unappealing in the first century, Jesus' body was stolen, Jesus' body was not buried Friday but Saturday night, Joseph of Arimathea is a fictional character, the ascension was a fiction developed by Luke, and modern objective scholarship refutes it.

The evidence for all these claims is too detailed and extensive to present in this book review. However, the discussion is directed against the historicity of the empty tomb and the arguments of William Craig Lane, "widely regarded as its foremost contemporary defender" (p. 261). The viewpoints of other writers, including Richard Swinborne, Charles Hodge, Stephen Evans, Peter van Inwagen, Ronald Tacelli and Peter Kreeft, are examined.

This book will perhaps appeal to theologians, philosophers, skeptics, defenders of the empty tomb, and anyone who likes the intellectual word-play of opposing views. The selected bibliography directs the interested reader to further resources which support both sides of the issue. However, for believers in the physical resurrection of Jesus, they will need to seek other sources for support. One of the best (reviewed in *PSCF*) is *The Resurrection of the Son of God* by N. T. Wright.

The book is modestly priced considering its length. It contains fifteen essays, plus indices of ancient sources, modern authors and selected topics. Each author is briefly identified. Robert M. Price, one editor of the book, is editor of the *Journal of Higher Criticism* and author of several

books including *Beyond Born Again*. Jay Lowder, the other editor of this book, is the cofounder and past president of Internet Infidels, an international coalition of nontheists.

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

THE RAPTURE EXPOSED: The Message of Hope in the Book of Revelation by Barbara R. Rossing. New York: Basic Books, 2005. 222 pages. Paperback; $15.00. ISBN: 0813343143.

This book is addressed to people of all ages who are concerned about the biblical book of Revelation and its end-time consequences for today (p. xvii). The author disagrees with dispensational fundamentalists who teach "Jesus is a warrior who kills all those who disagree with him ..." (p. viii). She particularly finds offensive the *Left Behind* series of books by Tim LaHaye and Jerry Jenkins which she considers sheer fiction, dangerous, right-wing, violent, apocalyptic, absolutist, "us-versus-them," politically dangerous, politically extreme, delusional, anti-environmental, mythic, fear-inducing, "an enormous and lucrative end-time industry" (p. xvi), "a cosmic countdown," a "simplistic biblical script," end-times enthusiasm, a rapture-racket, voyeuristic, false, a fantasy, self-centered, "Beam me up theology' (p. 12), Manicheistic, a theology of despair, a drastic scenario, a selfish nonconcern for the world, a diet of fear, false theology, ridiculous, a fabrication, deterministic, false view, vengeful, wrathful, and biblical hopscotch. Included among those who hold and advocate this misguided theology are Hal Lindsey, James Watt, John Nelson Darby, Cyrus I. Scofield, Lewis Chafer, Dallas Theological Seminary, John Walvoord, Charles Ryrie, John Hagee, Anne Coulter, Jack Van Impe, Benny Hinn, Jerry Falwell, and Pat Robertson. It is obvious from Rossing's characterizations of rapture theology that she has quite a large vocabulary and an equally large disdain for the *Left Behind* series of books, the theology they transport, and those who advocate it.

The author acknowledges the crux of the matter in her preface: it is all a matter of how you interpret the Bible. She believes the interpretation of Revelation on which the *Left Behind* series is based is Christian fiction. "Many other Christians read the biblical story differently, and I am one of them" (p. xvii). "What is at stake here is our reading of the Bible. Prophecy novels and televangelists offer people one particular storyline for our world, one reading of Revelation. I seek to offer a very different reading" (p. xviii). "With this book I will make the case for a different interpretation of Revelation and indeed, for a different version of Christianity" (p. 18). Such starkly different opinions of what the Bible teaches point to the question of its perspicuity.

As might be expected in a polemic of this kind, many controversial opinions are offered. For example, Christians who embrace escapist ethics (rapture theology) are not urgent in loving and caring for the world in anticipation of Christ's return (p. 4); early Christians thought they were living at the start of the end-times (p. 16); the rapture was invented 170 years ago (p. 20); temple rebuilding and Israel restoration are not taught in the New Testament (p. 58); biblical prophecy is not the predicting of future events (p. 89); and God does not follow a script (p. 90).

Dispensationalists will not like this book, I suspect; covenant theologians and those who prefer to take the Bible less literally will perhaps revel in it. At any rate, for those who study the Bible and prophecy carefully, there is a good deal to ponder in the opinions of Rossing. If her book motivates readers to study the Bible, perhaps its effect will be salutary.

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

WHAT HAS CHRISTIANITY EVER DONE FOR US? How It Shaped the Modern World by Jonathan Hill. Downers Grove, IL: InterVarsity Press, 2005. 192 pages. Hardcover; $24.00. ISBN: 0820833285.

Has Christianity been more of a liability or more of an asset through the centuries? Its liabilities are well known: witch trials, the Crusades, condemnation of Galileo, justification of slavery, the Spanish inquisition, to mention a few. But what about its assets or positive contributions? Jonathan Hill says there are plenty and he aims to prove it with the research in this book. His approach is not to argue that Christianity is the true religion or that Christianity has done more good than bad. Rather he intends to look at some of the good things Christianity has done, i.e., where Christians got things right. To quote Hill: "Without Christianity, today's world would be very different in many ways, quite apart from the obvious 'religious' ones" (p. 6).

Hill illustrates his point by citing three key contributions often overlooked which Christianity has made to society. They are a strong sense of duty to assist the poor (the Roman Empire had no welfare system); an emphasis upon literacy (Christians started many educational institutions); and a commitment to meaningful stories (*Divine Comedy, Pilgrim's Progress, The Lord of the Rings*). He further illustrates how Christianity has influenced culture, the arts, education, society, the individual and the world.

The book has large print, lots of white space, many photographs, picture acknowledgments, parallel quotes, and an index. The eighth chapter, the last in the book, asks the question: "What will Christianity do for us?" His answer is that the center of gravity of Christianity has shifted from the northern to the southern hemisphere, especially South America and Africa. Future contributions may well originate in those areas, and the church must respond to poverty, hunger, and AIDS so prevalent there.

This is a wonderful book, one which will not only inform, but balance the scale somewhat with Christianity's critics. Christianity started out a minority sect opposed by entrenched power. It is estimated that by the end of the first century there were no more than fifty thousand Christians. Today one-third of the world's population confesses to some form of Christianity. Just as in the past, the world continues to be strongly influenced by Christians who put their faith into action.

Hill, a graduate of Oxford University, has written *The History of Christian Thought* and *Faith in the Age of Reason*.

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

ENCYCLOPEDIA OF RELIGION by Lindsay Jones, ed. Detroit, MI: Macmillan Reference USA, 2005, 2d edition. 15 volumes, 10,735 pages, index. Hardcover; $1,295 set. ISBN: 002865997X.

When Mircea Eliade's edited multivolume *Encyclopedia of Religion* appeared in 1987 it was heralded as a major publishing event in scholarly literature. Lindsay Jones of the Ohio State University has successfully risen to the challenge of producing a substantially revised second edition of this enormously useful reference work. The editor decided to allow the contributing scholars considerable liberty in expressing their ideas and challenging traditional views in light of recent scholarship. The new editorial team exhaustively analyzed the 2,750 entries of the initial edition. First edition authors were invited to revise their entries and update the bibliographies. In instances where the original authors failed to respond for whatever reason, some entries were left unchanged and a 1987 date indicates that no revisions were made. Other entries had minor editorial changes and new bibliographies substituted. Still other entries were judged in need of a substantial revision and a new scholar whose name appears with the original 1987 author(s) undertook this task. Finally, there were some instances where a first-edition entry was considered a classic statement of the field at that point in time and left intact. A further entry was added that augments this earlier piece and may, in some instances, argue for a complete revision of the categories, perspectives, and research that informed the initial entry. In this dynamic way, readers can gain an appreciation for how scholarship about religion is an evolving field of human inquiry. Entirely new entries were also created for this second edition. The entire last volume of this reference work is devoted to various indices and supplementary matter including abbreviations and symbols employed, an appendix of late entries submitted too late to take their proper place in the other fourteen volumes but that thankfully appear here, a synoptic outline of contents, and a 500-page comprehensive index.

This multivolume set is too extensive to adequately review here. ASA members will find a delicious feast of entries related to science, technology, the social sciences, medicine, and religion scattered throughout the encyclopedia. Some sample entries from A–L (some of which are dealt with several times focused on different religious traditions) include Adam, alchemy, animals, architecture, Francis Bacon, bioethics, casuistry, chance, chaos theory, Christianity, cities, clothing, Copernicus, cosmology, cybernetics, Earth, ecology and religion, Albert Einstein, empiricism, ethnoastronomy, eugenics, evolution, fish, the flood, flowers, food, Galileo Galilei, gambling, gardens, gender and religion, genetics and religion, globalization and religion, healing and medicine, health and religion, human body, insects, intelligent design, life, and logical positivism. All the extended entries contain a bibliography that was updated through 2004. In an era when many publishers have raised prices to ridiculous levels, it is a marvel that these 15 volumes can be purchased for just under $1300. This is an essential addition to an institutional library and scholars active in the field of religion will find it worth the cost to acquire it for their personal collections.

Reviewed by Dennis Cheek, Adjunct Professor of Science Education, Penn State Great Valley School of Graduate Professional Studies, Malvern, PA 19355.

Social Science

THE ANONYMOUS GOD: The Church Confronts Civil Religion and American Society by David Adams and Ken Schurb, eds. St. Louis, MO: Concordia Publishing House, 2004. 287 pages, notes. Paperback; $16.99. ISBN: 0758608195.

This book, edited by Concordia Seminary professor David Adams and Lutheran pastor Ken Schurb, contains eleven essays dealing with church/state relationships and American Civil Religion. The perspective is that of the Lutheran Church, Missouri Synod. While the essays will have special interest to persons of that religious persuasion, others will benefit from studying them.

Schurb introduces the question: are the god of Civil Religion and the God of Christianity the same, and, if not, how are they to be distinguished? Quoting from Senator Mark Hatfield and Robert Bellah, Schurb defines the book's goal, that of recognizing the force that civil religion exerts on American Christians. That force, he claims, is pervasive, persuasive, and often destructive.

David Adams begins with "The Anonymous God," one who is a challenge to the Christian God. He argues that this god, developed from Rousseau's 1762 "The Social Contract," has taken on a distinctive American flavor, with "manifest destiny," "American chosenness," and "religious tolerance," resulting in a god with no name, a god that cannot offend, a cosmic Santa Claus.

The second essay, by David Liefield, discusses the Legatis of Athenagoras and the church/state precedents it established. Then Cameron MacKenzie, a Concordia professor, teams with Schurb in a discussion of the writings of Walther, Marty and Meade, all past Missouri Synod thinkers. This will be of only slight interest to non-Lutherans.

"In ____ We Trust, Filling in the Blank," by Professor Joel Okamute, argues that American Civil Religion is an inferior "theology of glory" as contrasted with "true theology" (Theology of the Cross). He has harsh words for those who argue, in the events of 9/11, that "God was there, holding all who die and all who mourn" (p. 159).

Next up is Professor Ronald Feuerhahn's "Patriotism Gone Awry." His historical view covers 2,000 years, culminating in criticism of the Reformed view of a "one kingdom" theology, one which has dominated America. "This explains ... why in America we so often confuse the civic and religious realms ... we are a nation comfortable with syncretism ..." (p. 180). Feuerhahn holds that "true" Christianity must necessarily be an offense. He claims that church leaders, offering advice to the state, are out of line. "The gospel is not spoken to the state because the state is not a community of faith" (p. 184). His conclusion is that pastors ought never participate in civic events in which other religious elements are mixed, for intolerance of error is to be preferred over love of neighbor.

Illinois Professor Alvin Schmidt next takes up a doctrinal sword against America's Civil Religion's new face, polytheism. While civil religion began with the Puritans as "Christian," it devolved to deism by the time of the Revolution, and morphed into polytheism about 1980. It uses

generic words for its god, it never defines him, it magnifies the "American Way," it has its own saints (Washington, Jefferson, Lincoln) and its own shrines (mostly in Washington, DC). Its holy day is July 4 and it holds that the USA is a "god-favored" nation. Schmidt attacks the Masons, the authors of the 1786 Virginia Religious Freedom Act, and even the U.S. Constitution (a hand offered to future polytheists). He concludes by arguing that "faith" is not to be equated with "religion." As an example, the phrase "Hindu religion," is OK; the phrase "Hindu faith" is without meaning. The word "interfaith," he says, is an oxymoron. He concludes with four scriptural arguments forbidding Christians from participating in civil religious exercises.

Adams returns again with "The Church in the Public Square in a Pluralistic Society." Summarizing the preceding essays, he presents ten theses, all keyed to recognizing that American Civil Religion is the state religion, and warning Christians against it.

Two short essays conclude the book. Adams writes about the tensions involved in being a Christian, the experience of living as "strangers in a strange land." He writes at length on "the scandal of particularity," and the need to not confuse the two kingdoms, the church and the secular realm.

Finally, Mark Sell writes on the two kingdom concept. It is best to read this essay first before engaging the other authors, for it is foundational to what they have to say.

I found the book interesting; it gave me insight into some of my Christian brothers with whom I have issues. I recommend everyone read it and Lutherans buy it.

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

Serial Endosymbiosis Theory and the Hierarchy of *rps* Genes

I agree with Michael Buratovich concerning the validity of the serial endosymbiosis theory, and that neo-Darwinian mechanics alone do not explain the grand history of universal phylogeny (*PSCF* 57, no. 2 [June 2005]: 98-113). However, I disagree with the Buratovich hypothesis that the hierarchal transfer of ribosomal protein small unit *(rps)* genes from mitochondrial genomes to nuclear genomes indicates inbuilt Intelligent Design (ID) instead of neo-Darwinian mechanics, where inbuilt ID involves "purposeful forces that are wholly natural in their scope and activity."

Buratovich explains that the hierarchal transfer of *rps* genes relates to the importance of each *rps* gene to the function of the ribosome. This suggests that the hierarchal transfer of *rps* genes relates to the selective advantage of the particular *rps* genes. And basic population genetics probability indicates that the percent of selective advantage of a particular mutation relates to the probability of fixation by natural selection for the particular mutation. Likewise, the percent of selective advantage of particular *rps* genes relates to its probability of fixation that results in gene transfer from a mitochondrial genome to a nuclear genome. This indicates that probabilistic neo-Darwinian mechanics alone could have been responsible for the hierarchal transfer of *rps* genes.

Perhaps the major flaw of the Buratovich hypothesis is that Buratovich seeks to find inbuilt ID other than neo-Darwinian mechanics in the processes of evolutionary genetics. While I encourage an exhaustive search for inbuilt biological ID, I conjecture that biologists will never find inbuilt ID apart from neo-Darwinian mechanics. But outside manipulation may have occurred in natural history.

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Soul-Doctrine

Jeeves and Rüst grant that common soul doctrine is unfounded in Scripture (*PSCF* 57, no. 3 [Sept. 2005] 170–86; 191–201). But both seem concerned over how to discard mythology without becoming heretics. Only in real Protestantism can one suggest that both Plato and Calvin were incompetent on the subject of the Hebrew "soul."

Realizations about Greek ghosts have long existed among the "patently heretical" notions (p. 188) that Siemens (*PSCF* 57, no. 3 [Sept. 2005]: 187–90) is anxious to label and condemn. Tyndale and Luther both taught that the Greek immortal soul doctrine and its dualism are in *clear opposition* to Scripture.[1]

Rüst grants souls only to higher animals. However, the seas brought forth "abundantly the moving souls" during creation (Gen. 1:20). This unique *abundance* suits Cambrian invertebrates.

The meaning of the Hebrew term for living animals—translated "soul"—is in Scripture, not Greek philosophy. Tyndale realized that Greek doctrine steals Christ's argument by which he proved the Resurrection. Abraham is alive, and this *proves* he will physically awaken. No mention is made of the alien notion of ghosts awake in heaven.

Scripture speaks of identity, not a ghost addition. Animals *are* souls. Humans *are* souls. Adam was not given a soul; he *became* a soul. The *religious* "soul" is no more (or less) than "person," "self" or "creature." It includes such abstract, but physically linked realities as thought, feeling and memory— but never *apart* from the physical. The Resurrection is God's anti-Greek declaration of reorganizing this *very same dust*. Humans struggle to accept the audacious claim, primarily because they demand immediate gratification over millennial patience.

Jesus is the *one unique person* ascended to heaven. David is still in his tomb (Acts 2). Further, Paul did *not* offer condolences by claiming the dead to be awake in heaven; instead, he gave assurance that the sleepers would be gloriously awakened—literally. The physicality of resurrection is crucial to the Gospel message. Orthodoxy rejected extreme Gnosticism and came to regard its own moderate infection of the disease as correct.

These articles make little mention of *spirit*, and little is known. The spirit-breath-wind is given up at the sleep of death. Marvelously, the action is reflected physically, and its ephemeral continuance is physical. Jesus' spirit-breath was commended unto God; his *soul* (identity) went to the grave (Sheol or hades, *not* Hell-Fire).

Siemens raises the heresy stakes by charging the "impossibility of accounting for the Incarnation ... something too important to ignore" (p. 190). Trinitarians might fold, but Scripture calls the bluff and raises one Messiah, the Son of Humankind, the *declared* son of God, the man given David's throne, the *unique* High Priest at the right hand of the Almighty. Scripture raises one physical Resurrection of the just and the unjust that "shall be" rather than "is" (Acts 24:15). Siemens' support is the "original version of the Nicene Creed," *originally* a controversial, human-authored *law* that bloodily divided the empire. This tool of tyranny—fashioned three centuries after Christ—is called an "ancient universal creed" (p. 190), though hundreds of equally "ancient" heresies contradict the creed.

The ghost-soul has "called in question" the "Resurrection of the dead" (Acts 24:21). If all believers have gone into the presence of God at their deaths, the monumental importance of Jesus' resurrection is negated. Behind this are indeed the high stakes of deification, which nullifies the Gospel message that God has proved the coming Day of Resurrection for *humankind* (Acts 17:31). Incarnation denies the sign of resurrection and says the explanation is a routine Greek myth. Jesus becomes alive like any resurrected god or immortal soul. It does not matter whether the gardener did it or his wife. Many imply Jesus did it.

Humanity's "image" (*shadow*) and the identity of the Great Light are both obscured behind the *image of deification*. This over-elevation of the shadow of God in humanity is a worship of image. Jesus the perfect *icon* is an image. Worship of the heavenly Son of Humankind on a stake is the same as worship of the brass *image* Moses raised up. Jesus foretold the required symmetry between these events. Greek deification mythology has "changed the glory of the incorruptible God into an image made like to corruptible man," turning Paul's words into prophecy (Rom. 1:23).

Notes

[1]For a presentation of Tyndale's and Luther's views on the subject, as well as a good general overview and a slate of *mostly* correct conclusions, see Mark H. Graeser, John A. Lynn, and John W. Schoenheit, *Is There Death After Life?* (Indianapolis, IN: Christian Educational Services, 1991). Tyndale is quoted at length on pp. 8–9. Luther is quoted on p. 24 and p. 66.

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Did Isaac Oversimplify His Categories?

I fear that Randy Isaac, "From Gaps to God" (*PSCF* 57, no. 3 [Sept 2005]: 230–3), condenses his introduction too much, for he appears to shortchange some areas of natural knowledge and to oversimplify the applicable categories. While it is legitimate to focus on the sciences, he passes too quickly to them as if they form the whole of natural knowledge. However, historical studies seem to be as natural as anthropology, psychology and sociology. Aborigines, though without science in their tribal condition, appear to have a great deal of accurate information about the plants and animals in their environment. Another area that may be included is the foundation of science, like the claim that the universe is understandable. Surely the foundation of empirical knowledge is also knowledge, although it cannot be demonstrated empirically.

As to the categories given, the recognized known, K, is obvious, although human fallibility and the corrigibility of science were not mentioned. What is labeled K is always tentative. With the unknown, Isaac suggests only U_K, what we know that we do not know, and U_U, where we know that we cannot know. An additional subcategory involves what is hidden from us because we do not even have enough information to anticipate it. Examples in the past are Kepler's elliptical orbit of Mars before he painfully worked it out; the range of electromagnetic radiation before the work of Faraday, Maxwell, and several others; $E=mc^2$ before Einstein's publication. Unfortunately, U_H cannot be labeled until after the fact.

An additional category is embedded in the facetious "It ain't what we don't know that gives us the most trouble; it's what we know for sure that just ain't so." Indeed, here are Augustine's view that there cannot be Antipodeans, for they would fall off; Cavendish's dephlogisticated air; Carnot's caloric; and oxygen, because Lavoisier thought it the essential element in acids. In the modern world, we find the belief, notable in Sagan and Dawkins, that science proves atheism. But what is not known because mistaken, U_M, will raise acrimonious debate from those who are sure it is K.

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A closely affiliated organization, the Canadian Scientific and Christian Affiliation, was formed in 1973 with a distinctively Canadian orientation. The CSCA and the ASA share publications (*Perspectives on Science and Christian Faith* and the *ASA/CSCA Newsletter*). The CSCA subscribes to the same statement of faith as the ASA, and has the same general structure; however, it has its own governing body with a separate annual meeting in Canada. Contact CSCA by writing to: Canadian Scientific and Christian Affiliation, PO Box 40086, 75 King St. S., Waterloo, ON N2J 4V1 or visit their web site at: www.csca.ca.

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