

# PERSPECTIVES on Science and Christian Faith

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

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The Noachian Flood: Universal or Local?

Dialectical Realism in Theology and Science

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

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1. Address all manuscripts (except Book Reviews) to: Roman J. Miller, Editor, 4956 Singers Glen Rd., Harrisonburg, VA 22802. E-mail: millerj@rica.net. Submissions are typically acknowledged within 10 days of their receipt.
2. Authors must submit **3 paper copies** (double spaced) for review purposes (an original and two copies) and **1 electronic copy** submitted on a DOS formatted floppy disk or as an email attachment. Typically 2–3 anonymous reviewers critique each manuscript submitted for publication.
3. Use endnotes for all references. Each note must have a unique number. Follow *The Chicago Style Manual* (14th ed., sections 15.1 to 15.426).
4. If possible, include graphics (electronic file preferred) that enhance the theme of the paper. Figures and diagrams not in electronic format should be clear, black and white, line ink drawings or glossy photographs suitable for direct reproduction. Provide captions separately.

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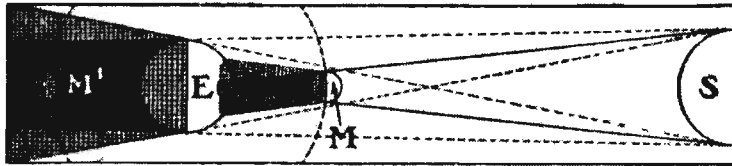
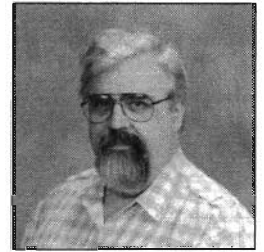
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## Syzygy: Aligning Heaven, Earth, and Faith

During my freshman year in college, I enrolled with some trepidation in a two-semester, six-credit-hour course called "Western Civilization I & II." Fresh out of graduate school, Professor Conrad DiMichele attempted to excite students with the fascination of history. Far more than simply retelling dated historical events, his teaching style was to extrapolate issues and problems from a historical context and recast them into contemporary times. From those classes, I gained insight into the linear progression of historical events and the cycloid of issues that humankind has faced from the dawn of creation through the present.

DiMichele provided an insight into what he called "pre-Adamic human history," humans living before the recorded stories of the Hebrew Scriptures. As a naive nineteen-year-old, I wondered and struggled with this information and feebly tried to reconcile it with the interpretation of the Genesis creation story that I had been taught at home and at church. However, the two streams of thought—human history and the Holy Bible—seemed "out-of-line" and irreconcilable. So who was wrong, DiMichele or my biblicist-oriented pastor?

Evangelical Christians, who accept the Scriptures as God's written Word, are constantly challenged to reconcile their faith system with the books of God—the laws of nature and the scroll of Scripture. Investigation of nature and theology continually uncovers both new accounts of their conformation as well as disturbing evidences of conflict. What is the resolution?

Christians have worked to adjudicate nature and theology in several ways. Some have maintained a "Bible science" and disregarded any evidence of natural science that

seems to conflict with the "biblical evidence." Others have skillfully compartmentalized theology as spiritual reality and natural science as material reality, never allowing the twain to meet. Another approach has made Scripture subservient to science, resulting in a radical reinterpretation of Scripture to fit theology into nature. And finally some have chosen to maintain an equivalent respect for both of God's books, believing that careful reading and interpretation will ultimately result in a harmonious synthesis.

In the regular paper section of this issue, four authors reveal how they harmoniously reconcile Scripture and science. In his treatise on Adam, John McIntyre places this character at a traditional time-line spot, 4000 BC, suggesting that a pre-historical evolutionary line of *Homo sapiens* pre-dated a real person, Adam. Raymond Zimmer presents a natural complementary metaphor, the Ubaid period (5000 BC) along with the evolution of language to frame the biblical story of the Fall. Carol Hill tackles the issue of a "universal" Noachian flood and carefully demonstrates geological and archeological evidence to show that a more limited Mesopotamian flood corresponds to the biblical Noachian flood. Alan Padgett uses a philosophical framework—dialectical realism—to align theology and science. He argues that this approach best provides a framework for a continued dialogue between theology and science.

Read our authors in this issue. In so doing, you can gain an insight on how four Christians have worked to bring their faith, natural science, and the Christian Scriptures into a metaphoric syzygy. \*

Sedulous reading,  
Roman J. Miller, Editor

*Evangelical Christians, who accept the Scriptures as God's written Word, are constantly challenged to reconcile their faith system with the books of God—the laws of nature and the scroll of Scripture.*



## Article

*The Historical Adam*

# The Historical Adam

*The discovery of prehistoric humans has cast doubt on the biblical date for Adam. In this paper, I demonstrate that it was Augustine, and not Scripture, who asserted that Adam was the ancestor of all humankind. By rejecting this assumption of Augustine, Adam can be placed at the biblical date of 4000 BC. Furthermore, by assuming that Adam was one of the prehistoric humans living in 4000 BC, several difficulties with the traditional interpretation of the story of Adam and Eve are eliminated.*

## Adam's Place in History

### The Problem of Adam

Roman Catholic Henricus Renckens said:

If there is one idea to which we must say goodbye once and for all, it is that of the traditional period of four thousand years between Adam and Christ. It is quite certain that this figure is at least ten times too small, the truth being in terms of tens of thousands of years.<sup>1</sup>

In this paper,<sup>2</sup> I will demonstrate that this statement is entirely wrong and that the biblical date of 4000 BC for Adam is historically reasonable. The demonstration will be faithful to both Scripture and the evidence for prehistoric humans implied by Renckens.

To identify the problem of Adam, we first must determine exactly what the biblical story of Adam includes. The story begins in Gen. 2:7: "God formed man from the dust of the ground and breathed into his nostrils the breath of life, and man became a living being."<sup>3</sup> God then places Adam in the Garden of Eden located in Mesopotamia where Eve is made from Adam's rib. Later, Adam and Eve eat of the forbidden tree of the knowledge of good and evil and are banished from the Garden of Eden by God.

*In 1950, John A. McIntyre received a Ph.D. in physics from Princeton University under the supervision of Robert Hofstadter. Subsequently he accompanied Professor Hofstadter to Stanford University where they carried out the electron scattering experiments for which Hofstadter received the Nobel Prize in 1962. After spending six years on the faculty at Yale University, McIntyre went to Texas A & M University in 1963 to direct the nuclear physics research program at the new Cyclotron Institute. In 1995, McIntyre was made Professor Emeritus at Texas A & M University. Jack has served on the Executive Council of the American Scientific Affiliation. As a active fellow in the ASA, he currently is serving on the Editorial Board of our journal. Jack and his wife Madeleine are charter members of a new congregation of the Presbyterian Church of America in Bryan, Texas. His email address is jmcintyre@physics.tamu.edu*

After leaving the Garden, Adam and Eve have children. The Bible lists their descendants with their ages; the date of 4000 BC for Adam and Eve is determined from these data. Also, the Bible gives other information about these descendants that permits correlation between the biblical dates and those from archaeology. Thus, descendants in the seventh generation after Adam are working with bronze in agreement with the beginning of the Bronze Age, about 3500 BC.<sup>4</sup>

But this is not the whole story. In Romans, Paul compares Adam to Christ: "For just as through the disobedience of the one man the many were made sinners, so also through the obedience of the one man the many will be made righteous" (5:19). Here Paul introduces the connection between Adam's disobedience in Eden and all humans becoming sinners. From this connection, Augustine (circa 400 AD) concluded that all humans inherited Adam's sin because Adam was the ancestor of all humankind.<sup>5</sup> This sin, which is inherited by all humans from Adam, is called Original Sin.

This account of Adam and Eve was acceptable until prehistoric humans, *Homo sapiens*, were discovered by the paleoanthropologists. Since these creatures lived more than 100,000 years before Adam<sup>6</sup> and across the surface of the earth, they could not biologically inherit Original Sin from an Adam living in Mesopotamia in 4000 BC.

### The Problem of Adam Today

Renckens is not the only investigator to recognize the difficulties for the interpretation of Genesis raised by the discovery of prehistoric humans. Listed below are four

*The biblical date of 4000 BC for Adam is historically reasonable.*



contemporary examples of difficulties with the interpretation of Genesis and prehistoric humans.

1. *The Council of Trent (1546)*. The following decision of the Council of Trent must be accepted by Catholics as authoritative:

Adam's sin, transmitted by propagation, is present in all humans and is removed only by the merit of Christ.<sup>7</sup>

Since Adam's sin is transmitted by propagation, all humans must be biological descendants of Adam. Consequently, Adam must have lived tens of thousands of years before Christ, as Renckens asserts.<sup>8</sup>

2. *The Westminster Confession of Faith (1647)*. Although their confessions of faith do not have the dogmatic authority of the Roman Catholic Councils, Protestants must still be concerned with the truth of their confessions of faith which were written within a century of the Council of Trent. For example, the *Westminster Confession of Faith* states:

They (our first parents) being the root of all mankind, the guilt of this sin was imputed and the same death in sin and corrupted nature conveyed to all their posterity, descending from them by ordinary generation.<sup>9</sup>

Just as for the Council of Trent, Adam's sin is conveyed to humankind through ordinary generation.

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### *The Roman Catholic and Protestant Confessions of Faith assume that Adam is the ancestor of all humankind.*

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3. *Blocher's "Original Sin" (1997)*. While the Councils and the Confessions continue to pronounce an authoritative understanding of Original Sin, they are creatures of the past. They were written before we were aware of the existence of prehistoric humans. For a contemporary evaluation of the influence of prehistoric humans on scriptural interpretation, we quote from *Original Sin* published in 1997 by evangelical Reformed theologian Henri Blocher:

Though we feel uncomfortable with all the uncertainties when we try to correlate scientific data and the results of a sensible interpretation of Genesis 1-4, we may maintain as plausible the hypothesis that the biblical Adam and Eve were the first parents of our race, some 40,000 years ago.<sup>10</sup>

Again, Adam is the ancestor of all humankind and is dated long before the date of the farmer in Genesis.

4. *Contemporary evangelical Christian research articles concerning the relationship between Adam and prehistoric humans*

(1996-1999).<sup>11</sup> In these three articles, Adam is dated from 400,000 BC to 100,000 BC. In all cases, the dating is selected so that Adam can be the ancestor of all humanity.

In summary, both the Roman Catholic and Protestant Confessions of Faith assume that Adam is the ancestor of all humankind. Furthermore, a significant number of contemporary evangelical Christians concur in this opinion.

### **An Insight from Atomic Physics**

We digress here to recall a situation in atomic physics where an unsuspected assumption led to contradictory results. In 1913 Neils Bohr introduced his model for the atom, a heavy nucleus surrounded by orbiting electrons. This model revolutionized the study of atomic physics by explaining, for the first time, the colors of the light emitted by atoms. However, the model was artificial; the motions of the electrons in their orbits contradicted well-established laws of physics. It was evident that there was a lot of truth in Bohr's model since it gave the colors of the light but clearly something was wrong when the laws of physics had to be violated to describe the electron orbits.

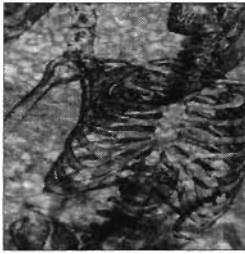
Werner Heisenberg identified the trouble with Bohr's model when, in 1925, he noted that experimental data could be obtained for the colors of the light emitted by the atoms but there was no experimental evidence for the electron orbits. He, therefore, recast Bohr's model of the atom so that only the light colors appeared in the model and the unobservable electron orbits were eliminated. With this new expression of the model, the atom was no longer described by classical mechanics (electron orbits) but by quantum mechanics (probabilities of finding an electron). All of the observations of atomic structure, as well as all of the rest of physics, could now be explained in exquisite detail with the new quantum mechanics.

We now apply Heisenberg's procedure of eliminating unobservables to the problem for the date of Adam.

### **Adam in Eden in 4000 BC**

In the study of nature, an "unobservable" is something that can be talked about but cannot be measured (observed in nature). As discussed above, such an "unobservable" was the orbit of an electron in an atom.

In the study of Scripture, an "unobservable" is something that can be talked about but cannot be observed in Scripture. Such an "unobservable" in connection with Original Sin is the means of the transfer of Original Sin from Adam to humans. Scripture talks about the transfer of Original Sin in Romans 5, but it does not tell us how the transfer occurs. Only a comparison is made: the transfer of sin to humankind through the disobedience of one man, Adam; and the transfer of righteousness to humankind through the obedience of one man, Christ.



## Article

### *The Historical Adam*

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any time.*

The biblical passage does not mention how sin was transferred to humankind by Adam nor how righteousness was transferred to humankind by Christ. In particular, Romans 5 does not say that Adam is biologically related to all humans any more than that Christ is biologically related to all humans. It was Augustine who assumed that Adam was the biological ancestor of all humanity. Augustine's assumption is the "unobservable"; it is not in Scripture, and so it can be rejected.

Neither space nor time is considered in the process of the transfer of righteousness and of sin. Christ could have been crucified anywhere, at any time. And, following the comparison in Romans 5, Adam could have sinned in any place, at any time. Thus, insofar as Romans 5 and Original Sin are concerned, Adam could have lived anywhere and at any time.<sup>12</sup> And, because Adam could have lived anywhere and at any time, we can select for Adam the biblical Garden of Eden in Mesopotamia at the traditional biblical date of 4000 BC. (From now on, we will use "4000 BC" to represent the biblical date.)

According to archaeologists, other prehistoric humans were in Mesopotamia at this time. But the Genesis account also implies the presence of other humans with Adam. Adam's son Cain is concerned that other humans will kill him. Cain finds a wife and builds a city. And in Gen. 6:1, we read: "When men began to increase in number on the earth and daughters were born to them, the sons of God saw that the daughters of men were beautiful, and they married any of them they chose." The sons of God would be Adam's family (in Luke 3, Adam is called the son of God). The daughters of men would be the daughters of the other men in Mesopotamia.

We can object to the assumption that Eve was only one of the many *Homo sapiens* living in 4000 BC. How could "Eve become the mother of all the living" (Gen. 3:20) if other people were living at the same time? The answer is, as Augustine noted, that Eve's relationship to Adam is the same as that of the Church to Christ.<sup>13</sup> Thus, Eve represents the Church that is the mother of all believers. Eve is the spiritual mother, not the biological mother, of all the living.

There appears then to be no reason to doubt biblical history back to the creation of Adam in 4000 BC. This conclusion contradicts Renckens' assertion: "If there is one idea to which we must say goodbye once and for all, it is that of the traditional period of four thousand years between Adam and Christ."<sup>14</sup>

### **"The Creation" in 15 Billion BC**

We turn now to Scripture to extend biblical history back to the beginning of time. This beginning is described in Gen. 2:4: "When the LORD God made the earth and the heavens." After two obscure and controversial verses, the creation of Adam is described in Gen. 2:7: "God formed man from the dust of the ground and breathed into his nostrils the breath of life, and man became a living being." From reading these Scriptures, Augustine confessed: "I own I do not know what ages passed before the human race was created"<sup>15</sup> Augustine recognized, from Scripture alone, a time interval of unknown duration between the creation of the universe in Gen. 2:4 and the creation of Adam in Gen. 2:7.

The duration of this time interval remained unknown until 1965, when the discovery of the cosmic microwave background radiation convinced scientists that the universe has been expanding from a Big Bang that occurred 15 billion years ago. Scientifically, this Big Bang, at the beginning of time, corresponds to the creation of the earth and the heavens in Gen. 2:4. The duration of Augustine's unknown time interval between Gen. 2:4 and Gen. 2:7 is now known to be an enormous 15 billion years. The discoveries of science enrich the history in the Scriptures; they do not change it.

### **Analysis of Adam's Place in History**

Adam's place in history at 4000 BC has been securely established. The scientific discrepancy with this Genesis date, resulting from the discovery of prehistoric humans, has been removed by recognizing that Augustine, not Scripture, asserts that Adam is the ancestor of all humankind. The Big Bang, 15 billion years ago, has been located in Gen. 2:4 with Adam's creation in 4000 BC appearing in Gen. 2:7. Biblical history extends seamlessly from Abraham in 2000 BC, back through Adam in 4000 BC and, finally, to the creation in 15 billion BC.

With Adam and Eve in the Garden of Eden in 4000 BC, we can read the Bible as a historical book just as Jesus and the Apostle Paul did. We no longer need to decide whether the record of Adam and Eve is a myth or a saga or an aetiological account. Taking the biblical record at face value as did Jesus and Paul, Adam died when Noah's father was 56 years old and Noah died when Abraham was 60 years old. Thus, the events in the Garden of Eden were reported directly by Adam to Abraham with only Noah and his father as intermediaries. And, with Abraham, we have reached historical memory. It is reasonable to believe in the historicity of Adam and Eve in the Garden of Eden in 4000 BC.

The historicity of Adam and Eve is based, then, entirely on the biblical record. The additional evidence from science confirms and enriches this record; it does not alter it.

## Adam as an Evolutionary Man

As seen above, both the Scripture and the scientific evidence agree on Adam's place in history. We turn now to the scriptural and scientific evidence for the nature of Adam himself. Of course, we could accept the traditional Adam of the Christian church. However, in a remarkable way, the recognition that humans have an evolutionary inheritance clarifies the scriptural account of Adam and Eve. I will demonstrate how the recognition of humanity's evolutionary inheritance removes gaps or puzzles associated with the traditional Adam. It is almost as though the Author of Scripture, the Holy Spirit, always knew about humanity's evolutionary nature while the interpreters of Scripture who created the traditional Adam were, of course, ignorant of evolution.

In this part, we derive from Scripture the story of Adam and Eve, assuming that Adam is a man who has inherited an evolutionary nature.

### The Creation of Adam

The account of Adam's creation is a typical expression of God acting in history. And when Scripture describes God acting in history, natural historical events are also occurring. For example, in the historical Book of Judges, Scripture says: "God gave Israel into the hands of the Midianites" (6:1). This action of God corresponded to the historical occurrence of the Midianites invading Israel from the desert on their camels.

The formation of Adam from the dust of the ground corresponds, then, to a historical event. Gen. 2:7 says that "God breathed into the man the breath of life and he became a living being." In 1 Corin. 15:47, Paul quotes this passage and associates Adam as a "living being" with his physical nature as "the dust of the earth." Even more to the point, Gen. 1:30 associates the same "breath of life" found in Adam with "the breath of life" found in "all the beasts

that move." Thus, as Calvin noted, both the animals and Adam have the "breath of life."<sup>16</sup> Genesis implies then a close, even an evolutionary, relationship between Adam and the animals. This observation leads us to the historical event associated with God's creation of Adam.

This historical event would be God's selection of one of the prehistoric creatures (*Homo sapiens*) living at the time of Adam's creation.<sup>17</sup> God placed this selected Adam in the Garden of Eden to be the representative of all humanity.<sup>18</sup> In like manner, 2000 years later, God would select another man, Abraham, and direct him to Canaan to be the father of his chosen people.

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Scientifically, Adam was originally an evolutionary *Homo sapiens* who was formed from the dust (atoms) of the Big Bang. The formation of Adam extended over a period of 15 billion years, from the production of the atoms in the Big Bang, through the coagulation of these atoms into the sun and the earth and finally, to Adam himself. Paleontologists, however, define *Homo sapiens* as modern man on the basis of his fossil characteristics. Thus Adam, the *Homo sapiens* selected by God, was not yet a religious man with a conscience.

As the reference above to God's actions in the Book of Judges demonstrates, God's selection of an existing *Homo sapiens* to be Adam is compatible with God's historical procedure. Even for the incarnation of the Son of God, Mary was selected to carry Jesus in her womb. In contrast, the traditional Adam of the creeds was created directly as an adult from the dust of the ground.

### Adam Becomes a Sinner

**Adam sins by disobeying God's command.** God placed Adam, the *Homo sapiens*, in the Garden of Eden and commanded him not to eat of the tree of the knowledge of good and evil. But Adam and Eve were evolutionary creatures, with natural drives and desires. They were clever animals behaving according to their instincts. They never before had been given a command requiring obedience. Eve, with her evolutionary nature, naturally responded to the attractiveness of a fruit that was "good for food and pleasing to the eye, and also desirable for gaining wisdom" (Gen. 3:6). Consequently, she (and Adam) ate the



## Article

### *The Historical Adam*

*The key to the comparison of Adam to Christ is that Adam is a pattern for Christ. ... The assertions about Adam are just the inverse of the assertions about Christ: Adam disobeys, Christ obeys; Adam produces sin, Christ produces righteousness.*

fruit. They yielded to their evolutionary desires and sinned by disobeying a direct command of God.

**Adam became a slave to sin.** When he ate of the forbidden tree, he acquired the knowledge of good and evil. God's law was now written on his heart so that he would sin whenever his natural instincts contradicted God's law because "through the law we become conscious of sin" (Rom. 3:20). Thus Adam was no longer simply a clever animal. He became a slave to sin because his evolutionary instincts were at enmity with God's law written on his heart.

#### **All Humans Become Sinners**

We have followed the course of Adam's sin as it is given in Genesis. Some four thousand years later, Paul picks up the account of Adam's sin and relates it to the sins of all humankind (Rom. 5:12–21). The reason for this delay in the scriptural account of Adam's sin is that the implications of Adam's sin could not be understood before the occurrence of Christ's death on the cross. For, just as the effects of Christ's death and resurrection were imputed to many, so the effects of Adam's sin were imputed to many. It is only from this comparison of Adam to Christ, that we can understand how Adam's sin was imputed to all humankind.

**Adam, a Pattern of Christ (Rom. 5:14).** The key to the comparison of Adam to Christ is that Adam is a pattern for Christ. An example of a pattern is the mold used to form the shape of an iron casting. The liquid iron is poured into the mold and, after cooling, the hardened iron casting is obtained. The shape of the resulting casting is related directly to the shape of the mold except that the shapes are the inverse of each other. Where the casting has a bulge, the mold has an indentation.

Paul uses this relationship between the mold and the casting in his comparison of Adam to Christ. For example, in Rom. 5:19, Paul compares the disobedience of Adam (the mold) to the obedience of Christ (the casting) and asserts that through Adam the many were made sinners (the mold) and through Christ the many will be made righteous (the casting). The assertions about Adam are just the inverse of the assertions about Christ: Adam disobeys, Christ obeys; Adam produces sin, Christ produces righteousness.

Paul uses this casting-mold relationship to explain the imputation of Adam's sin to all humankind. Since Scripture reveals more about Christ than about Adam, we begin our comparison between the two by considering first the "Case of Christ."

**The Case of Christ (the casting).** Christ obeyed God to make humans righteous (Rom. 5:19). Christ's obedience had two components: his death and his resurrection.<sup>19</sup> Through Christ's death, humans were justified (Rom. 3:24). They were made righteous in God's sight though their sinful nature was not changed.<sup>20</sup>

Through Christ's resurrection, humans were given a new life and became slaves to righteousness (Rom. 6:18). God applied this new life to humans by "writing his laws upon their hearts" (Heb. 8:10) and "by giving them the Holy Spirit to teach them all things" (John 14:26). Thus believing Christians have, not only the laws of God written on their hearts, but also the Holy Spirit as a constant guide for applying these laws to their lives.

**The Case of Adam (the mold).** Rather than obeying God, Adam disobeyed God to make humans sinners (Rom. 5:19). Christ's obedience had two components: leading humans (1) to be declared righteous and (2) to become slaves to righteousness. Applying the mold-casting relationship between Adam and Christ, we conclude that Adam's disobedience led to the two inverse results: humans (1) being declared sinners and (2) becoming slaves to sin.

Adam's disobedience of a direct command of God, not to eat of the tree, led God to declare all humans to be sinners. Just as, across space and time, Christ's act of obedience made Abraham righteous,<sup>21</sup> so did Adam's act of disobedience make the prehistoric American Indians and the Australian aborigines sinners. And just as there was no biological connection between Christ and those he "made righteous," there was also no biological connection between Adam and those he "made sinners." This universal sin, credited to all humankind by God, is Original Sin. The presence of this sin in infants, who themselves have not sinned, explains the practice of infant baptism, a symbol of the removal of the Original Sin and its consequent punishment by eternal damnation.



The second component of Adam's disobedience led humans to become "slaves to sin" (Rom. 6:17). The Original Sin of the preceding paragraph does not change people's actions. Yet a person's sinful actions are apparent to all, leading Reinhold Niebuhr to say: "The doctrine of Original Sin is the only empirically verifiable doctrine of the Christian faith."<sup>22</sup> However, it is humankind's slavery to sin that is empirically verifiable, not the Original Sin that is restricted to the judgment of God.

When Adam disobeyed God and ate of the tree of the knowledge of good and evil, this knowledge of good and evil (God's law) was written on his heart. This law then condemned Adam's natural evolutionary desires and made Adam a slave to sin. Since Adam's disobedience makes all humans sinners (Rom. 5:19), all humankind become slaves to sin through having the law of God written on their hearts as Rom. 2:15 confirms.

### Problems Solved with Adam as an Evolutionary Man

The traditional understanding of the creation of Adam is given, for example, in the *Westminster Confession of Faith* of the Presbyterian Church:

After God had made all other creatures, he created man, male and female, with reasonable and immortal souls, endued with knowledge, righteousness, and true holiness after his own image, having the law of God written in their hearts, and power to fulfill it; and yet under a possibility of transgressing, being left to the liberty of their own will, which was subject to change.<sup>23</sup>

In this traditional description of humankind's creation, a human is created as righteous and without a history. Hardly a greater contrast could be found than the Adam presented in this article: a prehistoric man with an undisciplined evolutionary nature. I now demonstrate that the evolutionary Adam is more closely identified with Scripture than the traditional Adam of the *Westminster Confession*.

**How Adam could sin.** The disobedience of Adam in the Garden of Eden has been an enigma throughout the history of the church. Because Gen. 1:26 states that "man was made in the image of God," the *Westminster Confession* asserts that Adam was created with "true holiness," yet "under a possibility of transgressing." The problem is how Adam could have true holiness and yet transgress.

Calvin addresses this problem in his *Institutes of the Christian Religion*:

Nor was it reasonable for God to be constrained by the necessity of making a man who either could not or would not sin at all. Such a nature would, indeed, have been more excellent. But to quarrel with God on this precise point, as if he ought to have conferred this upon man is more than iniquitous, inasmuch as it was in his own choice to give whatever he pleased.<sup>24</sup>

Calvin admits that God could have made Adam more excellent; however, we should not question God that he did not do so.

The recognition of the evolutionary inheritance of Adam removes this difficulty. The realization that Adam and Eve were simply creatures following their evolutionary instincts explains why they sinned in the Garden. They were not "holy, yet under a possibility of transgressing."

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*Adam's sin had two components: his disobedience of a direct command of God and his acquisition of the knowledge of good and evil. The first component led to the Original Sin for all humankind, the second to all humans becoming slaves to sin.*

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**The clarification of Adam's sin.** It was shown above that Adam's sin had two components: his disobedience of a direct command of God and his acquisition of the knowledge of good and evil. The first component led to the Original Sin for all humankind, the second to all humans becoming slaves to sin. As a result of the Original Sin, humans are declared to be sinners by God, and are liable to God's punishment. Because of their slavery to sin, humans lead "the empirically verifiable" sinful lives noted by Reinhold Niebuhr.<sup>25</sup>

These two components of Adam's disobedience (the mold) correspond to the two components of Christ's obedience (the casting). Because of Christ's death, humans are declared to be righteous by God; because of his resurrection, humans become slaves to righteousness.

However, these two components of Adam's disobedience are not recognized by the traditional account of Adam's sin. The *Westminster Confession of Faith*, e.g., says only: "men fell from their original righteousness and communion with God, and so became dead in sin."<sup>26</sup> The writers of the *Confession* could not know that, because of his evolutionary nature, Adam would become a slave to sin when he ate of the tree of the knowledge of good and evil.

**Humankind's "Flesh."** An important theme in Scripture is the struggle between man's evolutionary nature and his knowledge of good and evil. For example, Paul writes: "I know that nothing good lives in me, that is, in my flesh."<sup>27</sup> For I have the desire to do what is good, but I cannot carry it out" (Rom. 7:18).



*Paul's "flesh" is inherited from his evolutionary parents while Paul's desire "to do what is good" is acquired from Adam's eating from the tree of the knowledge of good and evil. The scientific discovery of evolutionary humans thus clarifies, but does not change, the scriptural account of the struggle with the "flesh."*

## Article

### *The Historical Adam*

From his own experience, Paul recognizes that he has a nature at enmity with God's law; Paul calls this feature of his nature, the "flesh." Traditionally, the origin of the "flesh" has been traced back to Adam's sin: "men fell from their original righteousness and communion with God, and so became dead in sin."<sup>28</sup> Yet, according to Scripture, Adam is punished for his sin against God in the Garden of Eden through the frustration of his labor. There is no indication in the scriptural record of the Garden of Eden that Adam's nature is changed from "true holiness with the possibility of transgressing" to the "flesh."

How different is the situation if humans have an evolutionary inheritance. Paul's "flesh" is inherited from his evolutionary parents while Paul's desire "to do what is good" is acquired from Adam's eating from the tree of the knowledge of good and evil. The scientific discovery of evolutionary humans thus clarifies, but does not change, the scriptural account of the struggle with the "flesh."

**The Biological Connection to Adam.** Over the course of the centuries, two scriptural verses, Acts 17:26 and Psalm 51:5, have been used to support the Augustinian biological connection between all humankind and Adam. I show here that these verses can be interpreted to accommodate evolutionary humans not related biologically to Adam.

"From one man he made every nation of men, that they should inhabit the whole earth" (Acts 17:26). Here, we have reference to evolutionary humans becoming true humans when they acquired their consciences (the knowledge of good and evil) through Adam's sin. This knowledge of good and evil was imputed to all humankind through the disobedience of the one man Adam (Rom. 5:19). Until Adam had eaten of the tree of the knowledge of good and evil, evolutionary humans were simply clever animals without sin.

"Surely I have been a sinner from birth, sinful from the time my mother conceived me" (Ps. 51:5). Here, David is referring to the Original Sin imputed to all humans because of Adam's disobedience to a direct command from God (see "The Case of Adam (the mold)," p. 154). As Rom. 5:19 says: "through the disobedience of one man, the many were made sinners." There is no hint of any biolog-

ical connection between Adam's disobedience and sinful humans.

### **Analysis of Adam as an Evolutionary Man**

The scriptural account of Adam and Eve has been interpreted with the assumption that humans have an evolutionary nature. Adam is a man selected by God from among the *Homo sapiens* just as Abraham was selected from among the Chaldeans. Adam's evolutionary nature led to his disobedience in Eden. And, Adam's disobedience made all humans sinners (Rom. 5:19) in two respects.

First, Adam's disobedience of God's command led to all humans being declared to be sinners. This is the Original Sin suffered by all of humankind. Second, Adam's acquisition of the knowledge of good and evil put God's law on all humans' hearts. This law condemned humankind's natural evolutionary actions so that all humans became "slaves to sin."

### **Summary**

Two issues have been discussed. In "Adam's Place in History," we learn that the assumption that Adam is the ancestor of all humans is unscriptural. By rejecting this assumption, Adam can be located in history at the scriptural date of 4000 BC while the creation of the earth and the heavens occurs at the scientific date of 15 billion BC.

In "Adam as an Evolutionary Man," the sin of Adam in the Garden of Eden is interpreted while recognizing humankind's evolutionary inheritance. This recognition clarifies and enriches the scriptural account of the origin of humankind's sin. In particular, it clarifies the two-fold nature of Adam's sin: the Original Sin of disobedience to a commandment of God and the slavery to sin through the acquisition of the knowledge of good and evil. \*

### **Notes**

<sup>1</sup>Henricus Renckens, S.J., *Israel's Concept of the Beginning* (New York: Herder and Herder, 1964), 36.

<sup>2</sup>This paper was presented at the 2001 Conference of the American Scientific Affiliation, July 20-23.

<sup>3</sup>The New International Version of the Bible (NIV) has been used for the Scripture references.

<sup>4</sup>*New Columbia Encyclopedia*, s.v. "Bronze Age."

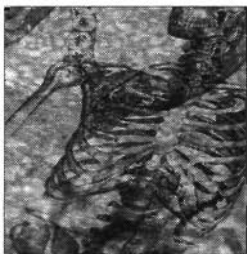
<sup>5</sup>St. Augustine, "The City of God," in *Great Books of the Western World* 18 (Chicago: Encyclopaedia Britannica, 1952), Book XIII, chap. 14.

- <sup>6</sup>See e.g., *The Cambridge Encyclopedia of Human Evolution*, 400.
- <sup>7</sup>Jerry D. Korschmeier, *Evolution and Eden* 43, no. 3 (New York: Paulist, 1998).
- <sup>8</sup>Renckens, *Israel's Concept of the Beginning*.
- <sup>9</sup>*Westminster Confession of Faith* (Richmond: Board of Education, 1969), chap. VI.3.
- <sup>10</sup>Henri Blocher, *Original Sin* (Grand Rapids, MI: Eerdmans, 1997), 42.
- <sup>11</sup>Allan J. Day, "Adam, Anthropology and the Genesis Record," *Science and Christian Belief* 10 (1998): 115-43; Glenn R. Morton, "Dating Adam," *Perspectives on Science and Christian Faith* 51 (87-97): 1999; and David L. Wilcox, "Adam, Where Are You?" *Perspectives on Science and Christian Faith* 48 (1996): 88-96.
- <sup>12</sup>As a Roman Catholic, Renckens (see note 1) is committed to the Augustinian explanation of Original Sin as formulated by the Council of Trent. This explanation assumes that Adam is the biological ancestor of all humankind. As Renckens concludes, this explanation contradicts the biblical date for Adam. However, many Protestant theologians, even in the nineteenth century, considered Adam to be the representative of all humans for Original Sin, not the biological source of Original Sin (see Charles Hodge, *Commentary on the Epistle to the Romans* [Grand Rapids, MI: Eerdmans, 1950]). For these theologians, Adam would not be required to be the ancestor of prehistoric humans and Adam could live in 4000 BC. However, Protestants appear still to believe that Adam was the biological ancestor of all humans. Consequently today, because of the presence of prehistoric humans, many Christians consider the story of Adam and Eve to be a myth (see e.g., R. J. Berry, "This Cursed Earth: Is 'the Fall' Credible?" *Science and Christian Belief* 11 (1999): 29-49, note 6).
- <sup>13</sup>St. Augustine, *The Literal Meaning of Genesis* (New York: Newman, 1982), book 10, note 85.
- <sup>14</sup>Renckens, *Israel's Concept of the Beginning*.
- <sup>15</sup>St. Augustine, "The City of God," in *Great Books of the Western World* 18 (Chicago: Encyclopedia Britannica, 1952), Book XII, chap. 16.
- <sup>16</sup>John Calvin, *Commentaries on the Book of Genesis* (Grand Rapids, MI: Eerdmans), chap. 2, v. 7.
- <sup>17</sup>Berry has also made a somewhat similar suggestion, "This Cursed Earth," 39.
- <sup>18</sup>See e.g., Charles Hodge, *Commentary on the Epistle to the Romans*, chap. 5, v. 12, fourth class of interpreters.
- <sup>19</sup>John Murray has considered the two effects of Christ's death and resurrection in *The Imputation of Adam's Sin* (Grand Rapids, MI: Eerdmans, 1959), 39 and 89.
- <sup>20</sup>See e.g., Charles Hodge, *Commentary on the Epistle to the Romans*, chap. 3, v. 20.
- <sup>21</sup>Charles Hodge, *Systematic Theology* (Grand Rapids, MI: Eerdmans, Photolithographed), Part III, chap II, § 6.
- <sup>22</sup>Quotation from Henri Blocher, *Original Sin* (Grand Rapids, MI: Eerdmans, 1997), 84.
- <sup>23</sup>*Westminster Confession of Faith*, chap. IV.2.
- <sup>24</sup>John Calvin, *Institutes of the Christian Religion*, John T. McNeill, ed. (Philadelphia, Westminster, 1960), Book I, chap XV.8.
- <sup>25</sup>Henri Blocher, *Original Sin*.
- <sup>26</sup>*Westminster Confession of Faith*, chap. VI.2.
- <sup>27</sup>We use "flesh" from the RSV instead of "sinful nature" from the NIV because we are claiming that the evolutionary nature is not sinful in itself.
- <sup>28</sup>*Westminster Confession of Faith*, chap. IV.2.

## Books Received and Available for Review

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

- Ian G. Barbour, *Nature, Human Nature, and God*, Fortress Press, 170 pages, 2002
- Connie Barlow, *The Ghosts of Evolution: Nonsensical Fruit, Missing Partners, and Other Ecological Anachronisms*, Basic Books, 220 pages, 2001
- Melvin Benarde, *You've Been Had: How the Media and Environmentalists Turned American into a Nation of Hypochondriacs*, Rutgers University Press, 300 pages, 2002
- S. Bonting, *Chaos Theology: A Revised Creation Theology*, Novalis, 104 pages, 2002
- Taner Edis, *The Ghost in the Universe: God in Light of Modern Science*, Prometheus Press, 324 pages, 2002
- Donald Fernie, *Setting Sail for the Universe: Astronomers and Their Discoveries*, 200 pages, 2002
- M. L. Greenhut & J. G. Greenhut, *Science and God: Our Amazing Physical and Economic Universe ... Accidental or God Created*, University Press of America, 180 pages, 2002
- J. A. Hobson & J. A. Leonard, *Out of Its Mind: Psychiatry in Crisis*, Perseus Publishing, 290 pages, 2001
- James E. Huchingson, *Pandemonium Tremendum: Chaos and Mystery in the Life of God*, The Pilgrim Press, 230 pages, 2001
- Stephen Kellert & Timothy Farnham, *The Good in Nature and Humanity: Connecting Science, Religion, and Spirituality with the Natural World*, Island Press, 280 pages, 2002
- John Kifner, et al., eds., *Cutting-Edge Bioethics: A Christian Exploration of Technologies and Trends*, Eerdmans, 200 pages, 2002
- Clif Matthews, *When Worlds Converge: What Science and Religion Tell Us*, Open Court, 400 pages, 2002
- William Nesbitt, *The Illusion of Time: Seeing Scripture through Science*, Black Forest Press, 180 pages, 2002
- Sten Odenwald, *Patterns in the Void: Why Nothing Is Important*, Westview Press, 270 pages, 2002
- Susan Quinn, *Human Trials: Scientists, Investors, and Patients in the Quest for a Cure*, Perseus Publishing, 295 pages, 2001
- W. M. Richardson, ed., *Science and the Spiritual Quest: New Essays by Leading Scientists*, Routledge, 265 pages, 2002
- Richard Schlagel, *The Vanquished Gods: Science, Religion, and the Nature of Belief*, Prometheus Books, 349 pages, 2001
- Esther Sternberg, *The Balance Within: The Science Connecting Health and Emotions*, Freeman and Company, 250 pages, 2001
- David Toole, *At Home in the Cosmos*, Orbis, 250 pages, 2001
- Robert Whitaker, *Mad in America: Bad Science, Bad Medicine, and Enduring Mistreatment of the Mentally Ill*, Perseus Publishing, 320 pages, 2001
- James A. Wiseman, *Theology and Modern Science*, Continuum, 175 pages, 2002



## Article

*A Possible Natural Complement to the Story of the Fall*

# A Possible Natural Complement to the Story of the Fall



*My art strives to elucidate a binding of the two accounts [early chapters of Genesis and the evolutionary record], the product of which may transcend the properties of either account.*

*The story of the Fall may be regarded as an association between a local event and its global consequences. This association will be denoted by brackets as {local : global}. {Genesis 2:4–4:26 : Romans 5:12–14} is one association belonging to the story of the Fall. The purpose of this article is to propose a natural {local : global} association that complements {Genesis 2:4–4:26 : Romans 5:12–14}. The binding of these two complementary associations yields a deeper appreciation of our current human condition.*

In 1999, I presented a talk to the ASA Conference at John Brown University in Siloam Springs, Arkansas titled "A Possible Change in the Dynamics of Human Evolution that Complements the story of the Fall." The presentation contained two key phrases: (1) "a possible change in the dynamics of human evolution" and (2) "a change that complements the story of the Fall." The first phrase pertains to anthropology and the second phrase pertains to Christian aesthetics. Thus, this work is part of an artistic project that, in the course of development, raises a scientific hypothesis. The goal of this article is to describe my project, the hypothesis that it generates, and a way that the hypothesis complements the story of the Fall.

In biochemistry, the word "complement" means both "adds to" and "gives functionality to." For example, a complement may be a nonprotein molecule that, upon binding, transforms a particular protein into an enzyme. The enzyme exhibits characteristics that transcend the properties of each unbound molecule. In both aesthetic and pragmatic terms, a complement and its biomolecule are "made for" each other.

The metaphor of complement describes an aesthetic point of view. For the biochem-

ist, the binding of complements is beautiful. The bound molecules are more than the sum of the parts. Binding yields a functionality that neither part could achieve alone. My artistic project endeavors to apply this metaphor of complement to the early chapters of Genesis and the evolutionary record. One may consider the project as an exercise in Christian concordism that pursues the ambiguous question: If the early chapters of Genesis and the evolutionary record pertain to a single reality, then how would they match?<sup>1</sup> The question is ambiguous because each set of "origin stories" is enacted on a stage built on exclusive assumptions.<sup>2</sup> Each "origin story" comes from a different tradition, history, and world experience. If each "origin story" points to a single reality, then that reality reveals itself to modern Christians as a strange, two-sided accounting that seems to me like a complement and its biomolecule.<sup>3</sup> My art strives to elucidate a binding of the two accounts, the product of which may transcend the properties of either account.

## A {Local : Global} Association

This article presents a concordist natural complement to the story of the Fall. For my purposes, we will regard the story of the Fall as an association of ideas. This association will be called {local : global} even though one could just as well call the association {single incident : universal consequences}. For ease of reading, brackets will be used to denote

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each association. The first compartment will be the local aspect; the second will be the global.

The local aspect for the biblical association is depicted in Gen. 2:4–4:26. The Bible has many expressions of the global aspect. We will choose the view expressed by Paul in Rom. 5:12–14. In the following sections, we will describe a natural {local : global} association that complements this biblical association. The complement is shown in its entirety in figure 1. The description begins by exploring the complement between the local aspects of each association, proceeds to the proposal of a natural association, and then concludes with pictures of how the global aspects complement.

### Complement for the Local Aspect

How does Gen. 2:4–4:26 “match” the evolutionary record? The story of Adam and Eve points to ancient Mesopotamia. In “The Garden of Eden: A Modern Landscape,” Carol A. Hill deduced that the four rivers of Eden were real rivers that flowed on a modern landscape before Noah’s flood.<sup>4</sup> Although the purpose of her article was to refute Flood Geology, her carefully constructed argument supports the idea that the mythic Adam was located in prehistoric southern Mesopotamia. Similar conclusions were reached by Juris Zarins of Southwestern Missouri State University<sup>5</sup> and independently, by Faurouk El-Baz of Boston University.<sup>6</sup> Both anthropologists were fascinated by the coherence between the mythic descriptions and the actual ancient landscape. They discussed their fascination with journalists, which is why the references are popular magazines. Both anthropologists thought that the naming of the four rivers locates Eden on the northern coast of the Persian Gulf during the Wet Neolithic, which lasted from 7000 to 4500 B.C.

These dates mean that the founding of the story took place long before the writing of the story. Presumably, the story was transmitted by oral tradition for at least two thousand years. By the time the stories of Adam and Eve and of Cain and Abel were committed to writing, the Wet Neolithic had long ended and two of the four rivers had become dry wadis. The references as to what goods came down each river may well have been added to the story during the Ubaid or later Uruk periods, which occurred prior to the desiccation of southwestern Asia. We know that organized long-distance trade was practiced during these periods.

Dick Fischer likewise placed Adam early in southern Mesopotamian prehistory.<sup>7</sup> He concluded that the children of Adam somehow interacted with the Ubaid, based on the similarity of the names of Adam and his descendants to the founding names of the Sumerian king lists.<sup>8</sup> The Ubaid was the first culture in a sequence of prehistoric cultures of increasing social complexity. The Ubaid preceded the Uruk. The Uruk preceded Sumerian civilization.

The occupations of Cain and Abel yield another indication of interaction. Each sibling practiced a different aspect of the economy of the Developed Neolithic. The Developed Neolithic followed the revolution in human production that came from combining agriculture and stockbreeding.<sup>9</sup> The combined economy was well established by the time the Ubaid culture settled in southern Mesopotamia.

Finally, as Fischer further noted, even though Adam and Eve were the only humans in the garden, they clearly were not once outside the garden. After the Lord God confronted Cain concerning Abel’s death, Cain wondered about being slaughtered by strangers. Cain then went to the land of Nod and took a wife. His offspring became powerful to the point of arrogance. They founded various economic specialties. Enoch founded a city.<sup>10</sup>

The success of Cain’s progeny reminds me of trends toward social complexity that emerged during the Ubaid period.<sup>11</sup> The Ubaid was one of the first cultures—perhaps the first—to develop what might be called “unconstrained complexity.” That is, the increase in social complexity was so unconstrained that it produced a completely novel structure: civilization.

In sum, the local aspect of the story of the Fall matches the location, time, and development of the Ubaid culture of southern Mesopotamia. From this footing, we can wonder whether there might be a global association to the development of the Ubaid culture that would complement the global aspect of the story of the Fall. The proposal of a natural global aspect is both artistic, from the point of view of Christian concordism, and scientific, since it presents a hypothesis subject to falsification.

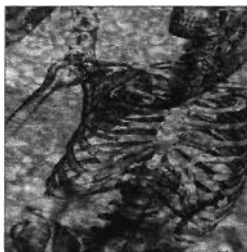
### A Global Association to Ubaid

The Ubaid was perhaps the first Neolithic society to exhibit indications of unconstrained complexity. There are many examples of these indications. One example is found at a single excavation site at Eridu. Excavators found a series of temples built one over the other, of more and more monumental proportions, and based on a single original Ubaid architectural design. Such a progression in monumental architecture had never appeared before in human evolutionary history. Earlier complex Neolithic

Complement		
Association	Local	Global
	Biblical	Natural
	Gen. 2:4–4:26	Ubaid cultural development
Association	Global	Natural
	Rom. 5:12–14	Psychological consequences of change in linguistic sign system

Figure 1. A natural association complements a biblical association.





*The Ubaid was perhaps the first Neolithic society to exhibit indications of unconstrained complexity. ... The term "complex" refers to multiple-level hierarchies, relatively rapid innovation, and exclusive social and economic specialization. ... The qualifier, "unconstrained," denotes a progressive increase in hierarchical power, innovation, and specialization.*

## Article

### *A Possible Natural Complement to the Story of the Fall*

cultures, such as Jericho and Catal Huyuk, which were remarkable in architectural achievements, were not "unconstrained" as the Ubaid was.<sup>12</sup>

Another example is the cultural expansion of the Ubaid. The villages of the Hassuna and Samarra cultures settled throughout northern Mesopotamia by way of division and resettlement, the traditional method of Neolithic cultural expansion. These cultures gave way to the Halaf, which showed signs of increasing social complexity. Then, around 4500 BC, the already complex Ubaid suddenly expanded into the region and apparently took over Halaf villages.<sup>13</sup> Whether the change in artifacts was due to conquest or conversion, this type of cultural expansion was a novel development in human prehistory. However, it is one familiar to history.

We find more indications in the subsequent Uruk period. The Uruk gave rise to the first towns, large-scale irrigation projects, standardized units of measure, and so forth.<sup>14</sup> There were so many "firsts" during the Uruk and subsequent Sumerian civilization that Samuel Noah Kramer titled his book on the subject *History Begins at Sumer*.<sup>15</sup> This cascade of developments in southern Mesopotamia makes the Ubaid and its descendent cultures particularly interesting to anthropologists.

Archaeologist Robert Wenke, in *Patterns of Prehistory*, captured the Ubaid's appeal to the anthropologist in his chapter on the origins of complex societies in Southwest Asia. In the chapter's header, he quotes Isa. 13:19–22. Isaiah prophetically envisioned the city of Babylon as a great rubbish heap, picked over by doleful creatures, such as archaeologists and tourists. Thousands of years later, Wenke reflected on that heap, and saw a puzzle to be solved, saying:

Five thousand years ago, when most of the world's people were dirt-poor illiterate farmers or hunters and gatherers, and when the peoples of the New World were still thousands of years from village life, Babylon and its surroundings were a cosmopolitan world of cities, libraries, schools, shops, international trade, roads, taxes, temples, and many of the other elements we identify with "civilization" ... Southwest Asian culture is so rich, so

ancient, that it almost defies ... interpretation. ... scholars have long sought some general sense of why and how these societies developed as they did, and why this part of the world was the first to produce complex cultures, and why the basic pattern of development in ancient Southwest Asia was repeated in most of its essentials in Egypt, the Indus Valley, China, Mesoamerica, Peru and perhaps elsewhere.<sup>16</sup>

Wenke envisioned the possibility of a grand narrative that explains the emergence of unconstrained complex society throughout the world. The term "complex" refers to multiple-level hierarchies, relatively rapid innovation, and exclusive social and economic specialization. This is in contrast to "band-level" societies that are characterized by lack of hierarchies, comparatively slow innovation, and restrained division of labor. The qualifier, "unconstrained," denotes a progressive increase in hierarchical power, innovation, and specialization. The Ubaid culture underwent a transition from band-level to unconstrained-complex prior to 4500 BC.<sup>17</sup>

Modern anthropology's pursuit of this grand narrative reminds one of the mythic medieval search for the Holy Grail. Prior to the 1960s, anthropologists found that no single material factor was common to the formation of all known (unconstrained) complex societies. Since each society followed a unique path of development, no universal arrangement of material causes could be discerned.<sup>18</sup>

The failure of material causality led anthropologists in the 1960s and 1970s to describe the characteristics of a cultural cause, if one existed.<sup>19</sup> The cultural transition must raise the cost of "band-level" or local-order social controls, and it must lower the cost of "complex" or higher-order social controls. To date, no cultural change has been proposed that meets these criteria.

If the story of the Fall has a natural global complement, then what better cultural change than one that meets the above criteria? But how do we get a handle on what this change could be? Since the stories in Gen. 2:4–4:26 complement the beginning of this transition, we might begin by creatively re-imaging these stories with this cultural

change in mind. Two features of these stories are evocative in this regard.

First, the Adam and Eve story tells of the start of language. Adam named the animals. He named Eve "mother of all living." Adam, the founder, spoke both literally and metaphorically. A spoken command and a deceptive line of logic lie at the core at the drama of disobedience. The crucial roles that language plays in the biblical drama point to the start of language *as we know it*. This leads us to wonder, in the above context: Did those living at the dawn of the Ubaid culture, such as the folks that the mythic Cain married into, speak language *as we do not know it*? This question is interesting, especially in light of the fact that, until recently, deaf people were suppressed from signing because it was not considered to be an appropriate way of talking. It was strange. It was language *as we do not know it*. So teachers of the deaf would not allow it. But deaf signing is language. William Stokoe ruined his life to demonstrate that very point.<sup>20</sup>

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*This cultural change [in language practices from "form X" to "language as we know it"] and the resulting development of complex society constitute a break with previous human evolutionary history.*

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Second, the success of Cain's progeny in the land of Nod allows us to imagine that Cain brought with him the cultural change that potentiated the irreversible and innovative social and economic specialization of the Ubaid and later cultures. Cain had something that the people of Nod lacked. The myth of Cain's departure suggests that this "something" was neither a tangible object nor a technical skill. This "something" could have been a new way of thinking or, in line with the first point, a new way of talking.

This artistic entanglement of anthropology and the early chapters of the Bible calls to mind an association between changes in communication or transportation and historical epochs noted by University of Chicago historian William McNeill.<sup>21</sup> The association may be crudely phrased as: Whenever a new way of "walking" or "talking" came to be widely practiced, the social structure of the society changed in response. The inventions of the chariot and of the train each made a new society possible. The inventions of writing and of the radio did the same. Consequently, Gen. 2:4-4:26 clues our imagination into the notion that a cultural change in language practices from "form X" to "language as we know it" potentiated the formation of

unconstrained complex society. This cultural change and the resulting development of complex society constitute a break with previous human evolutionary history.

## The Evolution of Talk and the Emergence of Complex Society

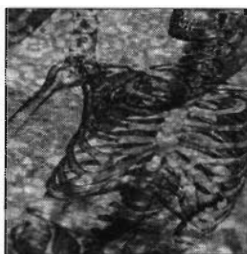
What "way of talking" preceded the way we talk today? How did the change make complex society possible? These questions are addressed by a scientific hypothesis, which appears in the journal *Semiotica*.<sup>22</sup> An outline of the hypothesis follows.

Typically, when we think of the word "talk," speech-alone comes to mind. But there is also sign language for the deaf. American Sign Language (ASL) is a way of talking as linguistically rich as speech-alone. Consequently, we can separate the evolution of talk from the evolution of language *per se*. Moreover, ASL is a different sign system than speech-alone.<sup>23</sup> We will call this sign system "hand-talk." The difference in sign systems between "hand-talk" and "speech-alone talk" is at the heart of the hypothesis.

The term "language" concerns the capacity of humans to talk. Language, essentially, is a primary modeling system devoted to the rapid processing of intentional signs through both meaning and syntax.<sup>24</sup> That is, language is a cognitive system that makes sense of talking. Since specialized regions of the human brain facilitate this task, it has been argued that language must be phylogenically ancient.<sup>25</sup>

What "form of talk" facilitated the evolution of language in species ancestral to humans? In *Gesture and the Evolution of Language*, Sherman Wilcox, David Armstrong, and William Stokoe argue that hand-talk was the medium through which language evolved.<sup>26</sup> Once language evolved, selection pressures favored the addition of speech as a way of talking, because speech has technical advantages over manual-brachial gesture. This does not mean that the voice was not used for expression by species ancestral to humans, only that language, the ability to talk, evolved first as hand-talk and then later—perhaps with the appearance of anatomically modern humans—speech was added as a way of talking. The semiotician Thomas A. Sebeok put it succinctly: "... language developed as an adaptation; whereas speech developed out of language as a derivative exaptation ..."<sup>27</sup>

This gives rise to the question: Did speech completely replace hand-talk with the emergence of anatomically modern humans? The answer is, "Probably not." In *Do You See What I Mean?* Brenda Farnell described the Plains Sign Talk of the Assiniboine people of North America.<sup>28</sup> In *Sign Languages of Aboriginal Australia*, Adam Kendon reported on the sign language of aborigines in the North Central Desert of Australia.<sup>29</sup> While these monographs focused on



*From the start  
of our species  
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Developed  
Neolithic, all  
human cultures  
practiced hand-  
speech talk ...  
Then, the  
hand-talk  
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hand-speech  
talk was  
dropped prior  
to the  
emergence of  
complex  
society, leaving  
speech-alone  
talk to be  
practiced in all  
unconstrained  
complex  
societies.*

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the use of sign, these cultures actually practice both sign and speech, which I will call "hand-speech" talk. In these cultures, either sign or speech is used for talking, such as giving directions and telling stories. These uses go far beyond the popular stereotype of "sign talk" as a way to communicate among different tribes. Hand-talk is part of the social fabric in these cultures. The use of sign or speech or both depends on the social context. For example, an Australian aborigine widow whose husband has recently died is forbidden, by taboo, from speech and therefore relies only on hand-talk.<sup>30</sup>

Returning to the concept of the evolution of talk, the following observations must be weighed. No extant cultures practice hand-talk alone. Native cultures of the North American Plains and of Australia, both relatively uninfluenced by modern civilization, currently practice hand-speech talk. All unconstrained complex and civilized societies practice speech-alone talk. These facts suggest that the evolution of talk followed the steps shown in Table 1.

If this table reflects the evolution of talk, then a transition from hand-speech talk to speech-alone talk is implicated in the emergence of complex society. The last two rows of Table 1 are the most important. From the start of our species to the Developed Neolithic, all human cultures practiced hand-speech talk, as natives of North America and Australia presently do. Then, the hand-talk component of hand-speech talk was dropped prior to the emergence of complex society, leaving speech-alone talk to be practiced in all unconstrained complex societies. This suggests that a change in the way humans talk potentiated the development of complex society.

#### Semiotics

This change in "the way humans talk" also was a change in linguistic sign systems. Semiotics is the study of signs initiated in the modern era by Charles Sanders Peirce, among others.<sup>31</sup> Since both hand-speech talk and speech-alone talk may be regarded as sign systems, semiotics is the appropriate field to describe their different natures. Peirce stated that every sign consists of a representamen (or sign), an object, and an interpretant. For example, consider a fellow

walking in the African grassland. He spies a certain set of footprints, turns and runs back to the village. Here, the footprints are a representamen. Let us say that a lion had recently walked by. To the fellow, these footprints are an indicator or index of a nearby lion. The lion is the object of the sign. The fellow's recognition is the interpretant. The interpretant accounts for his course of action. It explains his sense of urgency. It explains his fear. The interpretant may contain both cognitive and emotive qualities.

According to Peirce, natural signs typically exhibit one or more of three semiotic qualities: icon, index, and symbol.<sup>32</sup> Icon is the quality associated with similarity, caricatures, and features: "That child has her mother's smile." Index is the quality associated with pointing, symptoms, and correlations: "Where there is smoke, there is fire." Symbol is the quality of cultural association, law, and causality: "The flag stands for the nation." Although these qualities are related to each other hierarchically, each evokes a different set of qualities or of "senses of ..." <sup>33</sup> Using the above examples, we note that icon evokes a sense of recognition; index, a sense of correlation; and symbol, a sense of identification. In addition, each example evokes an emotion, such as family love, caution, and pride, respectively.

The intentional signs of hand-speech talk and of speech-alone talk contain a different blend of each of these three qualities. These are listed in Table 2. The semiotic qualities of hand-speech talk were strongly flavored by manual-brachial gestures, or the hand-talk component. In ASL, iconic and indexal aspects are easily recognized.<sup>34</sup> These aspects gave hand-speech gestures a feeling of "natural" meaning. As in the example of the fellow in Africa mentioned above, the speaker and listener uncritically recognized each sign—or word—as signing its referent either directly or through similarity. The hand-sign word for "lion" indicated the animal as intuitively and as magically<sup>35</sup> as a footprint in the wet earth or the twitch of an ear in tall grass.

In contrast, speech-alone talk primarily exhibits the quality of symbol. Symbols, although conventional, can seem arbitrary. For example, when considering French and English, the association of the sound "livre"

or “book” with a particular category of objects seems arbitrary. At the turn of the twentieth century, Ferdinand de Saussure revolutionized linguistics when he separated the signifier (acoustic image) from that which is signified (concept) and claimed that the relationship between the two was arbitrary.<sup>36</sup> The development of European thought from Saussure’s idea provides a lesson about speech-alone talk.

Saussure made his claim at a time when a movement toward the abstract in Western art and thought admitted an association between the terms “conventional” and “arbitrary.”<sup>37</sup> When you think about it, from within any particular culture, Saussure’s association makes no sense. Within a culture, we do not experience our conventions as arbitrary. Saussure’s counterintuitive association only makes sense when you make comparisons between languages. Despite this, his association inspired later developments in European philosophy.<sup>38</sup>

In European postmodernism, the arbitrary association between signifier and signified was interpreted to indicate that the construction of that association was an act of power. Put crudely, conventions indicate acts of power. Even the most introductory of books on postmodernists Jacques Derrida<sup>39</sup> and Michel Foucault<sup>40</sup> make this point. One could just as well have made the claim that convention indicates cooperation, since most words are adopted voluntarily. The particular emphasis on power in European postmodernism is a historical development. Today, a community of scholars focus on the question: Since the relationship between signifier and signified is arbitrary, who determines the meaning of words? We can accept the community at face value or we can ask: How did this community of scholars come to be? Was it “power” or “cooperation”? Or does it exist because Saussure named

the arbitrary relationship between signifier and signified? The postmodern use of Saussure’s thesis exemplifies the weird ability of speech-alone talk to construct social “reality” through the acts of naming and interpretation. This ability comes from the symbolic nature of words in speech-alone talk.

The qualities of symbols include the arbitrary, the conventional, and social construction. These qualities are significantly different from the iconic and indexal qualities of “form X,” hand-speech talk. As shown in Table 3, the qualities of each “way of talking” are related to other qualities. This list allows us to understand that each “way of talking” generates different interpretative points of view and feelings that, in turn, might influence the way that we signify nature, work, self, and society. Here, we can draw an intuitive link among the semiotics of the “way we talk,” the psychological experience of linguistic meaning, and social ideologies. By flavoring the way we experience signification in language, the qualities of each “way of talking” constrain the expression of social ideologies.

The qualities of hand-speech talk induce personal experiences that favor egalitarian band-level ideologies. For example, holistic and gestalt-oriented signification conflate possibly conflicting distinctions among self, society and nature. This experiential conflation coheres with tribal ideologies held by cultures presently practicing hand-speech talk. Brenda Farnell reported some stunning examples within the hand-speech talking cultures of the North American Plains Indians.<sup>41</sup> For example, movement generates meaning. Movement itself is the primal image for life that unites mind and body in action. Tribal social organization is visualized as a series of nested circles of motion. The order of society patterns the order of nature, the going and the coming of days, of birds, and of seasons.

Type of Talk	Epoch	Development
Hand-talk	ancestral to <i>H. sapiens</i>	neural structures for linguistic processing of intentional sign: primary modeling system
Hand-speech talk	<i>H. sapiens</i> through Paleolithic and Early Neolithic	geographical expansion of band-level societies
Speech-alone talk	Developed Neolithic to present	emergence of unconstrained-complex societies

Table 1.

Type of Talk	Model	Main Semiotic qualities
Hand-talk	sign language for deaf; ASL	index, icon, narrative; non-arbitrary relationship between signifier and signified
Hand-speech talk	sign and speech languages of natives of North America and Australia	similar to hand-talk
Speech-alone talk	Saussure’s linguistics	symbol; arbitrary relationship between signifier and signified

Table 2.



*Hand-speech words were not adept at dissecting, analyzing, or manipulating meaning. Yet they were more eloquent than any spoken word in the way they brought together meaning and emotion into a moment of signification. ... Meaning comes through definition. Definitions can dissect, analyze, and manipulate meaning.*

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Similarly, Kendon noted that hand-speech talk plays a role in cooperation and conflict avoidance for the aborigines of the North Central Desert.<sup>42</sup> Social coherence in band-level society has always been more a matter of cooperation than control (as opposed to civilization, where control—such as laws, decrees, contracts and institutions—plays a significant social role). Social ideologies that are holistic, expressive, playful, and magical, such as the dreaming of the aborigines of Australia, support cooperative action in these relatively nonhierarchical societies.

In contrast, the qualities of speech-alone talk do not as readily generate experiences supporting band-level ideologies. The senses of analysis, synthesis, and mechanism open our eyes to distinctions among nature, self, and society. These experiences of signification call to mind the ideologies of division and hierarchy expressed in all civilized societies, including our own.<sup>43</sup>

The transition from hand-speech talk to speech-alone talk opened the door to the expression of novel social ideologies that raised the cost of band-level social controls and lowered the cost of higher-order controls. In this way, a cultural transition in the “way we talk” meets the criteria for a cultural change capable of potentiating unconstrained complex society.

#### **The Natural {Local : Global} Association**

Let us now associate the above hypothesis with the emergence of unconstrained complex society in the Ubaid culture. The Ubaid appears to be the one of the first societies to realize speech-alone talk because it exhibited the traits of unconstrained complexity very early.<sup>44</sup>

#### **The Global Complement**

What about the psychological consequences of this change in the quality in linguistic signification? They resemble the disorientation and alienation inherent in what Christians call “Original Sin.” The disorientation comes from the different ways that each “way of talking” references the real. With hand-speech talk, humans sensed a “natural” connection between the word and the signified

object. Hand-speech words were recognized, not defined. Since the sense of recognition is holistic, the nuances of each word were folded into the gesture. For example, a sign for two and a sign for heart convey “doubt.” A sign for hugging means “love.” A sign to give and a gesture to all signifies “charity.” Like the holistic characters of Chinese ideographic writing, hand-speech words were not adept at dissecting, analyzing, or manipulating meaning. Yet they were more eloquent than any spoken word in the way they brought together meaning and emotion into a moment of signification.

In contrast, while we are inclined to think that the meaning of spoken words comes through recognition, it does not. Meaning comes through definition. Definitions can dissect, analyze, and manipulate meaning. Consider “doubt,” “love,” and “charity.” The definitions of these words are the products of a historical process that is, at any moment in time, convention. As seen in the example of what happened with Saussure’s naming of “arbitrary,” definitions influence behavior and construct social “reality.” That is why the definitions of words are such a point of contention. Is “doubt” a sign of social incompetence? Will a prescription of drug #9 enhance “love”? Is a politician giving away taxpayer’s money an act of “charity”?

Our spoken words dissect. They break apart the whole by naming the parts. Our spoken words analyze. They assign meaning to each part. Our spoken words synthesize. They bring the parts together. But each step is arbitrary. We do not know the unintended consequences of each process. We have no rules or guidelines to help us. For every set of definitions that leads to clarity, there are many equally attractive sets that lead to opacity. My definition of “doubt,” “love,” and “charity” may help me win a grant on social incompetence, sell a drug, or get re-elected. It may plunge you into darkness.

At the same time, we cannot live without the benefits of speech-alone talk. How can we put away the social and technical advances that we have developed over the past few millennia? We are disoriented, and yet, despite our confusion, we become more and more dependent on the fruits of social complexity.



So far, the discussion has only scratched the surface of the psychological consequences of this change in linguistic sign systems. The transition is both a curse and a gift. In the following sections, we will develop these ideas by way of snapshots. This series of pictures will take us from the present, through the vision of Adam and Christ depicted in Paul's letter to the Romans, and into the story of the transgression of Adam and Eve. We may artistically consider this progression of snapshots to be akin to images of a complement binding to its biomolecule.

### Postmodernism as an Example

Postmodern thought explores the ambiguous power of speech-alone talk. The modern project, which desired to name and construct a world of "objective" relations, ultimately could not impose itself on the abundance of reality.<sup>45</sup> "Reality" could not be reduced to objective relations. The attempt killed millions. It disoriented Western culture and Christian religion. We are in anguish about the meaning of science and how science was used to build societies without soul. Who could ever imagine that humans could be machines?

Postmodernism seems like a thousand hands either pulling back from the dying flames—there is no "truth"—or reaching forward to grasp a fading ember—if it worked for them, it will work for me.<sup>46</sup> The name "deconstruction" captures the confounding of words and meanings that follows the ill-fated construction of the modernist Tower of Babel. One wonders whether science, the bricks and mortar of the modern project, will be left like an abandoned ziggurat in the sands of time.

The proposed hypothesis places science in perspective. Science, after all, is formally a method of naming that is based on naturalistic assumptions.<sup>47</sup> The object of investigation is broken into component parts by denoting the parts with arbitrary symbols, such as constants and variables. The question then becomes whether operations performed on the symbols match, or explain, the behavior of the object of investigation. The attempt to match the symbolic operations to the behavior of the investigated object makes science a particularly productive language game. However, because science exists within the bounds of the semiotic system of speech-alone talk, the symbols that science forms may be later de-formed. The late Paul Feyerabend, in *Conquest of Abundance*, poignantly captured the downside of the construction of meaning made possible by science, and by extension, speech-alone talk.<sup>48</sup> Trouble awaits whenever a mechanism for the way the world works is extended into an exclusive metaphor for the way the world is.

At the same time, the upside of science cannot be ignored. The formation of meaning by science has improved the lot of humankind. The same can be said for the formation of meaning in certain social movements that preceded science, such as Judaism, Greek philosophy, Buddhism, Taoism, Christianity, Islam, and many other social movements that preach and search for universal insights. One can argue that the formation of meaning from these movements has deepened and widened the abundance of human "reality." For better or for worse, our naming constructs "reality." Our words can lead us to disaster or epiphany.

Signified	Signifier Hand-Speech	Speech-alone
Nature	<ul style="list-style-type: none"> <li>• action and thing often same word</li> <li>• part indicates whole</li> <li>• gestalt-oriented</li> <li>• holistic</li> <li>• narrative</li> </ul>	<ul style="list-style-type: none"> <li>• action property of thing</li> <li>• part named irrespective of whole</li> <li>• distinction oriented: names of parts are arbitrary</li> <li>• fragmented</li> <li>• definitional</li> </ul>
Work	<ul style="list-style-type: none"> <li>• hand-talk signs learned by imitation and mimicry</li> <li>• words defined intuitively, almost by magic</li> <li>• action defines words</li> </ul>	<ul style="list-style-type: none"> <li>• words learned by rote and association</li> <li>• technical vocabulary is constructed, not intuitive</li> <li>• words construct action and "what is possible"</li> </ul>
Self	<ul style="list-style-type: none"> <li>• words are embodied, the body not separate from the mind</li> <li>• self indicated through pointing</li> <li>• formal name signs attributes or narrative</li> </ul>	<ul style="list-style-type: none"> <li>• words disembodied</li> <li>• pronouns defined by convention</li> <li>• formal names assigned by convention</li> </ul>
Society	<ul style="list-style-type: none"> <li>• use of hand-talk or speech depends on social context</li> <li>• social relations indicated by holistic signs</li> </ul>	<ul style="list-style-type: none"> <li>• single channel for talking</li> <li>• social relations may be defined in same way as work</li> <li>• distinctions easy to name</li> </ul>
Overall	<ul style="list-style-type: none"> <li>• holistic</li> <li>• gestalt-oriented</li> <li>• natural</li> <li>• magical</li> </ul>	<ul style="list-style-type: none"> <li>• technical</li> <li>• distinction-oriented</li> <li>• conventional</li> <li>• constructive</li> </ul>



## Article

### *A Possible Natural Complement to the Story of the Fall*

#### The Letter to Romans

Paul's use of the word "death" with "sin" in Rom. 5:12-14 has confounded moderns. After all, if "death" entered into the world with Adam, then he must have lived before the primordial soup, or, at least, at the start of human evolution.<sup>49</sup> Paul's writing seems to indicate a problematical mode of transmission for "Adam's sin." For that reason, modern theologians have re-examined Rom. 5:12-21.<sup>50</sup> The proposal of this complement may assist that re-examination.

Paul may have included the word "death" in this passage for two reasons. First, he may have thought that all humans were literally descended from Adam. This constitutes a mode of transmission. Second, the word "death" is central to the story of the Fall of Adam and Eve. The psychological effects of a transition to speech-alone talk changes our appreciation of Paul's words by suggesting an alternate reading that is more consistent with our modern experience, thousands of years in Paul's future.

First, the natural complement suggests a method of transmission. Adam's sin is transmitted through culture. Today, there is no turning back from speech-alone talk. No society is hidden from the influence of speech-alone talking civilizations. Humans cannot forgo the wealth and power that come from being able to take apart, analyze, and reassemble physical and social "reality" through the semiotic system of speech-alone talk. Since each human must learn language, there is no escape from transmission, short of creating a "wolf" child. In this, transmission tracks reproduction.

Second, we civilized folk look at the few remaining hand-speech talking cultures, like the Australian aborigines and the North American Assiniboine, with a heart of longing, as if they know an innocence that we no longer have. They know what "death" is. We do not. On our own, we do not really know what anything is. Even scientific knowledge comes marked with the label "use provisionally until falsified or modified." Our words are not connected to their referents in the way they are in hand-speech talk, that is, as they were before the dawn of unconstrained complex society.

The consequences that flow from the symbolic quality of speech-alone talk recall a

familiar appreciation for Paul's use of the words "sin" and "death" in Rom. 5:12-14. The word "sin" complements our naming and construction of a false "reality"; the word "death," the consequence.<sup>51</sup> Paul notes that sin entered the world through a singular event, death ruled through sin, and Jesus was the next singular event that redeemed the first. From the perspective of the natural complement, we might say that speech-alone talk was adopted in a unique cultural transition that founded a new epoch for humanity. Speech-alone facilitated novel human constructions of natural and social "reality" based on arbitrary, willful, and exclusive word definitions. These novel social constructions were capable of producing serious mischief. But, all is not lost. Speech-alone talk also places us in a position to discover insights and appreciate revelations that anchor our naming in a completely new way. In this brave new world, Jesus, the new Adam, tethers our words to a reality that is not of our own construction.

Romans 5:12-14 notes that sin and death were in the world before the law was given, but sin was not counted where there was no law. In complement, prior to the adoption of speech-alone talk, aggression, conflict, disease, deception, and death were experienced through the medium of natural linguistic signs. There was no "law" as we know it. The meaning of these events was communicated through the magic of natural signs. Once those qualities of experience were less available with the irreversible and expanding adoption of speech-alone talk, from Adam to Moses so to speak, the types of disorientation and alienation that we are familiar with today became increasingly possible. Humans profited by their strange ability to divide and re-assemble the world. Marginal increases in social complexity resulted in economic gain. Eventually, the old way of talking was ignored and forgotten as continued developments in social and labor specialization generated a new world of wealth and power. This new world, the Sumerian civilization, wrote the first "law" as we know it. That is, law written by human hands.

With Moses, God gave the law. The law was a step forward, but suffered the same weakness as all acts of speech-alone talk. The law could be re-defined. The words became more important than the Word.

*In this brave  
new world  
[of speech-alone  
talk], Jesus,  
the new Adam,  
tethers our  
words to  
a reality  
that is not  
of our own  
construction.*

The one-to-come turned out to be a sign, a human, who provided a new narrative and gestalt experience to the words "sin" and "death." From the perspective of this natural complement, Jesus provided meaning that allows us to construct a "reality" that transcends the lack of meaning—or arbitrariness—inherent in the purely symbolic sign system of speech-alone talk. Jesus is the second Adam. He binds what the other loosened. The Resurrection is the sign that answers the rhetorical question, "What is death?" that arises when we read Rom. 5:12–14 in light of human evolutionary history. We can define "death" narrowly as "when brain activity permanently ceases." Or, we can use the word to mean "when the soul leaves the body." Or, we can use the word to mean "when the soul is separated from its Creator." We see each way of dying in the Gospel stories of the passion of Christ: "My God, my God, why have you abandoned me?" (Matt. 27:46); "Father, into your hands I commend my spirit" (Luke 23:46); and "It is finished" (John 19:30). The story of the Passion does not allow Christians to separate these meanings of "death."

### The Story of Adam and Eve

What type of meanings "came to be" through the use of hand-speech talk? If one looks at the list of various qualities of hand-speech talk in Table 3, one cannot help but notice that these are similar, if not identical, to many of the qualities that moderns use to describe both "religious" and "natural" thought. Word and "reality," the secular and the divine, were experientially confused in the same manner that footprints are signs of the animal that made them. The world of our prehistoric ancestors was correspondingly magical. Everything was a sign. As for the nature of our own words, we may consider the references to "death" in Gen. 2:4–4:26. In doing so, we see a modern drama within the ancient myth.

God's warning to Adam, that eating from the tree of the knowledge of good and evil would lead to death, sounds straightforward enough. God taught Adam to name the animals. The animals were natural signs. Death was, too. Death was a holistic experience, the gestalt of cessation of breath. Adam was not disposed to ask, "What is death?" as he might have asked, "What is knowledge?" Adam essentially lived in a world where his speech-alone talk was magically experienced in the same way as hand-talk. Eve was of like mind, for when the serpent—more subtle than any other wild creature that the Lord had made—talked, Eve did not realize the issue it was addressing: "What is 'death'?"

We are reminded of Pontius Pilate asking, "What is 'truth'?" At the time, Pilate was merely saying that spoken words are defined by both convention and evocative referral to personal experiences. Your convention may not be the same as mine. Even worse, your "truth" may be an evocative referral to your own personal experience, and you may desire to make your "truth" the convention. That

change may lead to either greater clarity or opacity; to the formation or deformation of meaning. It is not my business to judge. I wash my hands of the question of the meaning of "truth."

The denial in Pontius Pilate's rhetorical question echoes the denial by the serpent as it spoke to Eve: You will not die. Why? The meaning of "death" is constructed. It is whatever you say it is. By eating of the fruit of the tree of knowledge, you will realize this. Your eyes will be opened. "Death" is what you make of it, just like good and evil are whatever God makes of them.

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*Eve regarded the tree in a new light that was simultaneously conventional and natural. Since "death" and the fruit were experienced as defined signs rather than natural signs, the question arose in her mind as to what value should be assigned to them. The serpent suggested new values ...*

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Thus the serpent presented "death" as a logical sign, a sign speaking to the intellect, and severed the magical link between "death," "knowledge," the Lord God, and the fruit.<sup>52</sup> Eve regarded the tree in a new light that was simultaneously conventional and natural. Since "death" and the fruit were experienced as defined signs rather than natural signs, the question arose in her mind as to what value should be assigned to them. The serpent suggested new values, saying that "death" was God's fear that Eve would be as knowing as God and that the fruit caused God's wisdom.

The serpent's deformation of meaning is characteristic of the semiotics of speech-alone talk. A spoken word is just a symbol. Symbols are arbitrary in quality. In this, the spoken word may fool us. We intuitively want to recognize the word's meaning, not to follow its definition. When we yield to our intuition, we allow ourselves to recognize an arbitrary or conventional definition as real. In doing so, we unwittingly construct order. We may then act on that created order. It does not matter whether the construction is formative or deformative. "Reality" follows the word. In this way, the serpent constructed an alluring new and false "reality." Did Eve even have a chance at figuring it out?

Eve re-defined the meaning of the fruit and acted. Upon consumption, the fruit seemed to return the favor. Eve became aware that the natural sign of her own body could



*The natural association is {the early appearance of trends toward unconstrained complexity in the Ubaid culture : the psychological consequences of a change of semiotic system inherent in a transition of the "way humans talk" that potentiated the formation of unconstrained complex society}.*

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be seen, analyzed, commented upon, plucked, and consumed. She was naked, alone, aware that her determination of the meaning of the fruit was not what God made of it. She was torn from her moorings and consumed with apprehension. From the perspective of the natural complement, Eve had died to the way of natural linguistic signs, under the guidance of the serpent, who knew that the word "death" was defined by convention and had resolved to impose its own will as convention. But, unlike us, the serpent knew what the consequences would be.

## Conclusion

This artistic project wrestles with science (the evolutionary record) and God (the biblical stories) in order to "bind" these natural and revealed ways of knowing as a complement that increases our understanding of human evolutionary development, alters our awareness of the nature of both science and postmodern thought, and deepens our appreciation of the story of Adam and Eve as well as Rom. 5:12-14. The productivity of this "binding" is a sign of the single reality that sustains both accounts.

A concordist "match" may be found in the complement of two {local : global} associations, one biblical and one natural. The biblical association, here termed the story of the Fall, includes {Gen. 2:4-4:26 : Rom. 5:12-14}. The natural association is {the early appearance of trends toward unconstrained complexity in the Ubaid culture : the psychological consequences of a change of semiotic system inherent in a transition of the "way humans talk" that potentiated the formation of unconstrained complex society}. The hypothesis and the complement should influence both natural and Christian thought.

With respect to natural thought, the hypothesis demonstrates the value of separating the evolution of talk from the evolution of language. The hypothesis integrates semiotics into the biocultural sciences by claiming that semiotic qualities constrain social ideologies. The hypothesis reflects the importance of Peirce and Saussure. Peirce articulated the triadic nature of signs and explored the qualities of natural signs. Saussure brought attention to the quality of arbitrariness in speech-alone talk. The hypothesis opens a new point of view in his-

torical studies by highlighting the importance of understanding the influence of technology on the semiotics of talk and the experience of meaning. The hypothesis provides a new perspective on the postmodern association among naming, meaning, and social construction. Finally, the hypothesis proposes that we, today, are separated from our ancestors by a semiotic chasm.

With respect to Christian thought, this hypothesis presents modern Christian theologians with a novel insight into the economy of salvation by providing a way to look at the stories in Gen. 2:4-4:26 with the evolutionary record in mind. The complement brings these stories to life. It is as if these stories describe the initiation of a cultural change that altered the course of human evolutionary history.

The complement also provides an intersection between postmodern aesthetics and Christian realism. The story of the Fall maps onto the postmodern assertion that the choice of one word forces the exclusion of other words. To speak a word is thus an act of power. Indeed, the ideas presented here agree that our words construct "reality," even when that "reality" is harmful.

The complement brings postmodernism through the transgression of Adam and Eve to the sacrifice of Jesus. Jesus is the answer to our new human condition. Jesus is the Word that we cannot name, the "reality" that we cannot construct, because this Word is God. At the same time, Jesus is the Word that we are to name as we construct our own "reality." This is the Word that constructed us. All things were made through him. In him was the life, and the life was the light of humans. The light shines in the darkness, and the darkness has not overcome it. And what is the darkness? It rolled off the tongue of the serpent, whose speech constructed a "reality" where Eve was seduced into reaching out, then plucking, the idea that she could determine the meaning of God's creation. \*

## Notes

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## Upcoming ASA Conferences

**July 25-28, 2003:** Colorado Christian University, Lakewood, CO  
Topic: Astronomy and Cosmology  
Theme: "The Heavens Declare the Glory of God"  
Program Chair: Jennifer Wiseman  
Local Arrangements Chair: David Oakley

**July 23-26, 2004:** Trinity Western University, Langley, BC Canada  
Topic: Neuroscience  
Program Co-Chairs: Heather Looy, CSCA and Kenneth Dormer, ASA  
Local Arrangements Chair: Judith Toronchuk

**Aug. 5-8, 2005:** Messiah College, Grantham, PA  
Theme: "Energy, Conservation and the Environment"  
Program Chair: Kenell Touryan  
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Local Arrangements Chair: Hessel Bouma III





## Article

*The Noachian Flood: Universal or Local?*

# The Noachian Flood: Universal or Local?



*All of the evidence, both biblical and scientific, leads to the conclusion that the Noachian deluge was a local, rather than universal, flood.*

*The biblical and scientific evidence pertaining to the subject of a universal versus local Noachian Flood are discussed in this paper. From a biblical perspective, a universal flood model (and its corollary models: flood geology and the canopy theory) is based primarily on: (1) the universal language of Gen. 6–8, (2) Gen 2:5–6, and (3) the presumed landing of Noah's ark on the summit of Mount Ararat (Gen. 8:4). It is argued that the "universal" language of Gen. 6–8 was meant to cover the whole known world of that time (third millennium BC), not the entire planet Earth, and that this interpretation also applies to Gen. 2:5–6—the verses on which the canopy theory is based. It is also argued that the "fifteen cubits upward" flood depth mentioned in Gen. 7:20 favors a local rather than a universal flood.*

*From a scientific perspective, a universal flood, flood geology, and canopy theory are entirely without support. The geology of the Mount Ararat region precludes the premise of flood geologists that all of the sedimentary rock on Earth formed during the time of Noah's Flood. The most likely landing place of the ark is considered to have been in the vicinity of Jabel Judi (the "mountains of Ararat" near Cizre, Turkey) within the northern boundary of the Mesopotamian hydrologic basin, rather than on 17,000-foot-high Mount Ararat in northeastern Turkey. Since it would have been logistically impossible for all animal species on Earth to be gathered by Noah and contained in the ark, it is concluded that the animals of the ark were those that lived within the Mesopotamian region. The archaeological record outside of Mesopotamia also does not support a universal flood model. All of the evidence, both biblical and scientific, leads to the conclusion that the Noachian deluge was a local, rather than universal, flood.*

The Noachian Flood has been one of the sharpest centers of controversy in the long history of warfare between biblical theology and science.<sup>1</sup> It also has been one of the main stumbling blocks to faith, especially for scientists. Was this a universal flood responsible for all fossils and sedimentary rock on the face of the Earth, as some biblical literalists maintain, or was it a local flood confined to the limits of Mesopotamia?

This paper takes a "realistic approach" to Bible interpretation, as was done in two

earlier articles: "The Garden of Eden, a Modern Landscape"<sup>2</sup> and "A Time and a Place for Noah."<sup>3</sup> In the latter paper, an attempt was made to establish Noah as a real, non-mythical person who lived in Mesopotamia around 2900 BC, in what archaeologists refer to as the Jemdet Nasr Period (Table 1). In this paper, Noah also is placed in Mesopotamia around 2900 BC.

In the following discussion, two assumptions are made using the "realistic approach" to Bible interpretation:

1. The Bible can be taken at face value; that is, the biblical writer was accurately recording historical events of ancient times, viewed within the culture of those times. By taking the Bible at "face value," nothing is to be read into the Bible that is not explicitly stated in its original (autograph) text.

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2. The scientific disciplines of geology, geography, archaeology, biology, and physics can also accurately be applied to the events of ancient times.

## Biblical Evidence

One of the basic tenants of many biblical literalists (*creation scientists*) is that Noah's Flood was a universal phenomenon—that is, flood waters covered the entire planet Earth up to at least the height of Mount Ararat, which is ~17,000 feet (5000 m) in elevation. Corollary to this view is the position held by *flood geologists*—that most of the Earth's sedimentary rocks and fossils were deposited during the deluge of Noah as described in Genesis 6–8. To explain this universal flood, flood geologists usually invoke the *canopy theory*, which hypothesizes that water was held in an immense atmospheric canopy and subterranean deep between the time of Creation and Noah's Flood. Then, at the time of the Flood, both of these water sources were suddenly released in a deluge of gigantic, Earth-covering proportions. Along with this catastrophic hydrologic activity, there was a major geologic change in the crust of the Earth: modern mountain ranges rose, sea bottoms split open, and continents drifted apart and canyons were cut with amazing speed. All animals and plants died and became encased in flood sediments, and then these fossil-bearing sediments became compacted into sedimentary rock. There are modifications of the canopy scheme, such as the "ice-lens," "greenhouse," "invisible," and "visible" canopies,<sup>4</sup> but essentially the canopy theory claims that waters released during Noah's Flood caused all (or most) of the sedimentary and geomorphic features we see today on planet Earth.

Where do creation scientists get their ideas of a planetary geology completely at odds with the principles and findings of modern geology? A universal flood model is primarily based on: (1) the universal language of Gen. 6–8; (2) Gen. 2:5–6; and (3) the presumed landing of Noah's ark on the summit of Ararat (Gen. 8:4), a mountain in north-eastern Turkey (Fig. 1). These three topics will be discussed in this paper, as well as other factors that relate to a universal versus local model for the Noachian Flood.

### Universal Language of Gen. 6–8

The best argument, biblically speaking, for a worldwide flood is the "universal" language used in Gen. 6–8, and this is no doubt the main reason why people in centuries past have believed that Genesis was talking about the planet Earth, and why this traditional interpretation has continued to the present day. In Gen. 6–8, "earth" (*eretz* or *adāmāh*) is used forty-two times, "all" (*kōl* or *kowl*) is used twenty times, "every" (also *kowl* in Hebrew) is used twenty-three times, and "under heaven" (literally, "under the sky")<sup>5</sup> is used two times.

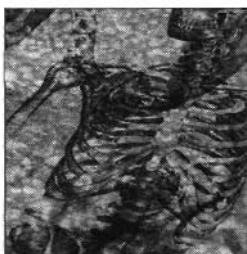
**Earth.** The Hebrew for "earth" used in Gen. 6–8 (and in Gen. 2:5–6) is *eretz* (*'erets*) or *adāmāh*, both of which terms literally mean "earth, ground, land, dirt, soil, or country."<sup>6</sup> In no way can "earth" be taken to mean the planet Earth, as in Noah's time and place, people (including the Genesis writer<sup>7</sup>) had no concept of Earth as a planet and thus had no word for it. Their "world" mainly (but not entirely) encompassed the land of Mesopotamia—a flat alluvial plain enclosed by the mountains and high ground of Iran, Turkey, Syria, and Saudi Arabia (Fig. 1); i.e., the lands drained by the four rivers of Eden (Gen. 2:10–14).<sup>8</sup> The biblical account must be interpreted within the narrow limit of what was known about the world in *that* time,<sup>9</sup> not what is known about the world today.

Biblical context also makes it clear that "earth" does not necessarily mean the whole Earth. For example, the *face of the ground*, as used in Gen. 7:23 and Gen. 8:8 in place of "earth," does not imply the planet Earth. "Land" is a better translation than "earth" for the Hebrew *eretz* because it extends to the "face of the ground" we can see around us; that is, what is within our horizon.<sup>10</sup> It also can refer to a specific stretch of land in a local geographic or political sense. For example, when Zech. 5:6 says "all the earth," it is literally talking about Palestine—a tract of land or country, not the whole planet Earth. Similarly, in Mesopotamia, the concept of "the land" (*kalam* in Sumerian) seems to have included the entire alluvial plain.<sup>11</sup> This is most likely the correct interpretation of the term "the earth," which is used over and over again in Gen. 6–8: the entire alluvial plain of Mesopotamia was inundated with water. The clincher to the word "earth" meaning ground or land (and not the planet Earth) is Gen. 1:10: *God called the dry land earth (eretz)*. If God defined "earth" as "dry land," then so should we.<sup>12</sup>

**All, Every, Under Heaven.** While these terms also seem to impart a universality to the Flood event, all three are used elsewhere in the Bible for local events, and so—like the term "earth"—do not necessarily have an all-inclusive or universal meaning. For example, Acts 2:5 states: "And there were

**Table 1. Archaeological Periods in Mesopotamia**

~5500–3800 BC	Ubaid
~3800–3100 BC	Uruk
~3100–2900 BC	Jemdet Nasr
~2900–2750 BC	Early Dynastic I
~2750–2600 BC	Early Dynastic II
~2600–2350 BC	Early Dynastic III
~2350–2150 BC	Dynasty of Akkad
~2150–2000 BC	3rd Dynasty of Ur
~2000–1600 BC	Old Babylonian



## Article

### *The Noachian Flood: Universal or Local?*

*An excellent example of how a universal "Bible-speak" is used in Genesis to describe a non-universal, regional event is Gen. 41:46: "And the famine was over all the face of the earth."... The same principle of a limited universality in Gen. 41:46 also applies to the story of the Noachian Flood.*

*dwelling at Jerusalem Jews, devout men out of every nation under heaven."* Does this passage mean every nation under the whole sky of the planet Earth or only the nations that Luke, the writer of Acts, knew about? Certainly it did not include North America, South America, or Australia, which were unknown in the first century AD. Such "universal" language is simply the way people expressed themselves in those days to emphasize a level of inclusiveness—a type of "Bible-speak" that is not supposed to be taken absolutely literally, but in the context of what the biblical author was trying to emphasize. This passage in Acts simply means that devout men (Jews) of many nations from some extended region of the then-known world were present at Jerusalem. The Apostle Paul uses similar hyperbolic language in Col. 1:6.

An excellent example of how a universal "Bible-speak" is used in Genesis to describe a non-universal, regional event is Gen. 41:46: *"And the famine was over all the face of the earth."* This is the exact same language as used in Gen. 6:7, 7:3, 7:4, 8:9 and elsewhere when describing the Genesis Flood. "All (*kowl*) the face of the earth" has the same meaning as the "face of the whole (also *kowl*) earth." So was Moses claiming that the whole planet Earth (North America, Australia, etc.) was experiencing famine? No, the universality of this verse applied only to the lands of the Near East (Egypt, Palestine, Mesopotamia), and perhaps even the Mediterranean area; i.e., the whole *known* world at that time.

The same principle of a limited universality in Gen. 41:46 also applies to the story of the Noachian Flood. The "earth" was the land (ground) as Noah *knew* (tilled) it and *saw* it "under heaven"—that is, the land under the sky in the visible horizon,<sup>13</sup> and "all flesh" were those people and animals who had died or were perishing around the ark in the land of Mesopotamia. The language used in the scriptural narrative is thus simply that which would be natural to an eyewitness (Noah). Woolley aptly described the situation this way: "It was not a universal deluge; it was a vast flood in the valley of the Tigris and Euphrates which drowned the whole of the habitable land ... for the people who lived there that *was all the world* (italics mine)."<sup>14</sup>

#### **Canopy Theory (Gen. 2:5-6)**

A universal deluge—and specifically the canopy theory—is also based on Gen. 2:5-6: *"And every plant of the field before it was in the earth, and every herb of the field before it grew; for the Lord God had not caused it to rain upon the earth, and there was not a man to till the ground."*

*"But there went up a mist from the earth, and watered the whole face of the ground."*

**Rain.** The misuse of the term *eretz* to mean planet Earth rather than a specific geographic piece of land also leads to a misinterpretation of Gen. 2:5: *"for the Lord God had not caused it to rain upon the earth."* Does this verse mean that it had never rained over the entire planet Earth before Noah's Flood, as claimed by flood geologists? No, it simply means that it had not rained over a specific parcel of land in Mesopotamia—in this case, the area known as Eden, located at the confluence of the four rivers in the vicinity of the Persian Gulf.<sup>15</sup> This area is one of the driest places on Earth, with an average annual rainfall of less than four inches.<sup>16</sup> Also, the creation of the plants is not alluded to in Gen. 2:5—that was done in Gen. 1:11-12—this verse simply refers to the planting of the Garden of Eden.<sup>17</sup>

**Mist.** A local interpretation of "earth" (*eretz*) also applies to Gen. 2:6: *"But there went up a mist from the earth (land or ground around Eden) and watered the whole face of the earth (ground surface)."* The key word of this passage—and the one on which the canopy theory hangs—is "mist" (*'ed*). This word has been assumed by flood geologists to imply a thick vapor canopy; yet, meanings other than "mist" and "vapor" have been suggested based on Akkadian and Sumerian cuneiform texts, which were not available to the translators of the King James Version of the Bible. The Akkadian *edû*, from which *'ed* is derived, can refer to the annual inundation of southern Mesopotamia (as well as to irrigation); thus, *'ed* may refer to Eden being watered by floods rather than by a mist.<sup>18</sup> Or, as preferred by Speiser and Cassuto,<sup>19</sup> "mist" in the King James Version is better translated as "flow" in the sense of an underground swell or spring, i.e., the Garden of Eden was watered by a spring. This spring interpretation also fits with Gen. 2:10, which Speiser says should be translated: *"A river (spring) rises in Eden."*

### Depth of the Flood (Gen. 7:20)

Another verse in the Genesis account that is key to whether the Noachian Flood should be interpreted as being universal or local is Gen. 7:20: "*Fifteen cubits upward did the waters prevail; and the mountains were covered.*" Flood geologists take this passage to mean that the floodwater rose at least fifteen cubits above Mount Ararat, their presumed landing place for the ark. But there are difficulties with this interpretation.

One difficulty involves the translation of the Hebrew word *har* for "mountain" in Gen. 7:20 of the King James Version. This word can also be translated as "a range of hills" or "hill country," implying with Gen. 7:19 that it was "*all the high hills*" (also *har*) that were covered rather than high mountains. To make matters more complicated, the Sumerians considered their temples (ziggurats) to be "mountains," calling them "*É. kur,*" which in Sumerian means "house of the mountain" or "mountain house."<sup>20</sup>

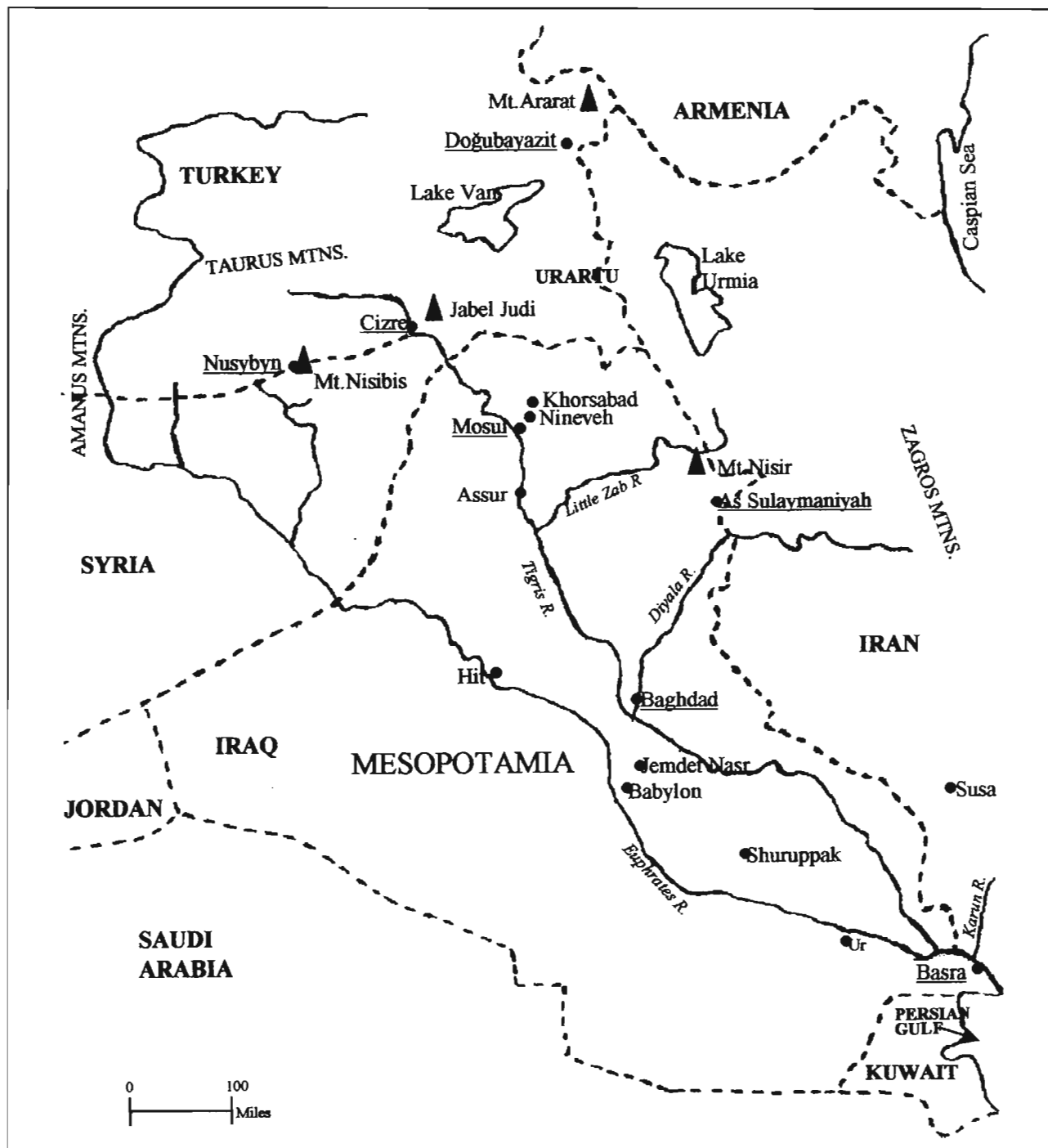
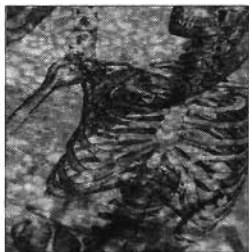


Figure 1. General geography of the Mesopotamia and Urartu regions, including names of locations mentioned in the text.



*No geologic evidence whatsoever exists for a universal flood, flood geology, or the canopy theory. ... The Bible itself never claims that all of the sedimentary rock on Earth formed at the time of the Noachian Flood – only flood geologists make this claim.*

## Article

### *The Noachian Flood: Universal or Local?*

Also, the specific Mesopotamian word for “mountain” (*šadû*) is derived from “mounds,” and may indicate that the Mesopotamians thought of their high temple mounds on the very flat alluvial plain as mountains.<sup>21</sup> So, to which of these scenarios was the biblical writer referring in Gen. 7:20? Were the flood waters fifteen cubits above the highest mountains of planet Earth; were they fifteen cubits above the “hill country” of Mesopotamia (located in the northern, Assyrian part); were they fifteen cubits above the tops of ziggurat temple mounds (“mountains”) in southern Mesopotamia, thus dooming all the people who ran to the high temples for safety; or were they only fifteen cubits above the Mesopotamian alluvial plain? Or, as suggested by Ramm, does the “fifteen cubits upward” refer to the draft (draught) of the ark; i.e., how deep its 30 cubit depth (Gen. 6:15) was submerged in the water when the ark was loaded?<sup>22</sup>

Another difficulty with Gen. 7:20 is: How did Noah measure the depth of the flood at fifteen cubits? In riverboats of that day, people used rods or poles to measure water depth.<sup>23</sup> Upon a tempestuous global ocean, where mountains were supposedly rising and continents were rapidly moving apart, how could Noah have taken a pole measurement on top of a mountain like Ararat? The biblical account (Gen. 7:14) seems to suggest that the waters increased continuously until the ark was gently lifted up above the earth (land), and in this situation, one can imagine Noah measuring the depth of water either to the alluvial plain or to the tops of “mountains” (ziggurats) to see how deep the flood waters were rising. In any case, the phrase “fifteen cubits upward” does not necessarily imply a universal flood; if anything, it favors a local flood where the depth to the ground surface could be easily measured.

## Scientific Evidence

### Geologic Evidence

No geologic evidence whatsoever exists for a universal flood, flood geology, or the canopy theory. Modern geologists, hydrologists, paleontologists, and geophysicists know exactly how the different types of sedimentary rock form, how fossils form and what they represent, and how fast the continents are moving apart (their rates can be measured by satel-

lite). They also know how flood deposits form and the geomorphic consequences of flooding.<sup>24</sup>

**Flood Geology.** In addition to a lack of any real geological evidence for flood geology, there are also no biblical verses that support this hypothesis. The whole construct of flood geology is based on the *original assumption* that the Noachian Flood was universal and covered the whole Earth. Since the Flood was supposedly worldwide, then there must be evidence in the geologic record left by it. Since the only massive sediments on Earth are those tied up in sedimentary rocks, and because these rocks often contain fossils, this must be the “all flesh” (Gen. 7:21) record left by Noah’s Flood. And since sedimentary rock can be found on some of the highest peaks in the world (including Everest, the highest), then these mountains must have formed during and after the Flood. The “leaps of logic” build one on top of another until finally, as the result of this cataclysmic event, almost all of the geomorphic and tectonic features present on the planet Earth (e.g., canyons, caves, mountains, continents) are attributed by flood geologists to the Noachian Flood.

Does the Bible actually say anything about mountains rising during the Flood? No, but it does say that mountains and hills were in place *before* the Flood (Gen. 7:19, 8:4). Does the Bible say anything about sedimentary rock, fossils, or drifting continents? Not one word. All of these things are read *into* the Bible from a centuries-past interpretation of it. Most important from a literalist perspective, it can be shown from the Bible (Gen. 2:10–14; Gen. 6:14) that the four rivers of Eden flowed over, and cut into, sedimentary rock strata; that the pre-Flood landscape was a modern one (similar to the present-day landscape; that is, overlying sedimentary rock); and that the bitumen (pitch) used by Noah to caulk the ark was derived from hydrocarbon-rich sedimentary rock.<sup>25</sup> Therefore, sedimentary rock *must* have existed before the Flood. The Bible itself never claims that all of the sedimentary rock on Earth formed at the time of the Noachian Flood – only flood geologists make this claim.

**Vapor Canopy.** Why is a vapor canopy invoked by many biblical literalists (creation scientists) as the proper interpretation of Gen. 2:5–6? Because some kind of extra water



source is needed to make the Noachian Flood universal (the original assumption). There simply is not enough water in Earth's atmosphere today to supply more than about 40 feet of water to the ground worldwide,<sup>26</sup> nor is there any evidence of vast reservoirs of subterranean water (past or present) that could have supplied this water. Therefore, a vast reservoir of water that deluged the entire Earth must somehow be "manufactured" in order for Mount Ararat (17,000 feet high) to have been covered by the Flood.

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### *Scientific (and biblical) problems abound with trying to supply the extra water demanded by the canopy theory.*

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Scientific (and biblical) problems abound with trying to supply the extra water demanded by the canopy theory. A few of the more major problems are:

1. The so-called "vapor canopy" was envisioned by Morris as a vast blanket of invisible water vapor, translucent to the light from the stars but producing a marvelous "greenhouse effect" that gave the entire antediluvian world a relatively mild and uniform climate.<sup>27</sup> However, if this atmospheric canopy once held enough water to cover Mount Ararat, it must have been so thick that it would have been hard for even sunlight (let alone starlight) to penetrate it so as to produce the plants of Gen. 1:11 and the trees in the Garden of Eden (Gen. 2:9). And surely an atmosphere holding all of this moisture would have been susceptible to thermal cells generated by the sun, and thus would have experienced storms and precipitation.
2. If only one-third of the water in modern oceans were part of the Earth's atmosphere in the form of a vapor canopy, the atmospheric pressure at the Earth's surface would have been greater than that of Venus' ~90 atmospheres.<sup>28</sup> This pressure, combined with warm temperatures envisioned for the "greenhouse effect" phenomena, would not have created a benevolent environment, but would have produced a "runaway greenhouse effect," such as has occurred on the planet Venus. Under these adverse conditions, how could the plants and animals of Gen. 1 have survived on Earth?
3. If there was only a vapor canopy before the Flood, and no rain, then how did the four rivers of Eden (Gen. 2:11-14) get their water? Would not rain and snow have fed these rivers as they do today?
4. Where did all of the 17,000+ feet of global water go after the Flood? Did it miraculously escape into space? The "fountains of the deep" (springs) would have been

completely saturated with water if there had been a worldwide flood, so the water could not have drained away back into the "deep." Also, how could the wind (Gen. 8:1) have evaporated water 3-6 miles deep in less than a year (Gen. 8:13)?

### **Landing Place of the Ark**

The landing place of the ark has been one of the most controversial of all the aspects of Noah's Flood, with flood geologists insisting that the Bible identifies the site as Mount Ararat—the huge volcanic construct, Agri Dag, in northeastern Turkey (Fig. 1). What is generally not realized is that placement of the ark on Mount Ararat is a relatively "late" phenomenon. Only in the eleventh and twelfth centuries AD did the focus of investigators begin to shift toward Mount Ararat as the ark's final resting place,<sup>29</sup> and only by the end of the fourteenth century AD does it seem to have become a fairly well established tradition.<sup>30</sup> Before this, both Islamic and Christian tradition held that the landing place of the ark was on Jabel Judi, a mountain located about 30 miles (48 km) northeast of the Tigris River near Cizre, Turkey (Fig. 1).

The ark has been assigned to at least eight different landing places over the centuries<sup>31</sup>—including Saudi Arabia,<sup>32</sup> India,<sup>33</sup> and even the mythical Atlantis.<sup>34</sup> One reason for this ambiguity is that the Bible does not actually pinpoint the exact place where the ark landed, it merely alludes to a region or range of mountains where the ark came to rest: *the mountains of Ararat* (Gen. 8:4). Ararat is the biblical name for Urartu (Isa. 37:38) as this area was known to the ancient Assyrians.<sup>35</sup> This mountainous area, geographically centered around Lake Van and between Lake Van and Lake Urmia (Fig. 1), was part of the ancient region of "Armenia" (not limited to the country of Armenia today). "Mountain" in Gen. 8:4 is plural; therefore, the Bible does not specify that the ark landed on the highest peak of the region (Mount Ararat), only that the ark landed somewhere on the mountains or highlands of Armenia (both "Ararat" and "Urartu" can be translated as "highlands").<sup>36</sup> In biblical times, "Ararat" was actually the name of a province (not a mountain), as can be seen from its usage in 2 Kings 19:37: "... some escaped into the land of Ararat" and Jer. 51:27: "... call together against her (Israel) the kingdoms of Ararat, Minni, and Askenaz ..."

Even though many sites have been proposed for the landing place of the ark, only four appear to meet the requirement of being located within the boundaries of ancient Armenia: Mount Nisir, Mount Nisibis, Mount Ararat, and Jabel Judi (Fig. 1). The Sumerian Gilgamesh Epic states that the boat came to rest on Mount Nisir, which is located not far from the Little Zab River, in the modern As Sulaymaniyah region of the Zagros Mountains.<sup>37</sup> Mount Nisibis is located near modern-day Nusybyn, near the border of Turkey and Syria.<sup>38</sup> While these two locations have been identified as possible landing places of the ark, the



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most cited and most likely contenders for that distinction are Mount Ararat and Jabel Judi.

**Mount Ararat.** A universal model for the Noachian Flood hinges on Mount Ararat being the landing place of the ark, because if the ark had landed on this mountain, it would imply that the water level would have had to have been at an elevation of at least 17,000 feet; thus, the Noachian Flood would have been a universal, planet-wide flood. Yet, as just discussed, the Bible (Gen. 8:4) does not specify Mount Ararat as the site. It simply refers to the "highlands in the province of Urartu" within the ancient kingdom of Armenia. The tradition of Mount Ararat being the landing site of the ark is a wrongful interpretation of the Hebrew text.<sup>39</sup>

Furthermore, it is not clear if in Noah's time (~2900 BC) the Mount Ararat region was even part of what was later to be called "Urartu."<sup>40</sup> In its "heyday" (eighth-seventh centuries BC), the kingdom of Urartu stretched from the eastern bank of the upper Euphrates River to the western shore of Lake Urmia, and from the mountain passes of northern Iraq to the Caucasus Mountains (thus including Mount Ararat in what is now the region of the Republic of Armenia) (Fig. 1). However, this northern, Armenian section was added in the eighth century BC during a time of major Urartian expansion.<sup>41</sup> It was not until the reign of Menua (810–786 BC) that the area of Mount Ararat became a part of Urartu.<sup>42</sup> By contrast, it is known that the Urartian language was present in the northern fringes of Mesopotamia at least sometime by the third millennium BC. Even later in time (after the eighth-seventh centuries BC), the name "Urartu" faded from view and was transformed into "Ararat" by later vocalizations imposed on the Hebrew Bible.<sup>43</sup>

**Search for Noah's Ark on Mount Ararat.** If Mount Ararat is not the landing site of Noah's ark, then what about all of the books, movies, and TV shows that have claimed that the ark has actually been found on Mount Ararat (Agri Dag)? None of these popular "ark fever" accounts have been verified: some have been shown to be actual hoaxes, and all have been shown to be scientifically unfounded. Since the early 1800s, there have

been more than a dozen expeditions to Mount Ararat to find the ark,<sup>44</sup> none of which have proved successful.

The first popularized modern search for Noah's ark on Mount Ararat was by Fernand Navarra in 1955 and then again in 1969.<sup>45</sup> On the northwest side of Mount Ararat, Navarra collected sections of worked timber from beneath a glacier at ~14,000 feet elevation. These specimens were identified as *Quercus* (oak), and have been radiocarbon dated by six different dating labs at 720–790 AD (for the wood collected by Navarra in 1955) and 620–640 AD (for the wood collected in 1969).<sup>46</sup> These dates suggest that the wood may have been part of a Byzantine or Armenian shrine commemorating what was believed by the people of that region to have been the landing site of the ark.<sup>47</sup>

In 1993, CBS aired a two-hour television special entitled "The Incredible Discovery of Noah's Ark," which was reportedly seen by an estimated twenty million viewers.<sup>48</sup> In this case, an actual hoax was involved in that a piece of modern pine wood was made to look ancient and was claimed to be a piece of the ark. Another hoax, where a Texas group claimed to have seen and photographed the ark from Mount Ararat, showed that their photo of the ark had been retouched.<sup>49</sup>

Noah's ark was again reported by the popular press in the early 1990s to have been found near Doğubayazıt, Turkey, ~12 miles (20 km) southwest of Mount Ararat (Fig. 1). Supposedly a "boat" having the dimensions of the ark had been found—a boat made out of petrified gopher wood and containing ribs, iron rivets, and stone anchors.<sup>50</sup> In reality, the "boat" turned out to be a natural volcanic (ophiolitic basalt) rock formation, 110–120 million years old, which mimicked the shape of a boat due to the rock being steeply inclined along the limbs of a doubly plunging anticline.<sup>51</sup> The supposed fossilized "gopher wood bark" was crinkle-folded metamorphosed rock, the "iron rivets" were naturally-occurring concentrations of limonite and magnetite; and the "anchor stones" were pieces of local andesite (another volcanic rock type), not (as supposed) derived from Mesopotamia. In short, the scientific evidence demonstrated that the "boat" found near Doğubayazıt is a completely natural rock formation—a "phantom ark."<sup>52</sup>

**Geology of Mount Ararat Region.** Mount Ararat (Agri Dag) is an almost 17,000-foot-high volcano that is still intermittently active (last eruption was reportedly on July 2, 1840).<sup>53</sup> The mountain rises above the high (~6000 ft) plateau of eastern Turkey, which is crossed by a broad east-west belt of folded mountains formed by the Armenian Taurus and Zagros systems that separate the plateau from the Mesopotamian depression.<sup>54</sup> As shown on the geologic map of Turkey,<sup>55</sup> the Ararat construct (including the two strato-volcanoes Great Ararat and Little Ararat) cuts across Devonian, Permo-Carboniferous, Cretaceous, Eocene, and Miocene sedimentary rock. The volcanoes have erupted along a southwest-northeast trending lineament, which became established at the beginning of the Miocene (~20 million years ago). Andesitic lava is typical for the main crater of both volcanoes, but flank eruptions are basaltic. Vast lava flows, from Miocene time to the present, cover many of the older sedimentary rocks of the region.

Why is all of this information on the geology of the Ararat region important to the discussion of flood geology and a universal-versus-local flood model? The claim of flood geologists is that all (or almost all) of the sedimentary rock on Earth formed at the time of Noah's Flood, and this includes the sedimentary rock of the Ararat region. But Mount Ararat itself *cuts across* sedimentary rock, and so must be *younger* than this rock.<sup>56</sup> The flood-geology scenario that is implied, according to the actual stratigraphic relationships present in the Mount Ararat region, is thus: (1) sediments (and dead animals) were deposited out of the flood waters; (2) then these sediments were compacted into fossil-rich sedimentary rock; (3) next volcanic lava erupted, intruding into and flowing over this sedimentary rock; (4) then the entire huge volcanic Ararat construct cooled; so that (5) finally, Noah's ark could land on Mount Ararat—all in the space of one year's time! Not only does this scenario propose a series of physical impossibilities, furthermore the Bible claims none of this! It simply states that the ark landed "on the mountains of Ararat"; that is, on mountains that existed in the already-known (to the Sumerians of Noah's time) land of "Urartu," or what is now the area of southeastern Turkey (Fig. 1).

**Jabel Judi.** Located just east of Cizre, Turkey, near the border of Iraq and just within the northern boundary of Mesopotamia (Fig. 1), Jabel Judi has been another favored landing place for the ark, being the most widely accepted site among Christians, Jews, and Muslims during the latter centuries of the first millennium AD. This area has alternatively been called "Cudi Dag" (sometimes spelled Dagh), "Mount Judi," Mount Cardu, "Mount Quardu," "the Gordyene or Gordyenean Mountains," "the Carducian Mountains," "the Corcyraean Mountains," "the mountains of the Kurds," "Mount Nipur" by the Assyrians, and the "the mountains of the Korduianians of Armenia" by Berosus (~280 BC).<sup>57</sup> The Arab geographer al-Masudi (~956 AD) stated that the ark "stood on el-Judi ... a mountain in the

country of Masur ... eight farsangs (about 30 miles) from the Tigris River."<sup>58</sup> In its principal reference to the Flood, the Koran (Houd 11:44) states that the ark eventually came to rest on Mount Djudi (Jabel Judi), and even into the twentieth century, there were reports of "dervishes" keeping a light burning there in honor of Noah and the ark.<sup>59</sup>

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Jabel Judi (Cudi Dag) is a mountain range partly composed of the Cudi Limestone of Jurassic-Cretaceous age that rises above the Cizre Plain. This plain at about 500 m elevation is surrounded by low hills in the north, gently sloping ridges in the south, hilly land in the west, the Jabel Judi mountains in the east, and alluvial valleys that become shallow southward away from the foothills.<sup>60</sup> All of the streams within the plain are tributaries to the Tigris River.

**Vineyards, Olive Trees, Doves.** Not only is Jabel Judi the earliest accepted landing site of the ark, it also corresponds to where vineyards and olive trees are known to have been grown in antiquity.

*"And the dove came into him in the evening; and lo, in her mouth was an olive leaf plucked off: so Noah knew that the waters were abated from off the earth" (Gen. 8:11).*

*"And Noah began to be a farmer (husbandman) and he planted a vineyard" (Gen. 9:20).*

**Vineyards.** The wine grape of antiquity, *Vitis vinifera*, is what is referred to in both the Old and New Testaments of the Bible.<sup>61</sup> *Vitis vinifera* has been cultivated for thousands of years, probably originating as a wild plant in the Transcaucasus area, then being domesticated in the area between the Black and Caspian Seas, eastern Turkey, and the Zagros range, sometime before 4000 BC.<sup>62</sup> It is certain that viticulture was practiced and wine was made in (northern) Mesopotamia sometime before 3000 BC and exported to Egypt.<sup>63</sup> Therefore, it is unlikely that Noah (~2900 BC) was the "first" person to ever drink wine and become drunk (Gen. 9:20-21), as is the view held by some Christians. The unlikelihood of this is also supported by Matt. 24:38: *"For as in the days that were before the flood they were eating, drinking, marrying and giving in marriage, until the day that Noah entered the ark."* What were they drinking? At least barley beer (the "national drink" of Mesopotamia), and for some elite, probably wine.<sup>64</sup> However, Gen. 9:21 implies that



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Noah was taken by surprise and was overwhelmed by the drink, so perhaps it was Noah's first experience with wine.

The importance of Noah's vineyard to the landing place of the ark is that *Vitis vinifera* can be cultivated only where the average temperature is at least 16–17°C (60–63°F) in the warmest summer months (for the fruit to ripen), where the winters are not too severe (frost can kill young grapevines), where the elevation is not too high, and where the climate is not too hot and dry (grapevines need at least a moderate rainfall).<sup>65</sup> Thus, in terms of where Noah could have grown his vineyard (Gen. 9:20), he could not have landed anywhere in southern Mesopotamia because it is too hot and dry there for viticulture to flourish, nor could he have landed in the high mountain regions because the severe winters would have killed his vineyard, making it impossible for him to grow the grapes to make his wine (Gen. 9:21).

The region of Mesopotamia where grapevines flourished in ancient times (and even still today) was Assyria (now northern Iraq), which has a moderate rainfall (500–600 mm per year) that extends through April, and abundant streams which irrigate orchards and vineyards.<sup>66</sup> The area north and east of Nineveh (Fig. 1)—in the foothills of the Taurus and Zagros Mountains, where temperatures are cooler and elevations are higher than in southern Mesopotamia—was especially renowned in antiquity for its wine, corn, and olive oil.<sup>67</sup> Thus, King Sennacherib boasts of Assyria in 2 Kings 18:36: "... a land of grain (corn) and wine, a land of bread and vineyards, a land of olive oil and honey ..."

**Olive trees.** Olive trees (*Olea europea*) are even more "choosy" than grapevines about their growth conditions, olives being less hardy than grapes in that they cannot tolerate hot and cold extremes (young plants or shoots especially cannot tolerate frost). Olive trees are not mentioned in Sumerian cuneiform texts as having been grown in southern Mesopotamia in antiquity. This is not only because the climate of southern Mesopotamia is too hot (good for dates but not for olives), but because a country so subject to inundation is not at all favorable to the cultivation or even growing of the olive.<sup>68</sup> The rarity of olives in the Sumerian record speaks unequivocally for the import of both

olive wood and olive oil into southern Mesopotamia.<sup>69</sup> However, olive fruit is recorded in northern Mesopotamia (Assyria), occurring in the Assur Temple offering lists back into the third millennium BC. Even in recent times, the villages at the foot of the Jabel Maqlub, just east of Khorsabad (~20 miles northeast of Mosul), are renowned in Iraq for their olives (especially Fadhiliya and Ba'shiqa, see Fig. 1).<sup>70</sup>

Most important to this discussion, olive trees need an elevated, well-drained soil to survive—in a waterlogged soil, they drown.<sup>71</sup> This fact makes the mention of an olive leaf in Gen. 8:11 supportive of a local flood rather than a universal one, because if the Flood had covered the entire planet Earth to 17,000+ ft. with seawater for a whole year, how could an olive tree (or even its seeds) possibly have survived such a severe inundation? Rather, the return of the olive leaf by the dove suggests the survival of relatively unharmed trees outside the flood area.<sup>72</sup>

**Doves.** Doves were well known to Mesopotamians—in fact, they were part of the Mesopotamians' diet.<sup>73</sup> Noah's dove was probably a rock dove (*Columba livia*), which is native to the Middle East and which is the ancestor to all of the various pigeon breeds we have today (including the common pigeon seen in cities worldwide).<sup>74</sup> Pigeons have a long history of domestication and interaction with humans. The birds feed mainly on seeds of cereals (such as barley, the staple food of ancient Mesopotamia), and commonly nest on human-made structures. The Akkadians, Armenians, Arabs, and Egyptians all felt a veneration for doves, and have kept them for millennia.<sup>75</sup> That the pigeon was already at least partially domesticated in Mesopotamia by Noah's time comes from al'Ubaid, where a row of sitting pigeons is pictured on the limestone frieze of a temple façade dating from ca 3000 BC.<sup>76</sup>

The pigeon's homing instinct to return to its nest from considerable distances also must have been recognized and exploited since earliest times.<sup>77</sup> Noah evidently had knowledge of this homing instinct when he sent forth a female dove from the ark (Gen. 8:8–12), and Noah's action in Gen 8:9 affirms that his dove was most likely a domesticated pigeon: "Noah put forth his hand, and took her, and pulled her into him into the ark."

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Exactly how far an ancient breed of dove like Noah's could have flown from the ark to search for dry land is not known, but it was probably less than 100 miles total.<sup>78</sup> Noah sent out his dove (presumably in the morning), and it came back to him in the evening (Gen. 8:2). Thus, within a one-day's flight from and back to the ark (Gen. 8:11), the dove found an olive tree or sprout growing, picked off a leaf, and returned again to the ark. This means that wherever the ark landed, it had to be less than about 50 miles from a region where it was suitable for olive trees to grow. That is, it could not have been high in the Taurus or Zagros mountains where temperatures get below freezing, and it could not have been in southern Mesopotamia where temperatures get too hot and where the land floods on an annual basis.

The Jabel Judi (Cudi Dag) region has the following advantages for being the landing place of Noah's ark:

1. Jabel Judi is located within the borders of ancient Armenia (Urartu).<sup>79</sup>
2. Jabel Judi is located within the foothills of the Taurus Mountains where the average low temperature (for Cizre) is 35°C,<sup>80</sup> where the average precipitation is 500–600 mm/yr,<sup>81</sup> and where the altitude is ~500 m<sup>82</sup>—all optimal conditions for the growing of both grapevines and olives. Grapevines and fruit trees are typical of this region, and even in recent times numerous vineyards are grown along the Tigris River valley in the Cizre area.<sup>83</sup> If Noah had landed in the Jabel Judi area, he would have found perfect growing conditions for his vineyard.
3. Jabel Judi is only ~80 miles from Nineveh (Fig. 1), a region that was renowned in ancient times for both its grapevines and olive trees.<sup>84</sup> Since the northern part of this region is within a 50-mile distance from Jabel Judi (Fig. 1), it is possible that a dove could have flown to this area and back to the ark with an olive leaf in one day, as required by the Genesis account.
4. The Cizre area was already known to the Sumerians by Jemdet Nasr time (Table 1), as many Uruk-age trading colonies and routes had been well established in this region by or before 3100 BC.<sup>85</sup> It is possible that Noah, as the "king" of Shuruppak,<sup>86</sup> would have known about the mountains of Urartu, and that he may even have headed toward this high ground to escape the flooding of the Mesopotamian lowlands.
5. If the ark did land in the Cizre area, then it means that the Flood stayed within the (northern) boundary of the Mesopotamian hydrologic basin. This in turn implies a local flood because if the flood was universal, why would the ark not have floated to somewhere outside the boundaries of Mesopotamia—some place like Europe or Asia?<sup>87</sup>

## Geographical Evidence: Animals of the Ark

If the Genesis Flood is taken to be universal, then another major scientific problem arises regarding the capacity of the ark to carry all of the animal species on Earth (the "all flesh" of Gen. 6:19). Even the early church fathers like Augustine (354–430 AD) recognized this difficulty and struggled with the apologetics of such a scenario.<sup>88</sup> Then, with the discovery of the New World and its multitude of new species, the problem became even more acute. It is now estimated that the number of animal species on Earth falls somewhere between 1.5–6 million,<sup>89</sup> and if "all flesh" also includes extinct animals and insects, this is multiplied into many more millions. Even a ship the size of an aircraft carrier could not carry all of these animals!

Other (among many) problems that arise with an "all animal species on planet Earth" universal interpretation of Genesis 6–8 are:

1. How did animals migrate to the Old World from the New World and from places like Australia? Or, how did they get from Mount Ararat to places like Australia without crossing oceans and without leaving descendants in the Old World?
2. How did the ark carry food for all of these animals for one year's duration (Gen. 6:21)?
3. How did only eight people—Noah, his wife, three sons, and three daughter-in-laws (Gen. 7:13)—care for at least two of all of the animal species on Earth?
4. How did large animals like the dinosaurs fit on the ark, if "all flesh" included extinct animals as well as non-extinct ones?
5. How could marine life have survived the Flood? Would it not have been crushed by tremendous water pressure and dilution of ocean water with fresh water?
6. How did all of the various kinds of animals descend the steep side of Mount Ararat, which is even difficult for humans to climb in modern times?

Universal flood advocates counter these concerns by heaping up miracles. God miraculously caused the animals to migrate to (and from) the Middle East. Or, angels picked up all of the animals and carried them to the ark.<sup>90</sup> God miraculously caused the animals on the ark to hibernate for a whole year, thus limiting their need for food and care.<sup>91</sup> Only taxonomic families (not individual species) were taken on the ark, and present-day species have somehow descended from these families within the last 5,000 years or so. The difficulty with these (and other) invoked miracles is not that God could not do every one of them if he wanted to—it is that the Bible does not claim a single one of them! The only mention the Bible makes of God's role in



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the Flood is that he miraculously intervened to impose a great flood upon the earth (land) (Gen. 6:17), and that he protected Noah in that flood (Gen. 7:16, 8:1). God commanded Noah to do all of the rest: to build the ark (Gen. 6:14); to bring the animals alive into the ark (Gen. 6:19–20); and to gather food for himself, his family, and the animals (Gen. 6:21), to be eaten while on the ark (a command that does not seem to favor hibernation). *“And Noah did all that the Lord commanded him”* (Gen. 6:22). No miracles regarding the animals are mentioned, and if the Bible is to be taken at face value, it must be assumed that Noah went out and gathered the animals himself. This factor alone limits the geographic region of the Flood to Mesopotamia, because it is hardly conceivable (nor logistically possible) to envision Noah collecting animals from places like New Zealand, Australia, North America, or South America.<sup>92</sup>

What animals does the Bible specify were gathered by Noah? It names “cattle” (Gen. 7:14); “fowls” (Gen. 6:20), specifically doves (Gen. 8:8) and ravens (Gen. 8:7); “creeping things” (*remes*) meaning reptiles or other animals that creep (Gen. 7:14); and “creeping things” (*sherets*) meaning an active mass of minute animals that creep (insects?) (Gen. 7:21). All of these animals are native to Mesopotamia and could have been gathered by Noah. Two other words for animals are used in the Genesis account: *hayyâ* (or *chay*), meaning a “wild beast” (Gen. 7:14),<sup>93</sup> and *behemâh*, meaning a “dumb beast” (Gen. 7:2)—especially large quadrupeds such as cattle.

In Gen. 6:19, the Bible calls for two of each kind; then more explicitly in Gen. 7:2, it calls for Noah to gather “clean” animals by “sevens,” the male and female (fourteen in all), and those that are “unclean” by “twos,” one male and one female. It also instructs Noah to do the same with birds (Gen. 6:20; 7:3). Assuming that “clean” and “unclean” were approximately the same dietary designations in Noah’s time as later in Moses’ time (Lev. 11), “clean” animals like sheep, cattle, and goats were taken by “sevens” into the ark (where some of them could have provided food for Noah and his family over the one-year period of the Flood),<sup>94</sup> whereas “unclean” animals like pigs, camels, badgers, and gazelles were taken by “twos” into the ark, but were not eaten. Similarly, birds

like doves (which were eaten by Mesopotamians)<sup>95</sup> were loaded into the ark by “sevens,” whereas birds like eagles, hawks, and ravens were loaded by “twos.” Aquatic creatures like native fish were not included in the Genesis list of animals because they would have been able to survive a local flood (but not necessarily a tempestuous, universal, sea-water flood).

All told, the animals taken into the ark may have numbered in the hundreds, but probably did not exceed a few thousand.<sup>96</sup> The ark—even a boat typical of ca 3000 BC—would have been adequate to house these animals and their food supply, and eight people could have cared for them, as well as for themselves, for many months. The animals destroyed by the Flood may thus be taken as limited to those within the immediate geographic region (of Mesopotamia), and the animals preserved on the ark may be taken also to mean those representative of that region.<sup>97</sup>

## Archaeological Evidence

There is also no archaeological evidence for a universal flood. No flood deposits correlative with those in Mesopotamia have been found in Egypt, Syria, or Palestine, let alone in other parts of the world more distant from the Middle East. Archaeological mounds in Syria and Palestine (such as Jericho), which exhibit fairly continuous occupation since at least 4500 BC, show no signs of a great flood.<sup>98</sup> That the Flood did not extend even to the land of Israel is alluded to in Ezek. 22:24: *“a land [Israel] ... nor rained upon in the day of indignation [day of God’s judgment by the Flood].”*<sup>99</sup>

The Bible is not the only place where Noah’s Flood is recorded. The story of the great deluge has also been found on cuneiform tablets collected from archaeological sites in Babylonia, Assyria, and lands surrounding Mesopotamia, the earliest of these being a Sumerian inscription found at Nippur and belonging to the close of the third millennium BC.<sup>100</sup> While these non-biblical texts have a definite mythological component to them, they still have a historical base that attests to an unusual environmental catastrophe that happened in the land of Mesopotamia at about the beginning of the third millennium. The Sumerian King



List divides the early history of Mesopotamia into (1) the reign of the pre-flood (antediluvian) kings (starting at Eridu), and (2) the reign of the post-flood kings (starting at Kish).<sup>101</sup> The ancient compilers of the King List regarded the Noachian Flood as an event that made a breach in the continuity of Mesopotamian history; certain cities suddenly being made desolate, while other cities were rebuilt on the ruins of the flood.<sup>102</sup> There is both epigraphical and archaeological grounds for believing that Ziusudra (the Sumerian name for Noah) was a real prehistoric ruler of a well-known city, the site of which (Shuruppak, or the modern-day mound of Fara) has been archaeologically identified.<sup>103</sup> Flood texts found in Mesopotamia and lands bordering it refer to a flood within Mesopotamia and to a righteous Mesopotamian man who survived the flood in a ship. The archaeological record thus definitely points to a flood within the confines of Mesopotamia, but not to a universal flood of planet-wide proportions. Flood legends from around the world exist simply because flooding has occurred in most parts of the Earth at one time or another. All of these flood stories—except for those from within and surrounding Mesopotamia—are essentially different from the biblical narrative and have only a few indeterminate elements in common with it.<sup>104</sup>

## Conclusions

From this information, we can draw the following conclusions:

1. Biblical evidence for a universal Noachian Flood is the “universal” language of Gen. 6–8—words like “earth,” “all,” “every,” and “under heaven.” However, these words are used in other places in the Bible to describe local or regional events and, therefore, cannot necessarily be taken as all-inclusive over the entire planet Earth.
2. Likewise, the terms “rain” and “mist” in Gen. 2:5–6 cannot be taken to support a canopy theory or universal deluge, because “earth” in these verses does not mean the planet Earth but only the “earth” or “ground” in the area of the Garden of Eden.
3. Absolutely no geologic evidence exists for the canopy theory, flood geology, or a universal flood.
4. The actual geology of the Mount Ararat region, where Mount Ararat cuts across sedimentary rock, precludes the Noachian Flood from being responsible for all of the sedimentary rock in the world, as claimed by flood geologists.
5. The most likely landing place for the ark is considered to have been Jabel Judi in the Cizre, Turkey region. This site meets all of the Bible’s requirements, including “the mountains of Ararat,” Noah’s vineyard, and the dove’s plucking off the olive leaf and bringing it back to the ark. It is also the earliest traditional site for the landing

place of the ark. A landing site in the Cizre region is compatible with a local flood model, as this region lies within the boundaries of the Mesopotamian hydrologic basin.

6. The problems concerned with putting all of the animal species on Earth into the ark, as per a universal flood model, are insurmountable barring miracles that the Bible never claims happened. The Bible indicates that Noah collected the animals and brought them to the ark, and this implies a local, not universal, flood.
7. There is no archaeological evidence for a universal flood. Even regions close to or surrounding Mesopotamia do not contain correlative flood deposits.
8. The picture that emerges from all of the biblical and nonbiblical evidence is that Noah’s Flood was confined to Mesopotamia, extending over a vast alluvial plain as far as the eye could see, from horizon to horizon (under the “whole heaven” or sky). The top of all the hills (ziggurats?) were covered by this flood, and all people and animals were drowned except for Noah, his family, and the animals on the ark. The flood was a real, historical event that covered—not the whole world—but the whole of Noah’s world.
9. The idea that the Noachian Flood was a universal flood stems from a centuries-old interpretation of the Bible not warranted by either the biblical or scientific evidence. The King James Version, written in the seventeenth century, reflects the very limited view that people had then of the planet Earth and its geology, and it is this centuries-old, traditional view that has been passed down to generations of Christians ever since. The Bible should always be interpreted within the framework of the culture in which it was *originally* written—in this case, the Mesopotamian culture of the third millennium BC, *not* the European culture of the seventeenth century AD. It is only by considering the culture and world view in which Gen. 6–8 was written that the Noachian Flood can really be understood. \*

## Notes

<sup>1</sup>B. Ramm, *The Christian View of Science and Scripture* (Grand Rapids: Eerdmans, 1974), 158.

<sup>2</sup>C. A. Hill, “The Garden of Eden: A Modern Landscape,” *Perspectives on Science and Christian Faith* 52, no. 1 (2000): 31–46.

<sup>3</sup>—, “A Time and a Place for Noah,” *Perspectives on Science and Christian Faith* 53, no. 1 (2001): 24–40.

<sup>4</sup>Ramm, *The Christian View*, 160–1; T. Key, “Does the Canopy Theory Hold Water?” *Journal of the American Scientific Affiliation* 37, no. 4 (1985): 224–5.

<sup>5</sup>E. A. Speiser, *Genesis: Anchor Bible Commentary*, v. 1 (Garden City: Doubleday, 1981), 52.

<sup>6</sup>J. Strong, *Strong’s Exhaustive Concordance of the Bible* (Nashville: Thomas Nelson, 1980), 1425 p. All subsequent translations of Hebrew words in this paper are from Strong’s Concordance.

<sup>7</sup>The earliest the first chapters of Genesis could have been written down by Mesopotamian scribes was ~2500 BC, or some 400 years

after Noah lived (Hill, "A Time and Place for Noah," 35). That the early chapters of Genesis derive from Mesopotamia cannot be denied, as "old" words, names, and places in Genesis are undoubtedly of Mesopotamian origin (U. Cassuto, *A Commentary on the Book of Genesis* part 2, trans. Israel Abrahams, [Jerusalem: Magnes Press, 1972] 252). This appears to conflict with the view of conservative Jews and Christians that the author of Genesis was Moses, who wrote the book either in the fifteenth or thirteenth century BC. However, there is no conflict if one assumes that Moses was the historian author of Genesis. According to this scenario, the early chapters of Genesis were first written down by Mesopotamian scribes sometime after ~2500 BC, and then these stories were conveyed by Abraham (either orally or in written form) to Canaan and handed down to his descendants until the time that Moses compiled them into a single book sometime between the fifteenth or thirteenth century BC.

<sup>8</sup>Hill, "A Time and Place for Noah," 28.

<sup>9</sup>J. H. Sailhammer, *Genesis Unbound – A Provocative New Look at the Creation Account* (Sisters, OR: Multnomah, 1996), 45.

<sup>10</sup>*Ibid.*, 49–50.

<sup>11</sup>J. N. Postgate, *Early Mesopotamia – Society and Economy at the Dawn of History* (London: Routledge, 1992), 34.

<sup>12</sup>D. Fischer, *The Origins Solution* (Lima, OH: Fairway Press, 1996), 172.

<sup>13</sup>D. Young, *The Biblical Flood – A Case Study of the Church's Response to Extrabiblical Evidence* (Grand Rapids, MI: Eerdmans, 1995), 163.

<sup>14</sup>L. Woolley, *Excavations at Ur* (London: Ernest Benn, 1955), 36.

<sup>15</sup>Sailhammer, *Genesis Unbound*, 51; and Hill, "The Garden of Eden," 31–42.

<sup>16</sup>K. Takahashi and H. Arakawa, eds., *Climates of Southern and Western Asia 9* (New York: Elsevier, 1981), 221.

<sup>17</sup>C. F. Keil and F. Delitzsch, *Commentary on the Old Testament: the Pentateuch* 1 (Grand Rapids, MI: Eerdmans, 1975), 77; U. Cassuto, *A Commentary on the Book of Genesis* part 1 (Jerusalem: Magnes Press, 1972), translated from the Hebrew by Israel Abraham, 104.

<sup>18</sup>R. L. Alden, "Ed," *Theological Wordbook of the Old Testament*, ed. R. L. Harris (Chicago: Moody Press, 1980), 17.

<sup>19</sup>Speiser, *Genesis*, 16.

<sup>20</sup>M. A. Beek, *Atlas of Mesopotamia* (London: Nelson, 1962), map 8; M. Roaf, "Palaces and Temples in Ancient Mesopotamia," in *Civilizations of the Ancient Near East*, ed. J. M. Sasson (New York: Charles Scribners, 1995), 425.

<sup>21</sup>H. Frankfort, *The Art and Architecture of the Ancient Orient, Part I: Mesopotamia* (Harmondsworth: Penguin, 1954), 6; and R. J. Forbes, *Studies in Ancient Technology* 2 (Leiden: Brill, 1965), 20.

<sup>22</sup>Ramm, *The Christian View of Science and Scripture*, 164.

<sup>23</sup>G. F. Bass, "The Earliest Seafarers in the Mediterranean and the Near East," in *A History of Seafaring Based on Underwater Archaeology*, ed. G. F. Bass (New York: Walker, 1972), 12.

<sup>24</sup>Numerous references on floods and flood deposits exist in the hydrologic literature. Refer to V. R. Baker, R. C. Kochel, and P. C. Patton, *Flood Geomorphology* (New York: John Wiley, 1988), for a general text on this subject.

<sup>25</sup>Hill, "The Garden of Eden," 31–46.

<sup>26</sup>R. S. Dietz, "Ark-Eology: A Frightening Example of Pseudoscience," *Geotimes* 38, no. 9 (1993): 4.

<sup>27</sup>H. Morris, *Scientific Creationism* (El Cajon: Master Books, 1985), 210–1.

<sup>28</sup>D. F. Siemens, "More Problems with Flood Geology," *Perspectives on Science and Christian Faith* 44, no. 4 (1992): 231.

<sup>29</sup>Young, *The Biblical Flood*, 34.

<sup>30</sup>B. Crouse, "Noah's Ark: Its Final Berth," *Archaeology and Biblical Research* 5, no. 3 (1992), 67.

<sup>31</sup>L. R. Bailey, "Wood from 'Mount Ararat': Noah's Ark," *Biblical Archaeologist* 40, no. 4 (1977): 137.

<sup>32</sup>Crouse, "Noah's Ark," 74.

<sup>33</sup>J. Hurley, *The Tree, the Olive, the Oil in the Old and New World* (Albany: John Hurley, 1919), 3.

<sup>34</sup>H. Johnson, *The Story of Wine* (London: Mitchell Beazley, 1989), 22.

<sup>35</sup>W. H. Stiebling, "A Futile Quest: the Search for Noah's Ark," *Biblical Archaeology Review* 2, no. 2 (1976): 16.

<sup>36</sup>R. E. Taylor and R. Berger, "The Date of 'Noah's Ark'," *Antiquity* 54 (1980): 34.

<sup>37</sup>Speiser, *Genesis*, 42.

<sup>38</sup>Crouse, "Noah's Ark," 74.

<sup>39</sup>Cassuto, *A Commentary on the Book of Genesis* part 2, 105.

<sup>40</sup>E. M. Yamauchi, "Uartians and Manneans," chap. 2 in *Foes from the Northern Frontier – Invading Hordes from the Russian Steppes* (Grand Rapids, MI: Baker Book House, 1982), 31.

<sup>41</sup>P. E. Zimansky, "Uartu," *The Oxford Encyclopedia of Archaeology in the Near East*, ed. E. M. Meyers (New York: Oxford University Press, 1977), 291–2.

<sup>42</sup>Yamauchi, "Uartians and Manneans," 34; and —, "Uartu," in *The New International Dictionary of Biblical Archaeology*, ed. E. M. Blaiklock and R. K. Harrison (Grand Rapids, MI: Zondervan, 1983), 465.

<sup>43</sup>The name "Uartu" was preserved in the Old Testament in the corrupt form "Ararat," which in the Latin version became "Armenia." When the Masoretic writers were vocalizing the text of the Bible, they inserted the vowel *a* into words which were unknown to them, so that "Uartu" became "Ararat." In is only within recent years that the Qumran (Dead Sea) scrolls have yielded a form of the name with the semi-vowel *w* in the first syllable; B. B. Piotrovskii, *The Ancient Civilization of Uartu*, trans. James Hogarth (New York: Cowles, 1969), 13.

<sup>44</sup>J. W. Montgomery, *The Quest for Noah's Ark* (Minneapolis, MN: Bethany Fellowship, 1972), 16.

<sup>45</sup>F. Navarra, *Noah's Ark: I Touched It* (Plainfield, NJ: Logos International, 1974), 137 p.

<sup>46</sup>Bailey, "Wood from 'Mount Ararat,'" 138, 142.

<sup>47</sup>Taylor and Berger, "The Date of 'Noah's Ark,'" 36.

<sup>48</sup>Dietz, "Ark-Eology," 4.

<sup>49</sup>H. F. Vos, "Flood (Genesis)," in *The International Standard Bible Encyclopedia* 2, ed. G. W. Bromiley (Grand Rapids, MI: Eerdmans, 1982), 319.

<sup>50</sup>L. G. Collins and D. F. Fasold, "'Noah's Ark' from Turkey Exposed as a Common Geologic Structure," *Journal of Geoscience Education* 44 (1996): 439–41; and H. Shanks, "Ark Enemies," *Biblical Archaeology Review* 23, no. 4 (1997): 22.

<sup>51</sup>Collins and Fasold, "'Noah's Ark' from Turkey Exposed as a Common Geologic Structure," 439.

<sup>52</sup>Evidently the Christian tabloid press is still touting the Dogubayazit "discovery." See the March 2002 issue of *International Discovery Times*, Victoria, Australia (no author or volume cited).

<sup>53</sup>Navarra, *Noah's Ark*, 121.

<sup>54</sup>E. C. Semple, "The Regional Geography of Turkey: A Review of Banse's Work," *Geographical Review* 6 (1921): 344.

<sup>55</sup>I. Altinli, *Geologic Map of Turkey, Van Sheet* (with map notes in English), 1:500,000 (1961): 50–62; and —, "Geology of Eastern and Southeastern Anatolia," *Bulletin of the Mineral Research and Exploration Institute of Turkey* 66 (1966): 42–64.

<sup>56</sup>Geologists call this the "Law of Cross-Cutting Relationships": a rock is younger than any rock it cuts across. Although very simple in concept, this rule is one of the building blocks for determining relative geologic time.

<sup>57</sup>Crouse, "Noah's Ark," 68; and S. M. Burstein, *The Babyloniaca of Berossus* (Malibu, CA: Undena, 1978), 21.

<sup>58</sup>Young, *The Biblical Flood*, 32.

<sup>59</sup>M. Polo, *Travels of Marco Polo the Venetian*, with an introduction by J. Masefield (London: Dutton, 1908), 35.

<sup>60</sup>A. tinli, *Geology of Eastern and Southeastern Anatolia*, 55.

<sup>61</sup>T. H. Everett, *Encyclopedia of Horticulture* 5 (New York: Garland, 1981), 1528.

<sup>62</sup>A. M. Negru, "Evolution of Cultivated Forms of Grapes," *Comptes Rendus (Doklady) de l'Académie des Sciences de l'URSS* 18, no. 8 (1938): 586; E. Isaac, *Geography of Domestication* (Englewood Cliffs, NJ: Prentice Hall, 1970), 69; T. Unwin, *Wine and the Vine – A Historical Geography of Viticulture and the Wine Trade* (New York: Routledge, 1991), 63–4; and H. P. Olmo, "The Origin and Domestication of the

*Vinifera Grape*," in *The Origins and Ancient History of Wine*, ed. P. E. McGovern, S. J. Flemings, and S. H. Katz (Luxembourg: Gordon and Breach, 1995), 36.

<sup>63</sup>Isaac, *Geography of Domestication*, 69.

<sup>64</sup>Hill, "A Time and Place for Noah," 29.

<sup>65</sup>Seiple, "The Regional Geography of Turkey," 345; and R. L. Gorney, "Viticulture and Ancient Anatolia," in *The Origins and Ancient History of Wine*, 139.

<sup>66</sup>Ibid., 345; M. A. Beek, *Atlas of Mesopotamia*, map 22.

<sup>67</sup>H. F. Lutz, *Viticulture and Brewing in the Ancient Orient* (Leipzig: J. C. Hinrich, 1922), 38.

<sup>68</sup>Hurley, *The Tree, the Olive, the Oil*, 3.

<sup>69</sup>H. Waetzoldt, "Ölpflanzen und Pflanzenöle Im 3 Jahrtausend," *Bulletin of Sumerian Agriculture* 2 (1985): 77.

<sup>70</sup>J. N. Postgate, "Notes on Fruit in the Cuneiform Sources" in *Bulletin on Sumerian Agriculture* 3, ed. J. N. Postgate and M. A. Powell (Cambridge, UK: Cambridge University Press, 1987), 130.

<sup>71</sup>T. H. Everett, *Encyclopedia of Horticulture* 7 (New York: Garland, 1981), 2380.

<sup>72</sup>Young, *The Biblical Flood*, 32.

<sup>73</sup>J. Bottéro, "The Cuisine of Ancient Mesopotamia," *Biblical Archaeologist* 48, no. 1 (1985): 42.

<sup>74</sup>There is no specific distinction between "pigeons" and "doves," the former term being used for the larger species and the latter for smaller species.

<sup>75</sup>W. M. Levi, *The Pigeon* (Sumter, SC: Levi Publishing Co., 1969), 1-2.

<sup>76</sup>J. Hansell, *The Pigeon in History or The Dove's Tail* (Bath: Millstream Books, 1998), 15-6.

<sup>77</sup>Ibid., 128.

<sup>78</sup>S. J. Bodie, *Aloft: A Meditation on Pigeons and Pigeon-Flying* (New York: Lyons and Burford, 1990), 23.

<sup>79</sup>Crouse, "Noah's Ark," 69.

<sup>80</sup>Weatherbase, "Historical Weather for Cizre, Turkey," *Webmaster, Cauty and Associates LLC* (2001): 1.

<sup>81</sup>United Nations, *Groundwater in Eastern Mediterranean and Western Asia*, Natural Resources/Water Series no. 9 (New York: Department of Technical Cooperation for Development, 1982), 58.

<sup>82</sup>J. M. Renfrew, *Palaeoethnobotany - The Prehistoric Food Plants of the Near East and Europe* (London: Methuen, 1973), 133.

<sup>83</sup>A. Tanoğlu, S. Erinc, and E. Tümerterkin, *Türkiye Atlası (Atlas of Turkey)* (Istanbul: University of Istanbul, 1961), no. 903, 1:2,500,000, map 68.

<sup>84</sup>D. J. Wiseman, "Mesopotamian Gardens," *Anatolian Studies* 33 (1983): 138.

<sup>85</sup>M. C. Astour, "Overland Trade Routes in Ancient Western Asia," in *Civilizations of the Ancient Near East* 3, ed. J. M. Sasson (New York: Charles Scribner, 1995), 1409; and G. Algaze, "Fourth Millennium BC. Trade in Greater Mesopotamia: Did It Include Wine?" in *The Origins and Ancient History of Wine*, 90-1, map 8.1.

<sup>86</sup>Hill, "A Time and Place for Noah," 36.

<sup>87</sup>Young, *The Biblical Flood*, 52.

<sup>88</sup>Ibid., 22-3.

<sup>89</sup>H. Ross, "Noah's Floating Zoo," *Facts and Faith* 4 (1990): 4.

<sup>90</sup>Ramm, *The Christian View*, 177.

<sup>91</sup>L. M. Davies, "Scientific Discoveries and their Bearing on the Biblical Account of the Noachian Deluge," *Journal of the Transactions of the Victoria Institute* (London: Philosophical Society of Great Britain, 1930), 133.

<sup>92</sup>J. T. Ator, *The Return of Credibility* (New York: Vantage Press, 1998), 37.

<sup>93</sup>W. L. Holladay, *A Concise Hebrew and Aramaic Lexicon of the Old Testament* (Grand Rapids, MI: Eerdmans, 1971), 102.

<sup>94</sup>H. F. Vos, "Flood (Genesis)," 316.

<sup>95</sup>Bottéro, "The Cuisine of Ancient Mesopotamia," 42.

<sup>96</sup>Ross, "Noah's Floating Zoo," 5.

<sup>97</sup>Ator, *The Return of Credibility*, 37.

<sup>98</sup>Stiebling, "A Futile Quest," 16.

<sup>99</sup>Cassuto, *A Commentary on the Book of Genesis* part 2, 26, 46.

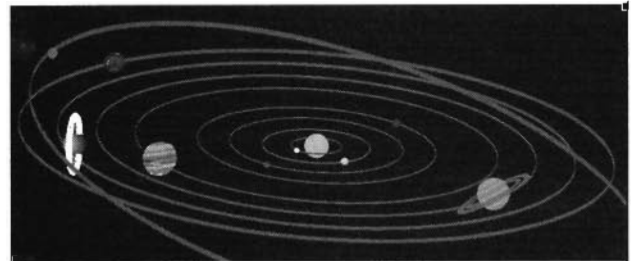
<sup>100</sup>Ibid., 4-5; and A. S. Issar, *Water Shall Flow from the Rock: Hydrogeology and Climate in the Lands of the Bible* (New York: Springer-Verlag, 1990), 37.

<sup>101</sup>For a primary source on the King List, refer to T. Jacobsen, *The Sumerian King List* (Chicago: University of Chicago Press, 1939).

<sup>102</sup>Woolley, *Excavations at Ur*, 35.

<sup>103</sup>M. E. Mallowan, "Noah's Flood Reconsidered," *Iraq* 26 (1964): 69; and H. P. Martin, *Fara: a Reconstruction of the Ancient Mesopotamian City of Shuruppak* (Birmingham: Martin Associates, 1988), 113.

<sup>104</sup>Cassuto, *A Commentary on the Book of Genesis* part 2, 4.



## Astronomy and Cosmology: *The Heavens Declare the Glory of God!*

Researchers at the cutting edge of cosmological discovery will share their findings and faith at the 58<sup>th</sup> ASA Annual Meeting from July 25 to July 28, 2003 at Colorado Christian University in Lakewood, CO. One featured speaker will be:

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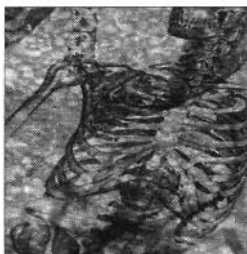
We welcome contributed papers and poster presentations on all topics related to science and Christianity, with special consideration given to those that focus on astronomy and cosmology. Papers should be based on work in your area of expertise.

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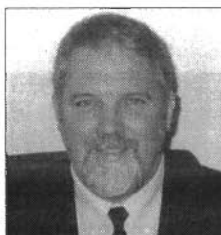
**58<sup>th</sup> ASA Annual Meeting**  
**Colorado Christian University**  
**Lakewood, Colorado**  
**July 25-28, 2003**



## Article

*Dialectical Realism in Theology and Science*

# Dialectical Realism in Theology and Science



*I have developed a version of scientific realism which I call "dialectical realism."*

*I seek to provide a philosophical framework for bringing theology and the sciences into a closer relationship. This closer mutual modification can be described as developing a Christian and scientific world view. I advocate, first of all, a dialectical approach, building upon Greek theologians (Pseudo-Dionysius and Maximus the Confessor) and a German philosopher (T. W. Adorno). I also argue that a sophisticated, dialectical realism is superior to both naive realism and anti-realism for progress in the religion-science dialogue.*

The recent and welcome growth of interest in the religion and science dialogue has created a large collection of books, articles, lectures, conferences, and even new positions in major universities. The religion and science dialogue has important issues on its agenda that are constructive and substantial, which are not part of philosophy. But philosophy (along with the disciplines themselves) provides an interdisciplinary framework or environment in which the debate takes place. Some of the differences among various voices in this debate are fundamentally philosophical differences, rather than religious or scientific ones. I do not think that philosophy should dominate this dialogue, but it can provide some useful clarifications and questions, especially given the current interest in post-modernity from all sectors of the academy. I agree with Wentzel van Huyssteen and Nancey Murphy, who in recent lectures are calling for a post-foundational or post-modern epistemology, which should help create a philosophical space in which there can continue a fruitful dialogue and exchange between theology and the special sciences.<sup>1</sup>

**Alan G. Padgett** is a Methodist theologian and pastor, with a life-long interest in natural science. A Californian, he is only just now finding out how cold a winter can really be, having recently accepted the call to be Professor of Systematic Theology at Luther Seminary in Minnesota. He holds academic degrees from Vanguard University (B.A.), Drew University (M. Div.) and the University of Oxford (D. Phil.). The author or editor of five books and numerous journal articles, he is well known for his contributions to philosophy of religion, philosophy of science, and systematic theology. He has thrice lectured on issues of religion and science at symposia in China (Peking University), and was part of the three-year Oxford Templeton Seminars on Science and Christianity. His most recent work is *God and Time: Four Views* (ed. Greg Ganssle, 2001), and he is working on a book for Eerdmans on the topic of theology and science. His e-mail address is: <apadgett@luthersem.edu>.

In the last few years, I have been developing a proposed *collegial metaphor* for the relationship between theology and the sciences, in the context of a *mutuality model*.<sup>2</sup> The basic idea is that theology and the special sciences should work together to help us develop world views that are both scientific and meet our deepest religious needs. I seek to go beyond dialogue in a mutuality model, in which it is rational (in certain circumstances) for theology to influence the content of science, and *vice versa*. This proposal, however, raises serious issues. To meet some of these questions, I have developed a version of scientific realism which I call "dialectical realism."

The purpose of this article is to sketch the outlines of this epistemological framework. Different models of the proper relationship between religion and science often are based upon different philosophies. I hope to set forth the philosophical frame within which a mutuality model for theology and science can best be pursued. Other philosophical frameworks are possible, but this one is a particular proposal for grounding the mutuality model in epistemology, philosophy of science, and metaphysics.

## Why Dialectic?

I believe a dialectical approach is the most fruitful epistemology for the current religion-science dialogue. For one thing, a dialectical approach is needed in both religion and science because of the problem of perspective. All of our knowing arises from our location, our point of view, and our cultural context.

Even the natural sciences are located in culture, language, and history. None of us has a God's eye view, a "view from nowhere." Any approach that hopes to grasp the object of our studies will need a host of contrasting, alternative points of view on that object. A single flower can be studied from the perspective of *every* discipline in the natural sciences! Even such an exhaustive analysis will only begin to grasp the full nature of that single bloom of living matter. The world is an amazing and astounding place—we need as much and as many insights as possible. Plato, in fact, made this point long ago in the *Republic*. He also called this process "dialectics."<sup>3</sup>

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*The key to dialectics is the notion that important insights can be gained from contrasting perspectives.*

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Plato is the father of dialectical thinking. The key to dialectics is the notion that important insights can be gained from contrasting perspectives. Voices in conflict may each grasp a partial truth. When Abelard wrote his famous *Sic et Non*, he used contrasting opinions to search more fully toward the truth.<sup>4</sup> In modern times, Kant, Hegel, Marx, and even Kierkegaard were all masters of dialectical thinking. The problem with these great masters of dialectics (excepting SK) was their attachment to grand meta-narratives. Plato, Hegel, and Marx placed dialectics into a grand synthetic system. They had an over-attachment to philosophical speculation, especially their own conclusions and philosophies. Whether under the name of the Realm of Forms, Absolute Spirit, or dialectical materialism, these philosophers were too enamored of speculative systems, which tended to obliterate in a synthesis the original tensions between thesis and antithesis. This drowning of difference has come under severe attack by postmodern critics, and I find these criticisms very much on target. To this extent, a dialectical realism is not a complete "system" of thought, but rather a proposed approach to epistemology in science and theology. At this point, I will focus on philosophy. (Later, in this paper, we will look at the dialectical theology of Greek orthodoxy, which is my preferred approach in theology.)

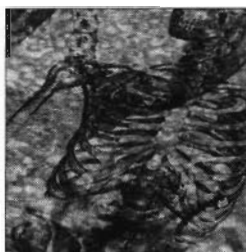
In his brilliant book *Negative Dialectics*, Theodor Adorno develops a postmodern dialectic that avoids the excesses of Plato, Hegel, and Marx.<sup>5</sup> Adorno rightly notes that "matters of true philosophical interest at this point in history" are the very ones that Hegel scorned, namely "nonconceptuality, individuality, and particularity" (p. 8). We need to pay attention to detail, to the concrete, and to difference. Adorno was a philosopher of art, and the artist in any medium pays particular attention to details. Nega-

tive dialectics pays attention first of all to the limitations of any philosophical concept. Adorno says: "A matter of urgency to the concept would be what it fails to cover, what its abstractionist mechanism eliminates, what is not already a case of the concept" (p. 8). Reality greatly exceeds any and all philosophical concepts. For this reason, negative dialectics begins with the criticism of current theories, concepts, and accepted systems of thought. But for Adorno, unlike some postmodern critics, criticism is not the whole story. He says: "In criticism we do not simply liquidate systems, however" (p. 24). The purpose of dialectical thinking, which seeks tensions, contradictions, and differences, is to open philosophy and science up to the reality of particularity. Adorno was a critic of both enlightenment absolutes and the easy relativism of the contemporary culture (pp. 35–7).

Attention to detail, to particularity, and to the concreteness of reality leads us to value different voices and perspectives on the object. Dialectics begins with the difference between word and object, with Derrida's *différance*. No word, no definition, is fully adequate (working definitions may be adequate for a limited purpose, of course). Therefore, a variety of languages and definitions, a variety of attempts to capture experience in words, is more than welcome. This will no doubt lead to contrasting, even conflicting, points of view about the object. Contemporary orchestral music often finds beauty in contrasting tones, even in clashing notes, rather than in the harmonies of classical music. This attitude is one that Adorno brings to philosophy. Synthesis is suspect.

Yet *science is synthesis*. The great breakthroughs in science have been a combination of saturation in the details of the subject and insightful, imaginative new models, laws, and theories. Copernicus, for example, was seeped in astronomical data. True, Kuhn has argued persuasively that Copernicus did not rely solely upon data to create his new paradigm.<sup>6</sup> But he was certainly intimate with all the relevant facts. Kuhn himself notes: "Copernicus is among that small group of Europeans who first revived the full Hellenistic tradition of technical mathematical astronomy which in antiquity had culminated in the work of Ptolemy."<sup>7</sup> In a different field, much the same general remark can be said of Darwin's new explanatory scheme in biology, which was rooted and grounded in biological details. The point is that science does advance through synthesis, at least in part. A new theory in a particular discipline contains a synthesis of older material and older problems, which the new theory gives better insight into (even while it creates new problems and avenues of research). If synthesis is suspect, then is not also science suspect?

The answer to this important question comes, I believe, both in our attitude toward scientific knowledge and in Adorno's proposed corrections to dialectical method, *viz.*,



## Article

### *Dialectical Realism in Theology and Science*

*Dialectics begins with difference and with the epistemological fact that all knowing is a kind of interpretation; ... with the gap between word and thing, and the inherent limitation of all concepts, definitions, and formulae.*

attention to the particular and an “ensemble of analyses.” Not all systems of thought, nor all dialectics, are alike. Adorno rightly rejects a “closed system” which is “bound to be finished” (p. 27). Such a system pretends to be absolute, and in this pretense, it distorts the particular. The antidote to this is a healthy grasp of the limitations of concepts, systems, and philosophical reflection attached to a new objectivity that pays greater attention to the objects themselves. Adorno says:

What is waiting in the objects themselves needs such intervention [from philosophy] to come to speak, with the perspective that the forces mobilized outside, and ultimately every theory that is brought to bear on the phenomena, should come to rest in the phenomena (p. 29).

A new kind of objectivity is called for. Not a supposedly “neutral” or “value-free” science, which is impossible, but an objectivity that takes the particularity of things seriously. There is nothing here that is contrary to a genuinely scientific attitude, which is always self-critical, always paying attention to the facts. When we invest too much in scientific knowledge, however, we can easily lose this critical scientific attitude. As Adorno rightly argued, a scientific perspective or “objectification” upon things is a powerful but limited abstraction (p. 43). Reason itself must not be identified with this mathematical and measurable abstract reasoning, and there is more to truth than scientific truth. But these insights need not inhibit science. On the contrary, they liberate it from false demands and pseudo-religious attitudes, which one sees all too often in the popular mindset and mass media.

Besides a new objectivity which respects difference and particularity, Adorno recognizes the philosophical needs for something like a “system” of ideas. He says:

The call for binding statements without a system is a call for thought models, and these are not merely monadological in kind ... Negative dialectics is an ensemble of analyses of models (p. 29).

This metaphor of an ensemble, or elsewhere a “constellation,” suggests the need to see models and concepts in their inter-relatedness. But the metaphor is also put forward

as a way of avoiding the totalizing tendencies of synthesis and conceptual system. A constellation or an ensemble may have tension, even contradiction, within it. There need not be a commitment, such as we find in Hegel, to a “true light” which sees everything in a completed whole, that is, in a finished system.<sup>8</sup> In an ensemble, things still are connected and related around a general theme or subject.

Scientific knowledge is not a great system of ideas. The actual body of scientific knowledge in any age ends up being closer to an ensemble of models, metaphors, and ideas, rather than some tightly connected logical system of propositions. If we return to our example of a single flower, what the various sciences can tell us about this flower is much closer to an ensemble than a system. In this particular case, there is no tension or paradox—but there might be in more difficult scientific subjects.

Dialectics begins with difference and with the epistemological fact that all knowing is a kind of interpretation; it takes place from a particular perspective. It likewise begins with the gap between word and thing, and the inherent limitation of all concepts, definitions, and formulae. The resulting epistemology is dialogical, communal, and historical. Like good diplomacy, knowledge takes time; it improves with serious debate and attention to differences.

## Why Realism?

The second aspect of epistemology, which I commend to those interested in the religion and science dialogue, is realism.<sup>9</sup> Attention to differences demands that we notice that not all “realism” is alike. There are at least naive realism and critical realism. To this list, I should like to add dialectical realism. We also should notice that realism is not a global concept. Rather, we are most often realist or non-realist with respect to some domain of inquiry, like numbers or beauty. Most criticism of realism in philosophy is an attack upon naive realism, a viewpoint I am not interested in defending here. No one who begins with dialectics is going to support a naive or direct realism in epistemology. On the other hand, I accept many of the arguments and positions of critical realism, but I want to supplement and extend these insights with a dialectical approach.<sup>10</sup>



Critical realism in the United States arose as a critique of idealism among a group of American philosophers, starting with Roy Sellars in 1916. These philosophers were responding to the then-dominant school of Anglo-American Idealism, publishing a book of essays critical of that movement.<sup>11</sup> Realism historically arose as a rejection of the idealists' overemphasis upon human consciousness and experience. Put in terms of Bishop Berkeley's philosophy, realism at its core insists upon a rejection of the notion that *esse est percipi* (to exist is to be perceived). It is possible to exist, to be real, without being experienced or perceived in any way: or at least this is the bedrock commitment of "realism" as they understood it, and as I wish to defend it in this paper. Scientific realism, then, is the view that *the subjects that are studied in the special sciences exist independently of that human experience which is at the base of science*. Theological realism, likewise, is committed to the view that the true object of religious experience exists independently of human experience, if it exists at all. Both of these positions are quite controversial in today's philosophical context, yet both are important for the collegial metaphor and mutuality model we are developing here.

If some form of radical empiricism is taken in philosophy, for example, there is no reason to expect coherence between various realms of reality (or we had better say, "experience"), and the various special sciences that study them. This is because, if there is no underlying reality behind our experiences, given the assumption-laden character of all experience and perception, why should we expect any coherence at all? Different domains of our experience, such as nature and religion, need have no coherence between themselves: reason will only demand an internal coherence. Ernan McMullin notes:

Take, for example, the desideratum that a theory should be consonant with well-established theories elsewhere in science ... From the non-realist standpoint, there is no reason why such a requirement should be enforced.<sup>12</sup>

From a non-realist account, a theory is merely a formalism for generating accurate predictions. As long as it does its job as a predictor, we cannot worry about any conflict it might have with the invisible parts of other theories since we do not actually believe in the invisible theoretical parts of the theory.

Why is (dialectical) realism so important for the mutuality model? The answer has to do with the basis for their mutual influence, and the notion of developing a coherent world view. If there exists a real world, independent of human experience, then our world view should be aimed at understanding that world as fully as possible. For this fuller understanding, we need all of the disciplines of the university, including the human sciences and theology. We will expect greater coherence in our world view, because we believe at bottom there is one reality, which is whole and coherent. On the other hand, given some kind

of non-realism, we have no reason to expect coherence among the many and diverse areas of academia. Various disciplines, with their quite distinct methods, aims, and histories, are so different that we have no rational basis for expecting some kind of coherence among them. The collegial metaphor and mutuality model for religion and science dialogue likewise assumes that truth in one area rightly affects our grasp of truth in another area, because there is one real, independent world that we study in the various disciplines. Without some kind of sophisticated realist metaphysics, these epistemological commitments and goals are difficult to justify.

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What motivates realism? One answer might be humility. Human experience is not the sole determinant of reality, according to the realist. Non-realism may be too epistemologically anthropocentric for a more humble approach to the world, which does not place human beings at the center of value. Another motivation is the underlying intuition that we are dealing with reality, both in our interaction with the world and in our spiritual life. We may not have a perfect grasp of that reality, but we know it is there. We exist in and with the world, and yet reality also exists independent of us: we neither create nor control it (except in a rather small way). Yet fundamental to my realism is the conviction that there is a God who is the utmost Real Being. God is the creator of all reality. God has created you and me, and all other things. Thus, reality (God and the world) exists independent of me. If theism is true, then there is one God, one world, and one complete system of truth (*viz.*, God's own knowledge). In fact, Kant at one point defines God as the one who alone has perfect intuition of the thing-in-itself (noumena).<sup>13</sup> Of course, as humans we do not have God's knowledge. We know phenomena, not noumena. But we would be foolish to deny the existence of the noumenal world just because we humans are limited to phenomena. In Kantian terms, this would be to deny the existence of God.

Most definitions of realism have focused on epistemology. Beginning there is a *mistake*. It distracts us from the real force of critical or dialectical realism, which is ontological. Human beings do not create reality nor do they determine what counts as real. It is another matter entirely, however, when we talk about our grasp of reality. In this



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## Article

### *Dialectical Realism in Theology and Science*

arena, namely in epistemology, much of the criticism voiced by non-realist philosophy can be granted. We do not have a perfectly clear understanding or experience of either the world or God. All of our perceptions and descriptions are already assumption-laden. There are always gaps between word and object, and so forth. But on the level of ontological commitment, there is very little reason to follow non-realism, and excellent reasons not to do so. Most non-realists are attacking a simplified and naive epistemology, which they label "realism" for their own rhetorical purposes. After attacking this simple viewpoint, they announce their own, superior form of non-realism.

Let us take Hilary Putnam as an example. He develops his own brand of non-realism, fetchingly called "internal realism" just to confuse the unwary! His opponent is "metaphysical realism" or "externalism," which he identifies in this way:

[For this view] the world consists of some fixed totality of mind-independent objects. There is exactly one true and complete description of "the way the world is." Truth involves some sort of correspondence relation between words or thought-signs and external things and sets of things. I shall call this perspective the *externalist* perspective, because its favorite point of view is a God's Eye point of view.<sup>14</sup>

Let us critically examine this Straw Man definition. First of all, why is the realist (or externalist) committed to a *fixed* totality of objects? Yes, reality is mind-independent in its fundamental existence, but why "fixed"? Do we not believe in the process of becoming? This word is just a rhetorical flourish. Second, a dialectical realism does not affirm that there is exactly one true description of the world for a *description is given in a language*. Rather, assuming the existence of God, the realist is committed to there being one exactly true *knowledge* of the way the world is. But God's knowledge of the world is direct and internal, as the omnipresent Creator and Sustainer of all that exists. As such, God's basic knowledge of things is neither linguistic nor propositional nor symbolic: it is direct and ontological. Realists take it as a given that human beings are not God, and the way humans see things does not deter-

mine reality! Finally, realism is not committed to a picture-theory of meaning, or a simplistic correspondence theory of truth. By saddling "external realism" with all of these epistemological burdens, Putnam finds it easy to knock down his opponent and make way for his brand of non-realism ("internal").<sup>15</sup>

Alas, Putnam is not the only one to resort to such Straw Man definitions. A recent essay by evangelical philosopher Brad Kallenberg defines a "realist" as (1) one who holds to a "representational theory of language," and is therefore (2) committed to "some version of the correspondence theory of truth," and (3) "who believes that reality divides neatly into subject and objects (or into language and world; or ideas and things)."<sup>16</sup> All three of these assertions are false—as far as I can tell—at least among sophisticated realists.

The representational or "picture" theory of meaning has been out of fashion among realists since the work of the late Wittgenstein. The correspondence theory of truth is not a very common commitment, although it still has a few defenders. I prefer what William Alston has recently called a "minimal realist" theory of truth for propositions.<sup>17</sup> But realism *per se* does not imply one specific theory of truth (one could be a pragmatic realist like John Dewey, for example). And why must the realist hold that subject and object divide "neatly"? Is Kallenberg denying the difference between subject and object? That is just another form of idealism, of course. While a realist does believe there is a difference between subject and object (or word and thing) in philosophical analysis, it does not follow that this is a "division" or "separation" except in thought. What we have here is yet another example of caricature rather than analysis.

What epistemology is "realism" committed to? There is no right answer to this question, because there are many types of realism. I prefer dialectical to critical realism, because of the reasons already given in favor of dialectics. Critical realists usually take an individualistic and synchronic view of epistemology. I believe that knowledge and perception are diachronic, dialogical, communal, and traditional. It is this epistemology within which a mutuality model most naturally finds its home.

## Realism and Theological Knowledge

Even if we can begin to make a decent argument for realism in science, it seems well nigh impossible to argue for realism in religion in today's academic context. I believe there are good arguments for realism even in religion. The first is that this is the viewpoint of most religious believers. The Ultimate Reality that they worship and live for must be real to be worshiped and for prayer to make sense. Even religions such as Taoism or some forms of Buddhism that have no simple God or gods nevertheless assert some religious truths, and they believe them to be true independent of what other people may think or experience. Perhaps religious believers—who disagree so much among themselves—may be deluded about this.

The second reason has to do with knowledge and explanation. For the purposes of religion and science dialogue, the notion of realism in religion can be factored out as theological explanation and theological knowledge (or better, claims to knowledge). If both of these are allowed as legitimate and possible, then this is all the "realism" in religion that our mutuality model demands. Theological explanation will only be accepted if God (for theistic religions) is real, and causes things to happen (creates the world, for example, or meets Moses at the burning bush). Other than denying the existence of the true object of religious faith, I can see no reason in principle to deny the possibility of theological explanation. Obviously, an atheist will deny it, but that argument will take place in another area of philosophy. I can find no reason why religious believers should deny theological explanation, unless they think their God is just a symbol for human aspirations. But that is another way of saying that God does not exist.

So we now turn to the question of theological knowledge-claims. What counts, then, as knowledge of God? What is theological knowledge? It is, first of all, *not* knowledge *about* a religion. Knowledge about religions is certainly possible, for religion is a human institution with history, texts, and artifacts. No one should deny that we can have knowledge *about* religion—otherwise teachers in religious studies would be without a job. What I mean by theological knowledge is knowledge of the Object and Subject of religious faith. Theology, as I use the term, is the conceptual, abstract dimension of a religious tradition. In this sense, there is Muslim, Hindu, Christian, and even Taoist "theology."

In Western religious terms, theological knowledge is knowledge about God, and not about religion, human religious experience, nor religious faith. Theological knowledge may come *through* a religious tradition, religious experience, or religious faith, but these items are not what theological knowledge is *about*. Theology, after all, is the study of God. Theology, therefore, should not be confused

with religious studies, though it often is. Religious studies is the study of religion; theology is the study of God.

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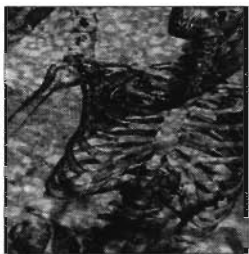
In his recent, excellent book on *Religion and Revelation*, Keith Ward sets forth a program of "comparative theology" which is not part of any religious tradition.<sup>18</sup> Ward wants to study God from the perspective of any and all religious traditions, Scriptures, and experiences. He wants to move us away from the older concept of theological knowledge as doctrine, that is, as assured propositional knowledge. He states:

The propositions of theology are concerned to articulate and express, always provisionally and indirectly, such disclosures and forms of commitment [within a religion], rather than to define a set of truths which are directly and precisely descriptive of suprasensory reality (p. 29f).

Ward rightly insists that the communal and tradition-constituted project of knowing God is best understood as modest, provisional, dialectical, and open to revision. His perspective is very much in line with the proposal we are making concerning the mutuality model.

Even conceived in such modest terms, however, is theology possible? Can we have conceptual, propositional knowledge of the Great Ultimate (God, the Tao, etc.)? Against some philosophers who would question the very idea of theological knowledge, I argue that such knowledge is possible for human beings in this world. Theology is always paradoxical. I have no quarrel with those who think that theological knowledge is paradoxical, difficult, or can never arrive at the full truth. My complaint here is against those who argue that theology *per se* is impossible, or who misrepresent the object of theological study. Many philosophers and theologians could be discussed on this point, but for the sake of brevity, I will focus on Martin Heidegger.

Heidegger began his academic studies in theology, and tells us that theological studies brought him to an interest in hermeneutics and phenomenology.<sup>19</sup> He published two essays on the relationship between theology and philosophy, which have become famous.<sup>20</sup> He correctly sees that theology is a "positive science," that is, an area of knowledge with an object of study. So far we are in agreement.



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## Article

### *Dialectical Realism in Theology and Science*

But Heidegger wrongly attributes to theology the study of *faith* (that is, *die Christlichkeit* or Christianness) rather than the study of God. Heidegger claims that the “given” or basic data of theological science is Christian faith and practice. He says:

Thus we maintain that what is given for theology (its *positum*) is Christian-ness ... What does “Christianness” mean? We call faith Christian. The essence of faith can formally be sketched as a mode of human existence (p. 9).

Christianness, then, is the life of faith. And this faith is the basis of theology as a positive science.

Heidegger is mistaken in his grasp of the purpose of theology as a positive science. I do believe that theology is a positive science (in the German sense of *Wissenschaft*), but with a different purpose. The purpose of theology is to understand the gods. In this quest, of course, theology can and should make sense of the way of life within a particular religion. However, this is not the only, or the chief, purpose of theology. Theology is, in part, the rigorous academic study of the Great Ultimate within a particular religious tradition. Of course, in making this mistake, Heidegger is in good company! The problem with this common view is, in the end, it collapses theology into religious studies (a collapse I am trying to avoid). This is so even when Heidegger allows that theology must also study “that which is revealed in faith” (p. 9), for such a study also can be merely descriptive (for example, “Christians believe that God is so-and-so”). This is clear when, in another essay, Heidegger states:

Above all else one must determine what theology, as a mode of thinking and speaking, is to place in discussion. That is the Christian faith, and what is believed therein (p. 22).

On the contrary, if theology is a discipline at all (a “positive science”), it must have the god as its object of study. What theology “places into discussion” is God, therefore, and not “faith.”

The idea that theology can yield both knowledge and explanation is controversial, yet crucial to the mutuality model. Without these, it would make no sense to modify our science in the light of our theology. This

kind of minimal “realism” in theology can be defended against critics, but needs much more elaboration than we can provide here.

## Dialectical Realism in Theology

I have argued for “theological realism” understood as the affirmation of theological explanation, combined with the acceptance of the possibility of theological knowledge. But this knowledge and realism should not be accepted without qualification. Once again, we can turn for help to dialectics, this time the dialectical theology of Greek Orthodoxy.

Although I greatly admire the German-speaking founders of “dialectical theology” during the twentieth century, for my own model of dialectical realism in theology, I am in debt to the Greeks.<sup>21</sup> Pseudo-Dionysius (ca. 500 AD) developed the language and method of a negative theology (apophatic) and a positive or affirmative theology (cataphatic), both of which are important.<sup>22</sup> This tradition of dialectical theology has roots in the Cappadocian theologians of the fourth century, and is developed in such great Greek theologians as Maximus the Confessor and Gregory Palamas. In this tradition, God’s own existence is affirmed, but God’s infinite Being is understood to be beyond all thought and all language. The highest theology, then, is mystical theology, or the life of prayer and worship. Dionysius puts it this way in the beginning of his *Mystical Theology*:

Timothy, my friend, my advice to you as you look for a sight of the mysterious [or mystical, *mystikos*] things, is to leave behind you everything perceived and understood, everything perceptible and understandable, all that is not and all that is, and, with your understanding laid aside, to strive upward as much as you can toward union with him who is beyond all being and knowledge.<sup>23</sup>

We should understand that this is a realist theology, but it is not a naive realism. The highest and best form of theology is mystical union with God. This God is not just a symbol (although Dionysius would agree that the word “God” is a limited human symbol). It is hard to understand how Gordon Kaufman, in his influential *An Essay in Theo-*

*logical Method*, can characterize traditional theology as holding "God exists independently of the perceiver or knower and has a definite character which can be described."<sup>24</sup> Dionysius was quite influential in Latin theology (after being translated into Latin by Robert Grosseteste in the thirteenth century), and the basic point is common in Platonic-Christian thought as a whole, including the Latin tradition. It is hard to see how "God has a definite character which can be described" is anything like this traditional understanding of theological language. Kaufman goes on to insist that Kant "first [!] pointed out the root difficulties with this view, but his revolutionary insights remain unappreciated in much theological work." Kant is important because he "saw that ideas like 'God' and 'world' performed a different kind of function in our thinking than concepts like 'tree' or 'man'" (p. 29). Such an exposition completely ignores the tradition of dialectical theology I am seeking to recover.

The practice of Dionysius and other Greek theologians of the past ends up being something like Adorno's "cluster of metaphors." His famous book, *The Divine Names*, is a series of models and metaphors within which positive theology seeks to know something about God.<sup>25</sup> In his book *The Mystical Theology*, Adorno provides a kind of "critique of models" (by means of negative theology) that he was also interested in developing. T. F. Torrance once put this Greek theological position in three points:

1. The unapproachableness of God, which calls forth from us the attitude of worship and reverence;
2. Only by God is God known, and only through God is God revealed; and
3. The application of our ordinary language to speech about God involves a fundamental shift in its meaning.<sup>26</sup>

In my own terms, seeking to know the One who loves us, and yet is beyond our comprehension, leads to a theology with two moments. A positive theology, based upon the Word of God (the Second Person of the Trinity) as true revelation, is balanced with a negative theology, which negates the finite and worldly language we are forced to use concerning the One that is beyond all being and all thought and all language. Maximus the Confessor put the point this way in his *Two Hundred Chapters on Knowledge*. On the one hand, "Every concept involves those who think and what is thought, as subject and object. But God is neither of those who think nor of what is thought for he is beyond them." At the same time, there is a positive knowledge of God through his Word, the Son. "In Christ who is God and the Word of the Father there dwells in bodily form the complete fullness of deity by essence," being the full Word and Mind of God, he is able to "reveal the Father whom he knows."<sup>27</sup> Finally, both the apophatic and the cataphatic theologies are best combined in the life of prayer and spiritual discipline (mystical union), and in the worship of the community of faith (liturgy). This is the

kind of dialectical realism in theology, which I believe is most fruitful for the religion-science dialogue, for it pays attention both to the need to develop a metaphorical theology grounded in the Word of God and our ecclesial life of the Spirit. At the same time, it continues a critique of any and all language about God, or confident claims to know the truth about God. The Eastern tradition has kept alive the important point that theology is not done fully in academic seminars, but in the life and worship of the Church and the disciples of Jesus in the world today.

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This brief essay into philosophy has sought to explain and defend a dialectical realist approach to science and theology.<sup>28</sup> I believe such an approach will prove to be most fruitful as we seek to develop a world view that is both fully scientific and fully Christian. Both the realist and the dialectical elements of my proposal assist us in taking seriously the need for theology and science to mutually inform and modify each other. As such I find a sophisticated, dialectical realism the best philosophical framework for continued dialogue between theology and the sciences. ✱

## Notes

<sup>1</sup>See Wentzel van Huyssteen, *Duet or Duel?* (London: SCM, 1998); Nancey Murphy, *Reconciling Theology and Science* (Kitchener, ON: Pandora Press, 1997). Both books represent lectures given in Canada.

<sup>2</sup>See A. G. Padgett, "The Mutuality of Theology and Science," *Christian Scholar's Review* 26 (1996): 12-35; and my forthcoming book, *Science and the Study of God: A Mutuality Model for Theology and Science* (Grand Rapids, MI: Eerdsman).

<sup>3</sup>*Republic*, book 7, 530d-e. Aristotle's definition of "dialectical reasoning" in the *Topics* is quite different, and does not affect current usage.

<sup>4</sup>See the critical edition of *Sic et Non*, ed. B. B. Boyer and R. McKeon (Chicago: University of Chicago Press, 1977). Abelard also wrote a book with the title *Dialectica*, trans. L. M. de Rijk (Assen: Van Gorcum, 1956) which was an introduction to logic.

<sup>5</sup>T. W. Adorno, *Negative Dialectics*, trans. E. B. Ashton (New York: Seabury, 1973). Page numbers in the text are to this work.

# Article

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<sup>6</sup>Thomas Kuhn, *The Copernican Revolution* (Cambridge, MA: Harvard University Press, 1957).

<sup>7</sup>Ibid., 135.

<sup>8</sup>Hegel's definition of dialectical reasoning is "the indwelling tendency outwards by which the one-sidedness and limitation of the predicates of understanding is seen in its true light, and shown to be the negation of them. For anything to be finite is just to suppress itself and puts itself aside." *Encyclopedia of the Philosophical Sciences*, § 81 (tr. T. F. Geraets, as *The Encyclopedia Logic* [Indianapolis: Hackett, 1991]).

<sup>9</sup>For some other defenses of realism in theology, see Ian Barbour, *Issues in Science and Religion* (London: SCM, 1966); T. F. Torrance, *Reality and Scientific Theology* (Edinburgh: Scottish Academic Press, 1985); Arthur Peacocke, *Intimations of Reality* (Notre Dame: University of Notre Dame Press, 1984); Janet M. Soskice, "Theological Realism," in *The Rationality of Religious Belief*, ed. W. J. Abraham and S. W. Holtzer (Oxford: Oxford University Press, 1987); Polkinghorne, *One World* (London: SPCK, 1987) and his *Belief in an Age of Science* (New Haven: Yale University Press, 1998); Roger Trigg, *Rationality and Religion* (Oxford: Blackwell, 1998); J. Wentzel van Huyssteen, *Essays in Postfoundationalist Theology* (Grand Rapids, MI: Eerdmans, 1997); John Cobb, "In Defense of Realism," in *Theology at the End of Modernity*, ed. Sheila Davaney (Philadelphia: Trinity Press, 1991); K. V. Niekirk, "A Critical Realist Perspective," in Niels Gregersen and J. W. van Huyssteen, eds., *Rethinking Theology and Science* (Grand Rapids, MI: Eerdmans, 1998); and Sue Patterson, *Realist Christian Theology in a Postmodern Age* (Cambridge: Cambridge University Press, 1999).

<sup>10</sup>Roy Bhaskar, in *Dialectics: The Pulse of Freedom* (London: Verso, 1993) also sets forth a "dialectical critical realism" for both philosophy of science and social philosophy, sharing some of the goals of my own work. But his approach and general position is quite different from the one adopted here.

<sup>11</sup>The origin of the term is a book by Roy Sellars, *Critical Realism* (Chicago: Rand, McNally, 1916). The collected volume is Durant Drake, et al., *Essays in Critical Realism* (London: Macmillan, 1920), which includes essays by Sellars, A. O. Lovejoy and George Santayana.

<sup>12</sup>"Epistemic Virtue and Theory Appraisal," *Realism in Science*, ed. I. Douven and L. Horsten (Leuven: Leuven University Press, 1996), 30.

<sup>13</sup>I. Kant, *Critique of Pure Reason*, trans. N. K. Smith (London: Macmillan, 1929), B70-2.

<sup>14</sup>Hilary Putnam, *Reason, Truth and History* (Cambridge: Cambridge University Press, 1981), 49.

<sup>15</sup>We should note in fairness to Putnam that in a recent book, *The Threefold Cord: Mind, Body, World* (New York: Columbia University Press, 1999), he has abandoned his earlier non-realism ("internal realism") for realism in the tradition of John Dewey and William James.

<sup>16</sup>Brad Kallenberg, "The Gospel Truth of Relativism," *Scottish Journal of Theology* 53 (2000): 183, n.12.

<sup>17</sup>W. P. Alston, *A Realist Theory of Truth* (Ithaca, NY: Cornell University Press, 1996).

<sup>18</sup>Keith Ward, *Religion and Revelation* (Oxford: Oxford University Press, 1994). This is the first book in a four-volume work in comparative theology.

<sup>19</sup>This is disclosed in a dialogue Heidegger had with a Japanese philosopher, published in *On the Way to Language*, trans. P. D. Hertz (New York: Harper & Row, 1971), 9-10.

<sup>20</sup>These are collected in his book, *Phänomenologie und Theologie* (Frankfurt a/M: Klostermann, 1970), and published in English in *The Piety of Thinking*, trans. J. G. Hart and J. C. Maraldo (Bloomington: Indiana University Press, 1976). My references in the text above are to the English translation.

<sup>21</sup>Bernard Lonergan also finds a place for dialectics, as one among several "functional specialties," in his *Method in Theology* (London: Darton, Longman & Todd, 1972).

<sup>22</sup>See *Pseudo-Dionysius: The Complete Works*, trans. Colm Luibheid (New York: Paulist Press, 1988).

<sup>23</sup>Ibid., 135.

<sup>24</sup>G. Kaufman, *An Essay in Theological Method*, 3d. ed. (Atlanta: Scholars Press, 1995), 26.

<sup>25</sup>In *Pseudo-Dionysius: The Complete Works*, 47-132.

<sup>26</sup>T. F. Torrance, *Theology in Reconstruction* (Grand Rapids, MI: Eerdmans, 1965), 30. See also his *Divine Meaning: Studies in Patristic Hermeneutics* (Edinburgh: T. & T. Clark, 1995).

<sup>27</sup>Maximus the Confessor, *Selected Writings*, trans. G. C. Berthold (New York: Paulist, 1985), "Second Century on Knowledge," § 2 (p. 148) and § 21 (p. 152).

<sup>28</sup>I am grateful to my friends John Culp and Nancey Murphy for their critical comments on an earlier version of this essay.

## Discussion on the ASA List Server

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### Language at the Dawn of Humanity

by Glenn R. Morton, ASA Member, Ramsden Lodge, 103 Malcolm Road, Peterculter, AB14 0XB, Scotland

A paper presented at the 51st Annual Meeting of the American Society of Human Genetics in San Diego, California, in October 2001 suggests that language was in existence when *Homo sapiens* first appeared on earth 120–200,000 years ago. An abstract of the paper by Knight, Underhill, Mortensen, Lin, Louis, Ruhlen, and Mountain is on the web.<sup>1</sup>

This team studied the genetics of African groups who speak in “click” languages, formally known as members of the Khoisan language family. (Click languages incorporate up to forty-eight click sounds and other unique vocal sounds not found in most of the world’s other languages.) They then compared the genetics of the Khoisan with the linguistic separation of the languages. Reasoning that, in general, genetics and language follow each other quite closely, they expected to find that people with similar genetics would speak languages that have descended from each other, because we learn our language from our parents, who share 50% of our genes with us.<sup>2</sup>

Despite the fact that both the Hadza and !Kung use unusual consonants and clicks, many linguists believe that the languages are totally unrelated. One linguist was cited:

“Linguistically, we don’t think they’re one group, and we don’t believe they have a common ancestor,” says linguist Bonny Sands of Northern Arizona University in Flagstaff.<sup>3</sup>

And Merritt Ruhlen notes:

Two isolated languages found in East Africa not far from Lake Victoria – Sandawe and Hadza – use clicks like those in the other Khoisan languages, and have been linked by Greenberg to the rest of the Khoisan family, though they are clearly the most divergent (that is, most distinctive) members of the family. Surprisingly, since they are located quite close to each other, they show little similarity to one another.<sup>4</sup>

Since both Sandawe and Hadza use clicks and have a distantly related language, we should expect that the speakers would be genetically closer to each other than to other groups. One report says:

To determine whether click languages emerged from a common tongue, anthropological geneticists Alec Knight and Joanna Mountain and their colleagues at Stanford University analyzed cells from cheek swabs of several African populations for genetic markers on the Y chromosome, which fathers pass on to sons. The more related click speakers are, Knight reasoned, the more likely it is that click languages arose relatively recently. If click speakers are genetically

diverse, that could imply that other speakers lost their clicks after the click speakers diverged into separate populations.<sup>5</sup>

The two click-speaking groups, however, are not genetically closely related. Tests of the Y-chromosome, *Science News* reports, indicate that the !Kung, who speak Sandawe among other languages, and Hadza are as genetically far apart as any two populations on earth. With these groups having both distantly related languages and yet the most genetic separation, one must conclude that the language relationship occurred a long time ago. This, in turn, implies that the two languages they speak may have diverged at the “dawn of humanity,”<sup>6</sup> i.e., the dawn of anatomically modern humans.

Could the similarity of language be due to a more recent conquest event in which the conquered people assume the language of their masters? The fact that the Y-chromosome is indicating such vast genetic separation argues very strongly against the conquest scenario. In such scenarios, the conquerors often kill the men and take the women for wives, leaving the conqueror’s Y-chromosome in the male offspring.<sup>7</sup> If either tribe had conquered the other in more recent times, the Y-chromosomes would not show such divergence.

It is also unlikely that one of the groups learned their “click” language from the other, changing the group from nonclick- to click-language speakers. Due to the difficulty of learning click languages as adults, few outsiders ever learn these languages. It is far easier for click-language speakers to learn a nonclick language than for outsiders to learn their click language.

If the click languages diverged as long ago as this study indicates, then there would be several implications for apologetics. First, no longer could we claim that spiritual humankind was created less than 50,000 years ago with the advent of the upper Paleolithic artistic explosion, as is often claimed by Christian apologists.<sup>8</sup> Spirituality requires language and without it, there is none. It is difficult to conceive of a being which can speak but has no spirituality. If humankind were speaking as long ago as 100–200,000 years, then spirituality has nothing to do with art.

Secondly, we could no longer claim that the lack of art in Neanderthal culture indicates that they had no language or spirituality, as is often claimed.<sup>9</sup> This is because the behavior of anatomically modern humans, their material culture, the items they made, and the activities they engaged in were identical to that of the Neanderthals for the first 60,000 years of their existence. Shreve writes:

According to the “Out of Africa” hypothesis, these earliest modern humans eventually spread out to take over the territory of all other existing hominids. But, so far at least, there is no sign that these hyper-successful moderns were making fancy tools, paint-



## News & Views

### *Language at the Dawn of Humanity*

*Over the years, anthropology continuously has pushed back the date for the appearance of language and this will continue. The existence of language is of immense importance to apologetics, as God taught Adam to speak.*

ing caves, or otherwise doing "modern" things. Modern behavior can no longer explain modern human form, because by all appearances modern culture didn't even exist for another 60,000 years. Suddenly, the emergence of anatomy and culture have become delaminated in time. You might as well try to account for the origin of the wind by talking about sailboats.<sup>10</sup>

The implications are clear. If humans were speaking but behaving just as the Neanderthals were, how can we claim that the lack of modern behavior among the early Neanderthals means that they could not speak? This data makes such a claim a non-sequitur.

Thirdly, if humans were speaking 100-200,000 years ago and yet possessed the same technology as hominids existing at 250,000 or even 400,000 years ago, how could we be sure that these earlier hominids did not speak? Indeed, some of the activities carried out by these ancient peoples convince some anthropologists that speech was a prerequisite. One such activity, which occurred as long ago as 800,000 years ago, concerns the building of a boat to cross the ocean. Archaeologists who have studied the technology required for *Homo erectus* to reach the island of Flores in Indonesia wrote of the need for language:

The presence of hominids on Flores in the Early Pleistocene therefore provides the oldest inferred date for human maritime technology anywhere in the world. Elsewhere, dates for such capabilities are much more recent. These findings indicate that the intelligence and technological capabilities of *H. erectus* may have been seriously underestimated. An accumulating body of evidence from elsewhere supports this conclusion (e.g., Thieme 1997).

The complex logistic organization needed for people to build water-craft capable of transporting a biologically and socially viable group across significant water barriers, also implies that people had language. Previously the organizational and linguistic capacity required for sea voyaging was thought to be the prerogative of modern humans and to have only appeared in the late Pleistocene. It now seems that humans had this capacity 840,000 years ago.<sup>11</sup>

Over the years, anthropology continuously has pushed back the date for the appearance of language and this will continue. The existence of language is of immense importance to apologetics, as God taught Adam to speak. Data like the above must be incorporated into any future apologetics. \*

### Notes

- <sup>1</sup>[www.faseb.org/genetics/ashg01/f24.htm](http://www.faseb.org/genetics/ashg01/f24.htm)
- <sup>2</sup>L. Luca Cavalli-Sforza, Paoli Menozzi and Alberto Piazza, *The History and Geography of Human Genes* (Princeton: Princeton University Press, 1994), 301.
- <sup>3</sup>[www.academicpress.com/insight/10222001/graphb.htm](http://www.academicpress.com/insight/10222001/graphb.htm)
- <sup>4</sup>Merritt Ruhlen, *The Origin of Language* (New York: John Wiley and Sons, 1994), 141.
- <sup>5</sup>[www.academicpress.com/insight/10222001/graphb.htm](http://www.academicpress.com/insight/10222001/graphb.htm)
- <sup>6</sup>John Travis, "DNA Hints at Origin of All Language," *Science News* (Oct 27, 2001): 269.
- <sup>7</sup>In the Ahnishinahbaejibway tribe, 99% of the men have European Y-chromosomes. See Milford Wolpoff and Rachael Caspari, *Race and Human Evolution* (New York: Simon and Schuster, 1997), 363-4.
- <sup>8</sup>Hugh Ross, "The Broken Tie That Binds," *Faith & Faith* 10:3, Third Quarter (1996): 6.
- <sup>9</sup>David L. Wilcox, "Adam, Where Are You? Changing Paradigms in Paleoanthropology," *Perspectives on Science and Christian Faith* 48 (June 1996): 93.
- <sup>10</sup>James R. Shreeve, *The Neanderthal Enigma* (New York: William Morrow and Co., 1995), 11.
- <sup>11</sup>M. J. Morwood, et al., "Archaeological and Palaeontological Research in Central Flores, East Indonesia: Results of Fieldwork 1997-1998," *Antiquity* 73 (1999): 285, 286.

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# Book Reviews



## ETHICS

**THE HUMAN EMBRYONIC STEM CELL DEBATE: Science, Ethics, and Public Policy** by Suzanne Holland, Karen Lebacqz, and Lurie Zoloth, eds. Cambridge, MA: The MIT Press, 2001. xxvii + 257 pages, 3 illustrations, glossary, index. Paperback; \$24.95. ISBN: 0262582082.

Appearing in the series "Basic Bioethics," this book has four divisions: (1) "The Science and Background of Human Embryonic Stem Cells," (2) "Raising the Ethical Issues," (3) "Angles of Vision," and (4) "Public Discourse, Oversight, and the Role of Research in Society." The book's twenty chapters are written by nineteen writers of different religious and scientific backgrounds.

This book encourages a very necessary debate: Should science engage unlimitedly in embryonic stem cell research? Is an embryo a human, and if not, when does "human" life start? How do we view pluripotent cells, which can grow into many different human organs? Answering these questions is difficult, but decisions should not be left to the ethicists employed by pharmaceutical companies. If they are, the end results may be what is described by Gilbert Meilaender: "... we may sometimes have to deny ourselves the handiest means to an undeniably good end. In this case the desired means will surely involve the creation of embryos for research and then their destruction. The human will, seeing a desired end, takes control, subjecting to its desire even the living human organism" (p. 144).

The government or some oversight committee should be involved in making these decisions. Cynthia Cohen writes that "a public oversight body is required that will monitor this work as it is carried out across the country. The body would also prepare for the prospect that significant issues of public concern related to the use of cloning and germ interventions will have to be addressed" (p. 220).

How do we decide when an embryo becomes a human being? I like the approach of some Jewish writers who look at this question from a Hebrew Bible perspective. There are other views presented in this book, and they all add to the discussion and provide information for considering this most important question.

*Reviewed by Jan de Koning, 20 Crispin Crescent, Willowdale, ON, M2R 2V7 Canada.*

**TRUST US, WE'RE EXPERTS: How Industry Manipulates Science and Gambles with Your Future** by Sheldon Rampton and John Stauber. New York: Penguin Putnam Inc., 2001. 359 pages, index; references; notes. Hardcover; \$24.95. ISBN: 158542059X.

"Torture the data until it confesses!" It was 1955; the research for Professor X was not giving the expected results. I looked up in horror, for if my physics education

had taught me anything, it was that honesty was not the "best" policy, it was the "only" policy. Thankfully, it was immediately obvious that my mentor was not at all serious!

This book is extremely disturbing to an idealist, and I confess to being one. If only ten percent of the stories related here are factual, then there are "scientists" in abundance who simply do not subscribe to normative professional ethics. For monetary gain, they are not shy about arguing "junk science," citing only favorable evidence while ignoring the contrary, thereby risking not only their own reputations, but also that of the profession we all love. The authors cite an abundance of instances, some involving scientists of nationwide stature. Frankly, I felt sick as I read this book.

It is an exposé of the dishonest policies that all too often lie behind the making of "industry experts." The authors show how easy it is to buffalo the media, and by extension, the public, by pseudoscientific claims made by "real" scientists whose intellectual heritage is that of nineteenth-century snake oil salesmen.

The authors, who are associated with the nonprofit Center for Media and Democracy, pull few punches, naming names and footnoting incriminating actions. Suppose you were offered \$10,000 to write a short letter for the Tobacco Institute to the *Journal of the American Medical Association* supporting their cause. According to this book, one biostatistician did so, and the letter was published. Would you accept over \$600,000 in consulting fees from a certain company and then not mention this when defending their product in Congressional hearings on that product's safety? A well-known scientist did. He testified in the Nestlé infant formula marketing story (pp. 256-7).

There are many stories like these. In all of them, some scientists "sold their souls" for personal gain, disgracing themselves and their profession. The book makes a strong case for complete disclosures of corporate influences and possible financial conflicts for those who write in scientific journals and testify as "experts" in Congressional hearings.

The authors also argue long and hard for the well-known "precautionary principle," which, simply stated, disallows products and services from the marketplace until they are reasonably and rationally checked out. But today's regulatory system, they argue, allows almost anything to be released unless it is "proven unsafe," meaning measurable harm can be shown. In other words, preventative action cannot be taken until the damage has already occurred.

To conclude this review, I will illustrate its disturbing message by telling an old, stale joke.

*Why do they bury scientists twelve feet down?  
Because, deep down, they are really good people.  
Oops! Not funny! That should be some other profession, not "scientists!"*

After reading this book you will not be so sure. Other professions have their share of shysters. So does the scientific profession. The public just has not picked on us yet.

The book is a "keeper" and is highly recommended. But it is not "happy" reading. It is clear that far too many

# Book Reviews

in our profession have lost their way. Are they a small minority? I would like to think so. Do they have a bad influence in our society? Yes. Is this a good thing? Clearly, no. Can anything be done? You'll have to answer that for yourself. Edmund Burke once said: "Nobody makes a greater mistake than the person who does nothing because only a little can be done." At least, buy the book. And then tell people about it.

*Reviewed by John W. Burgeson, Retired Government Physicist and IBM Computer Engineer, Stephen Minister, First Presbyterian Church, Durango, CO 81301.*



## FAITH & SCIENCE

**PATHS FROM SCIENCE TOWARDS GOD: The End of All Our Exploring** by Arthur Peacocke. New York: Oneworld Publications, 2001. 198 pages, index, bibliography, glossary, notes. Paperback; \$16.95. ISBN: 1851682457.

Peacocke, theologian and biochemist, promises in this slim volume to reunite science and religion, which he terms "worlds at war." Peacocke has published over 200 papers and twelve books on this topic and similar subjects, and received the Templeton Foundation Prize in 1995 for his best-known work, *Theology for a Scientific Age*. He is currently director of the Ian Ramsey Centre for the Study of Science and Religion at Oxford University.

Peacocke has a view of Christianity that differs greatly from more conventional (classical) views. On page 31, he rejects the notion of "faith seeking understanding," which for many of us in the ASA has been exactly what we thought we were about, and argues "I would urge that the only defensible theology is one that consists of understanding seeking faith ... in which 'understanding' must include that of the natural and human worlds which the sciences ... have unveiled." He (properly, I think) suggests that the inference to the best explanation (IBE) principle must be, in all investigations, scientific or religious, the "rule of the game." But then he makes other assumptions. On page 34, he writes, "... there is no evidence for any existing entities other than those emerging from the natural world." He "damns with faint praise" the Scriptures writing: "It (the Bible) remains an irreplaceable resource in our exploration towards God. Yet ..." (p. 35). Peacocke rejects classical theism, following the arguments of Hume. Miracles do not (and did not) happen, much of what the Gospels report as the sayings of Jesus are too problematical to accept (particularly those in the Gospel of John), and if one is "scientifically educated," one understands all this— for such a person "... it is incoherent ever to accept the presupposition that God intervenes in the created processes of the world ... A God who intervenes could only be regarded ... as being a kind of semi-magical arbitrary Great Fixer or occasional Meddler ..." (p. 57).

Peacocke calls himself a panentheist, carefully differentiating that position from pantheism, and contrasting it with what he terms "supernatural theism," or what most persons understand as classical theism, of which Christianity is a major part. He also uses the term "theistic naturalism" to describe his stance, as does David Ray Griffin, also a self-described panentheist. Griffin examines the reli-

gion/science question in a much more detailed manner than Peacocke in his book *Religion and Scientific Naturalism*. Still another modern panentheistic writer is Marcus Borg, who, in *The Meaning of Jesus*, debates this theological view with fellow scholar N. T. Wright, a conservative.

Is Peacock's book worth reading? I think it is. It is a "keeper" in my library. As a "supernatural theist," I learned much from this book about panentheism, and where it necessarily leads. It does not, I believe, lead to a rejection of the Christian faith, but it does point to a vastly different, and weaker, version of that faith, one, for example, in which petitionary prayer is a whistle while crossing the graveyard, and a god (God?) who is strangely impotent. But read this book for yourself; at least check it out from the library. It is worth that much anyway. Panentheism is alive and well in theological and scientific dialog today, and we ignore it at our peril.

*Reviewed by John W. Burgeson, Stephen Minister, First Presbyterian Church, Durango, CO 81301.*

**A SCIENTIFIC THEOLOGY: Nature**, vol. 1 by Alister E. McGrath. Grand Rapids, MI: Eerdmans Publishing Co., 2001. xx + 325 pages. Hardcover; \$40.00. ISBN: 0802839258.

The relationship between science and Christian faith is, of course, the theme of this journal and thus quite familiar to readers of this review. What McGrath contributes in this first volume of a multi-volume work is a careful exploration of this relationship with insights from history and philosophy. This volume gives an explanation of the approach (in 78 pages) and then concentrates on the concept of nature. Subsequent volumes will deal with reality (supporting a realist position) and theory (dealing with how science and theology represent reality).

McGrath is a careful analytic thinker and expositor. The argument here is very detailed and includes dialogue with and response to many other thinkers from the ancient classical period through the history of the church and its critics, up to the present period. The presentation is thoroughly documented. While this is important for a work of this type, at times some readers might wish for the compressed summary of the author's own views that, while shaped by his interaction with other thinkers, are found only after considerable and careful reading. Perhaps another form of presentation for a more general audience will appear.

The major thrust of this volume is that nature is not an univocally defined concept. Our sense of nature is shaped by the thinking we bring to our perception of it. In part, nature is a socially constructed notion. However, as the author insists, only in part—there is a reality that we aspire to understand, some postmodernists notwithstanding. Creation is presented as a term sometimes to be preferred by Christians. Karl Barth's resistance to a natural theology is discussed at length and set in the context of the broad stream of Christian thought that is more accepting of a legitimacy in natural theology.

Those who affirm the statement of faith of the ASA will find this an attractive book. It provides detailed analysis and argument for positions that many of us may hold

naively, or at least without understanding some of their historical and philosophical contexts. It is worthy of careful study. I look forward to reading the other two projected volumes in the series.

*Reviewed by David T. Barnard, University of Regina, Regina, SK, S4S 3X4 Canada.*

**SCIENCE IN THEISTIC CONTEXTS: Cognitive Dimensions**, vol. 16, *Osiris* by John Hedley Brooke, Margaret J. Osler, and Jitse M. van der Meer, eds. Chicago, IL: The University of Chicago Press, 2001. 376 pages, index. Hardcover; \$39.00. ISBN: 0226075648. Paperback; \$25.00. ISBN: 0226075656.

Evangelicals have long sought to identify Christian influence on scientists and science "writ large"—the result being what historian Colin Russell has called "a massive debt." The role of the "Puritans," prominent figures such as Harvey, Kepler, Newton, Descartes, and Faraday have received increasing attention in the last several decades as the winds of historiography have moved from a wooden positivism to include the place of cultural factors—including religion—in the development of science. Van der Meer brought an international cast of historians and philosophers of science to a 1998 conference on this topic at the Pascal Centre for Advanced Studies in Faith at Redeemer College, Ancaster, Ontario, Canada.

John Brooke's "Religious Belief and the Content of the Sciences" offers a fine-grained analysis of ways that religious belief (unbelief) may shape the content and culture of the sciences. Brooke is well aware of the linguistic problems involving "science" and "religion" and the temptation to make apologetic points or a pithy quote.

Definitive answers to how belief shaped or was shaped by science are hard to come by:

The more subtle approach is to recognize that religious beliefs and practices can shape worldviews, that worldviews may find expression in a commitment to metaphysical principles that govern theory construction, and that these, in turn, may govern the assent one might give to particular explanatory theories ... religious beliefs may not be so readily detectable in the execution of a piece of scientific research but may nevertheless have an indirect, regulative role in conferring different degrees of legitimacy on competing influences that might be drawn from it (p. 6).

Brooke ranges widely over scientific history to examining ways that "cross-traffic" can occur. Religious practices, doctrines, propositions derived from a religious culture, pious enthusiasm for a particular scientific explanation, and the use of religious preferences where data is insufficient are among many other patterns of influence that have been suggested. Brooke cautiously offers three kinds of criteria for testing claims of the role of religious belief in shaping scientific content. They are:

1. Scientific and religious interests are integral to a larger enterprise, which may then be said to confer a unity on what might be seen as disparate endeavors;

2. Criteria which demonstrate that the scientist took religion seriously;
3. A polemical context where a scientific program is designed to support a particular religious notion (p. 26).

Stephen Wystra seeks to help us to distinguish metaphysical beliefs from religious beliefs so that we can focus more directly on the specific role of religion in science. Wystra finds a "believed-believing" distinction to be helpful. Here "religious beliefs might differ from metaphysical beliefs not just in the content of the believed, but also in the character, the how and the why, of the believing."

To take history of science seriously is to let the historical figures we study surprise us with their unexpected connections. As we see how the enterprise we now call "science" has descended from so many of these unexpected connections, our own initial pigeonholes (including our categories of the "scientific," the "metaphysical," and the "religious") begin to interpenetrate in new ways (p. 46).

The Case Study chapters include Islamic and Jewish studies on early modern science. Margaret Osler critiques the efforts of historians who downplay the role of final causes in the Scientific Revolution. "'God of gods, and Lord of Lords': The Theology of Isaac Newton's General Scholium to the *Principia*" offers a thorough analysis of Newton's views on the design argument and God (theistic, biblically based, and antitrinitarian). The influence of religion on later astronomy is illustrated in Michael J. Crowe's "Astronomy and Religion (1780–1915): Four Case Studies Involving Ideas of Extraterrestrial Life."

Evolution receives attention from Martin Fichman, Philip R. Sloan, Richard England, and Geoffrey Cantor. Sloan offers a counter to those who see the later Darwin as agnostic toward religion. England notes that Darwin's followers developed systems that incorporated religious elements.

Darwinism banished the near deism of Paleyan natural theology and opened the way to an immanentist theology of nature more compatible with Trinitarian Christian doctrine ... Darwin, by proving that all organic structures developed by the natural law of natural selection, had in effect, extended human understanding of divine action (p. 280).

*Science in Theistic Contexts* belongs on your bookshelf.

*Reviewed by John W. Haas, Jr., Emeritus Professor of Chemistry, Gordon College, Wenham, MA 01984.*



## HISTORY OF SCIENCE

**THE RISE AND FALL OF MODERN MEDICINE** by James Le Fanu. New York: Carroll and Graf Publishers, 2000. 448 pages, index, illustrated with 16 pages of black-and-white photographs. Hardcover; \$26.00. ISBN: 078670732.

Le Fanu, a medical columnist for both the *Daily* and *Sunday Telegraph* as well as a writer for the *Times*, the *Spectator*, and *GQ* magazine, lives in London. He tells stories of medical advance that typified medicine from post-WWII to the

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mid-1970s. Sometimes it is difficult to know whether he is referring to a trend in the US or the UK. Le Fanu argues that since the mid-1970s, progress in medicine has slowed because of a declining interest in clinical research, few new medicines discovered or developed, failed social medical theories, and the inability to realize the potential of genetic engineering. Le Fanu calls this slowdown "the Fall."

Le Fanu thinks we need to reclaim the lost art of clinical research performed by practicing physicians. He notes that the Postgraduate Medical School in London and Mayo Clinic have changed the way medicine is done from treating the patient to considering "what we can get out of his case in order to do better next time" (p. 170). This new approach, coupled with the sense of invincibility that came after the war years, created an atmosphere where people believed any problem could be solved. Stricter ethical regulations in research and competing interests have compromised the quantity and quality of research being done since the late 1970s.

In the 1930s, there were few drugs available, but by the 1960s there were thousands. Most of these drugs were discovered fortuitously. Why? At that time, biochemistry and cell biology were not well understood, so researchers just followed "leads" or hunches. It was a very productive time of pharmaceutical research. He states that the decline in discovery has been because pharmaceutical research moved in the direction of searching for (or synthesizing) the perfect drug based on a clear understanding of the biochemistry of the disorder. He seems to be making a case for research being less systematic and/or less regulated.

Le Fanu is critical of what he calls "The Social Theory of Disease" and its proponents, such as Geoffrey Rose and Ancel Keys. Le Fanu contends that lifestyle changes, such as reducing fat and salt intake, do not reduce cholesterol in the blood and do not reduce heart disease. He suggests a return to a rigid biomedical model to guide all health research. In fact, he questions the value of the entire discipline of epidemiology! He contends that contradictory results are the norm in epidemiology, blaming these contradictions on selective omission of facts and the exclusion of negative data. In contrast, Le Fanu praises doctors who treat the sick. He implies that medical doctors should guide the health care industry.

The fourth reason for "the Fall" since the mid-1970s is overuse of new medical technology. For example, although much ballyhooed, the potential of genetic engineering has not been realized. Furthermore, neither genetic screening of fetuses *in utero* nor gene therapy have proven practical.

On the one hand, Le Fanu is making a strong case for a strict biomedical approach to health care. On the other hand, he is critical of current biomedical research, reduced to experts trying to devise health solutions based on their understanding of cell biology, an approach Le Fanu finds expensive and seldom able to produce health-benefitting results. He does not make it clear what he thinks needs to be done to resume progress in medicine.

Regarding the so-called "Fall" in medicine, the author completely ignores the patient's perspective. For example, there is no analysis of whether patient dissatisfaction with medical care may be responsible for the increase in use of non-allopathic medicine in recent years.

This book has interesting historical tidbits such as how a single condition, such as hypertension, has influenced world events. For example, how might postwar events have been different if President Roosevelt and Josef Stalin had controlled their blood pressure (Roosevelt died of a stroke in 1945 and Stalin died of complications due to high blood pressure in 1953)?

There are a few mistakes in the book, such as calling the University of Minnesota, the University of Minneapolis, and misspelling Stanford University. However, the book is well written, even if not always convincing. Medical doctors and readers interested in the history of modern medicine will find it provocative.

*Reviewed by Mark A. Strand, graduate student, University of Colorado-Denver, Denver, CO 80212.*

**THE PERVERSION OF KNOWLEDGE** by Vadim J. Birstein. Boulder, CO: Westview Press, 2001. 492 pages. Hardcover; \$32.50. ISBN: 0813339073.

A book about Soviet science written by a scientist familiar with the system is unusual. The writer's aim is to expose the responses of scientists to moral choices when working under a totalitarian state. Those who acquiesced, betraying their calling, used the Soviet political system for personal gain, but, in doing so, lost credibility with colleagues. Those who did not follow this path, were sometimes executed wrongly, and then, in some instances, rehabilitated later.

Birstein, a geneticist and historian, now lives in New York. He has the credentials to write about biology and medicine in the Soviet Union, because he was trained and worked there. The book has a sound binding and clear type-face with a few illustrations. The Table of Contents and list of abbreviations are followed by a carefully constructed introduction, an extensive section of referenced materials, and biographical sketches of the characters.

Birstein's access to secret materials in Russian is not available in the West, and his knowledge of research establishments allows him to place the events described within their actual context. He discusses the influence of the pseudo-biology of Trofim Lysenko, an uneducated agronomist, who opposed Mendel's findings and Darwin's theory and denied that genes were the basis of inheritance. Lysenko destroyed Soviet genetics and geneticists, many thousands of whom lost their academic positions. Publication of their work was refused and psychological pressure was exerted on them. Those with little training moved into the top positions. In this way, Stalin, the KGB, and the Party gained control over science.

The Germans at Buchenwald and the scientists in Moscow substituted humans who were about to be executed for animals in lethal medical experiments. Many of these died terrible deaths, poisoned with mustard gas, ricin, and then curare as a search was made for lethal materials to liquidate enemies of the Party. The infectious agents, plague and anthrax, were tested and became available for wider use. The knowledge gained about these materials was restricted to a small cohort. The threat of biological and chemical warfare in World War II is now shown to have been a very real one. In Birstein's opinion, all of these



activities could be equated with the crimes outlined at the Nuremberg doctors' trial, but those responsible in the Soviet Union escaped this route of accountability. The author is not blind to the situation in the USA, UK, and Canada where vast weapon stocks of mustard gas led to army personnel in World War II being exposed to these poisons.

Birstein describes a number of other fields of study such as a search for "truth" drugs as a means of extracting "truthful testimonies" from the accused during interrogation. Mairanovsky, a leading investigator in this unit, thought that the Germans lagged behind them in the techniques used.

I believe this book presents a true story about Soviet science. In general, it confirms the contentions of Judith Miller, et al., in *Germs: Biological Weapons and America's Secret War* (2001). Birstein expresses concern that Russian technologies might accompany workers who seek better remuneration elsewhere, thus providing for the possibility of spreading terrorism. He also raises the issues associated with an emerging neo-Stalinist Russia.

Birstein has a chilling message for all when he says that uncontrolled secret research, wherever it takes place, may lead to tests on unsuspecting humans. This year both the USA and the UK have indicated that they intend to stop some publications in order to control what scientists will be permitted to say. The author, with a carefully constructed argument, achieves his aim set out above. The book will be of special interest to ethicists, historians of this era, and those engaged in biomedical studies. Other sections may be of general interest to some readers.

*Reviewed by Ken Mickleson, 21 Windmill Rd, Mt. Eden, Auckland, New Zealand.*

**GOD'S TWO BOOKS: Copernican Cosmology and Biblical Interpretation in Early Modern Science** by Kenneth J. Howell. Notre Dame, IN: University of Notre Dame Press, 2002. 319 pages. Hardcover; \$39.95. ISBN: 0268010455.

Protestant and Catholic writers have expended many pages and much venom over the centuries about the reception of Copernicanism among both church and society in the early modern period. More recent works have been considerably less strident in tone and much more careful in their handling of the primary materials associated with this period in seeking to understand the impact of Copernicus and his disciples. This monograph is a monumental interpretation that builds on the best in prior work and then extends it into a nuanced discussion of the interplay among astronomical theory, astronomical observations, contemporary theology, scriptural exegesis, and natural philosophy.

The reading of the heavens and Scripture in the early modern period turns out to be far more complicated than many discussions of this period infer. Howell, Director of the John Henry Newman Institute of Catholic Thought and adjunct professor of religious studies at the University of Illinois, Champaign-Urbana, cogently dissects beliefs and behaviors of key players in this drama. He introduces the notion of a convergent realism to describe the approach of Copernicus, Brahe, Peucer, Rothman, and

Kepler to the physical world. This orientation incorporates empirical and theological perspectives into a holistic version of the universe without being slavish to either perspective.

These thinkers believed firmly that the Bible was relevant to cosmology but denied that the Bible had scientific content. On the other hand, they held that theological truths expressed in the Bible were interwoven into nature in subtle and amazing ways. Howell shows how their thinking was much more closely aligned with many Catholic thinkers than was formerly believed and lays to rest any simplistic notions that the Protestant genius was due to literal hermeneutics or Copernicanism versus anti-Copernicanism sentiments.

This book also makes clear the range of views held by the principal players in this important astronomical drama while explicating the nature of their shared goals and understandings. As is true with so many historical events, the actual truth always appears far more complicated than at first glance. Howell has produced a first-rate study to which all subsequent work must pay homage. He also has provided an enormously useful case study pertinent to contemporary discussions about the relationships among the sciences, the Bible, theologies, and believers. Much of the nuanced discussion within this book is quite pertinent to ASA discussions over the years about this topic and points the way forward in a useful manner to perhaps a more satisfactory exposition and understanding of this complex relationship.

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## NATURAL SCIENCE

**MATHEMATICS IN A POSTMODERN AGE: A Christian Perspective** by Russell W. Howell and W. James Bradley, eds. Grand Rapids, MI: Eerdmans Publishing Company, 2001. viii, 399 pages, bibliographical references, notes, index. Paperback; \$28.00. ISBN: 0802849105.

Maybe Michael Veatch gave the clearest and shortest formulation of the reason for this book when he asked: "How can a career in mathematics be of service in God's Kingdom, and participate in redemption of our culture?" (p. 247). Ten writers provide answers to this question.

The writers indicate that mathematics may be traced back to pagan Greek philosophers and their idea that the universe is accessible to rational analysis and reducible to a small number of principles. This has influenced modern views which hold that math is logical, objective and therefore disconnected from persons. (The Chinese rejected the universal power of human theory, which paradoxically led to greater contact between person and mathematics.)

I was disappointed that the book did not refer to the booklet by Gene Chase and Calvin Jongsma "Bibliography of Christianity and Mathematics." Chase and Jongsma list books relating Christian faith to mathematics during the twentieth century.

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Today the trend is toward mathematization of all areas of knowledge. Therefore, a Christian philosophy in all areas of life, including mathematics, becomes important. Concerns about what math is, how it is used, what affect it has on society, and how it is used to build the kingdom of God are important for everyone. Since the book shows as well that all areas are now being mathematized, it should be of interest to all people working in any area of scholarship where math is used.

*Reviewed by Jan de Koning, 20 Crispin Crescent, Willowdale, ON, M2R 2V7 Canada.*



### ORIGINS & COSMOLOGY

**DARWIN'S GOD: Evolution and the Problem of Evil** by Cornelius G. Hunter. Grand Rapids, MI: Baker Book House, 2001. 192 pages. Hardcover; \$17.99. ISBN: 1587430118.

Hunter was senior vice president of Seagull Technology, Inc., a high tech firm in Silicon Valley, and was completing a Ph.D. in biophysics at the University of Illinois when this book was first published. This book, which appears to be his first, is endorsed by Phillip Johnson, Michael Behe, William Dembski, and Stephen Meyer; authors who are all associated with the Intelligent Design movement. Although this book does not deal directly with the concept of Intelligent Design, it is easy to see from the content why proponents of this concept would be supportive of Hunter's conclusions.

The goals of the author are twofold. The first goal addressed in chapters two through four is to show that the scientific evidence for the process of macroevolution is not as convincing as evolutionary biologists would lead us to believe. In chapter two, problems with the evidence from comparative anatomy are discussed. They include the ambiguous nature of homologies, the problem of measuring fitness, the subjective nature of the argument from embryology, and the lack of evidence from molecular comparisons. The question of how small-scale change (microevolution) can actually lead to the large-scale changes required by macroevolution is addressed in chapter three, with the author arguing that biological modification within populations is limited and that small-scale changes appear to be bounded. The evidence for macroevolution from the fossil record is challenged in chapter four. Included in this chapter is a brief discussion of the concept of "irreducible complexity" and the problem it poses for an evolutionary process which relies on the mechanisms of chance and opportunism.

Hunter's second goal, which is actually the main goal of the book, is to show how deeply wedded evolution is to its metaphysical presuppositions. While this connection is introduced in the first four chapters of the book, it is further developed from a historical perspective in chapters five through eight. Hunter argues that negative theology has been woven into the fabric of evolutionary thought from the time of Charles Darwin up to the present. Darwin's theory of evolution was a solution to the problem of natural evil in that it distanced God from the creation by interposing a natural law—his law of natural

selection. The idea that God would never have created a world with so much suffering and inefficiency preceded evolution historically and became the metaphysical landscape on which the theory of evolution was constructed. Hunter contends that evolution's real problem is not its metaphysical foundation, but the refusal of its proponents to acknowledge this reliance upon theological premises. He concludes chapter eight with the following statement; "Philosophy and science have always been influenced by theology. This is especially true for evolution. The difference is that evolution denies the influence" (p. 160).

In chapter nine, the last chapter of the book, various attempts to maintain and reconcile orthodox views of both theism and evolution are examined. Individuals included in this brief survey are biochemist Terry Gray, professor emeritus of physics Howard Van Till, biology professor Kenneth Miller, and theology professor John Haught. Instead of presenting their versions of theistic evolution as viable options, Hunter uses them to point out how difficult it is to believe in Darwin's theory of evolution and in a sovereign God who is in complete control of the world at the same time. He goes on to suggest that these more recent attempts to reconcile God and evolution are actually quite similar to the pre-Darwinian metaphysic of a Creator who is distanced from the world and, more important, from its evil and suffering.

While the problems with the evidence for evolution presented in chapters two through four have been addressed more extensively by other authors, to my knowledge, the story that Hunter tells in the latter chapters of the book has not been previously published. His historical survey of the relationship between evolutionary thought and negative theology is documented with references to the original source material in the endnotes. The book as a whole is easy to read and is therefore accessible to anyone who has an interest in the past and present interactions between evolutionary thought, the problem of evil, and the doctrine of God. This book will most likely be widely read and well received among those of Christian faith. It will be interesting to see how evolutionary biologists and historians of science will respond.

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**RESPONSES TO 101 QUESTIONS ON GOD AND EVOLUTION** by John F. Haught. Matwah, NJ: Paulist Press, 2001. 143 pages. Paperback; \$12.95. ISBN: 0809139898.

Haught, the Landegger distinguished professor of theology at Georgetown University, is well qualified to author this volume on God and evolution for Paulist's "101 Questions" series, for he has been thinking about this topic for many years. Following his recently published *God After Darwin: A Theology of Evolution*, the present volume considers the same topics in a question-and-answer format. The questions are comprehensive in their range; the answers, clear and succinct. Haught incorporates into his Roman Catholic perspective the ideas of a number of theologians; including Karl Rahner and Pierre Teilhard de Chardin, and evangelicals Jurgen Moltmann and Howard Van Till.

The 101 questions and their answers are organized into several categories: I. Darwin's Dangerous Idea; II. Darwin

and Theology; III. Creationism; IV. Darwin and Design; V. Divine Providence and Natural Selection; VI. Evolution, Suffering and Redemption; and VII. Teilhard de Chardin and Alfred North Whitehead. The questions raise many serious and difficult issues about evolution, and Haught meets them head-on. In the process, he often demonstrates that a theory or fact about the evolution of life, which seems to rule out the need for God, can be understood in a way that invites the reader into a new and deeper understanding of God's creativity and relationship to the universe.

For example, in his response to the question, "Could life have originated by chance?" Haught argues that accepting the notion that life may have emerged by a random occurrence invites us to conceive of God "as the ultimate depth and ground of nature's resourcefulness [rather] than as a magical intruder" (p. 23). He adds:

It is unseemly to picture a divine "designer" stitching atoms and molecules together in a special act of "design" in order to make the first living cell. Rather, we should think of the universe, in Howard Van Till's words, as "richly endowed" in a comprehensive way for giving birth eventually to life from within its own inner storehouse of creativity" (p. 24).

The same may be said about all of the new creatures that have emerged into being through random mutations worked on by natural selection (and other processes) over immense periods of time.

Along with an accurate (though abbreviated) summation of the major features of evolutionary biology, Haught develops a theology of evolution and forthrightly critiques—on theological grounds—evolution's critics, young-earth creationists, and intelligent design proponents as well as its materialist defenders. Their three positions, he points out, exhibit the common error of conflating science with a belief system that dictates the way its proponents will interpret scientific data. He offers the readers suggestions on how to respond to, say, the literalism of the creationists (and of the materialists!), and explains how intelligent design advocates fail to distinguish between design as a theological concept and as a scientific concept, thus bringing God in "as *part* of scientific explanation" in a way that theologians should reject as vigorously as scientists (p. 89).

In these and other sections, Haught presents a concept of God and of Providence that he and his colleagues argue is consonant with scientific evolution. As in his other writings, he challenges the reader to think of God and God's relationship to the creation in ways that depart from popular notions but are consistent with the God revealed in Holy Scripture. He asks the reader to abandon the "Caesarian" God of Christian history for the vulnerable and compassionate God of the Bible who with infinite love allows an unfinished, emergent, and evolving creation to become itself in all of its variety and mystery. Evolution is consonant with the biblical God who calls to the world from the future, "luring" the creation into greater dimensions of complexity and beauty (Whitehead) toward the "Omega Point" to which all of creation and especially self-conscious creation is drawn (Teilhard). This God exercises sovereignty and power not like an absolute monarch of human governance but as the kenotic God revealed in

Jesus (Phil. 2:5–11): "God's power is manifested most fully in God's self-emptying empowerment of the creation" (p. 115), and in God's decision to share in and thus redeem the suffering of all creation through the Incarnation and the Cross.

These comments are only highlights. The text itself is replete with thought-provoking reflections on the God of evolution. A valuable book for general audiences, it would especially serve as an excellent resource for teachers and students.

*Reviewed by Robert J. Schneider, 187 Sierra Vista Drive, Boone, NC 28607-7980.*

**OF THE PLURALITY OF WORLDS** by William Whewell. Edited with Introduction by Michael Ruse. Chicago: University of Chicago Press, 2001. 510 pages. Paperback; \$20.00. ISBN: 0226894363.

Whewell was the Master of Trinity College at Cambridge for twenty-five years during the early- to mid-1800s. He wrote numerous books on various topics from the theory of the scientific method, to morals, to the 3<sup>rd</sup> Bridgewater Treatise. *Of the Plurality of Worlds* is a fascinating look at a Christian struggling to come to grips with data consistent with extraterrestrial life and the implications of this for Christianity.

In the early 1800s, many new facts were being discovered about the number of stars in the universe, both in the Milky Way and in the nebulae, which we now call galaxies. A magnificent six-foot reflecting telescope, built just a few years prior, was showing that the Milky Way and many of the nebula did not consist of dust but of faint stars. This vast number of stars caused many to believe, via analogical argument, that the universe was widely peopled with other forms of intelligent life. The newly discovered stars were analogous to our sun, and thus, by analogy, most likely had numerous planets surrounding them. Those planets, by analogy with the earth, were probably undergoing geological processes, just as occur on earth, leading to similar conditions as exist on earth with similar populations (pp. 7–8). Ruse points out that Whewell himself had accepted this line of reasoning in the 1830s but rejected it as he became older and was moving toward more dependence upon revealed religion as opposed to natural theology.

Whewell's central question was "What is man that thou art mindful of him?" Whewell argued against the idea that God's attention to other life forms would make humans insignificant. First, he claimed that astronomy could not show that earthlings were more insignificant than geology had already shown them to be. After all, geology showed us that humans were late appearing beings in a very old universe, previously empty of intelligent life. Astronomy merely confirmed that it would take great lengths of time for light to travel to earth from the stars. Secondly, he then attacked the analogical argument by claiming that the newly resolved stars were not like our sun. Indeed he claimed that these objects were merely dots of light and were comets. In the "Dialogue on the Plurality of Worlds" at the back of Ruse's edition, Whewell's contemporaries all objected to this characterization claiming that it was com-

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mon knowledge that these were stars and not comets. Whewell dismissed their claim indirectly by merely claiming that the nebula were not far away. That hardly addressed the issue of their nature.

Thirdly and most bizarrely, Whewell protected his position by claiming that even if these objects were not comets, the universe was metrically heliocentric. Whewell's universe made the sun the largest object with everything, including the other stars, getting smaller in size with distance. Our sun as the largest object in the universe maintained humankind's importance in God's eyes. Again, the "Dialogue" shows that his contemporaries were aghast at such a claim. Whewell retorted that the entire pattern we see in systems is that a large body dominates a system, and it is surrounded by smaller objects like the sun with its planets. Thus, the sun is placed squarely in the center of Whewell's universe. Whewell correctly showed the low probability for life on the other planets in our solar system.

According to Ruse, Whewell was in between a rock and a hard place. If you supported revealed religion, then observational data so useful to natural theology became irrelevant. But the more Whewell depended upon natural theology to support his religion, the more he opened himself up to the specter of evolution which had just come on the intellectual scene with the publication of Chamber's *Vestiges*. And if he denied evolution, then an empty universe seems like a waste in that age when God would waste nothing.

The book, as I said, is a fascinating look at a distant struggle to come to grips with the conflict between observational data and one's religion. It is an engaging study of this struggle.

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**FROM GENESIS TO GENETICS: The Case of Evolution and Creationism** by John A. Moore. Berkeley and Los Angeles: University of California Press, 2002. xvi and 223 pages, references, index. Hardcover; \$27.50. ISBN: 0520224418.

Moore writes in an easy-to-read style about the reaction of American Christians to the study of evolution in the science curriculum. He wants to discuss the religion-versus-science debate, in particular, the standoff between evolutionists and creationists. That description is unfortunate, as it excludes those who believe that evolution and creation are not opposites. Evolution may have been part of the creation process.

Moore uses the King James Version of the Bible in a way that suggests that "creationists" read the first chapters literally. Many theologians, even when they accept the Bible as God's Word, do not take Genesis 1-11 in that way. Moore's result is an incomplete discussion of Genesis and the views of Bible-believing Christians. Even in the nineteenth century, some orthodox theologians in Western Europe accepted the fact that God created using evolution.

A consequence of Moore's position is that he states that science and religion occupy different domains. To the con-

trary, many Christians believe that religion involves all of life, including science. If religion is excluded from part of life, does this not exclude God from part of our life?

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**THE BIG BANG** by Joseph Silk. New York: W. H. Freeman and Company, 2001. xv + 496 pages, mathematical notes, bibliography, glossary, index. Paperback; \$19.95. ISBN: 0716738783.

Silk is the head of astrophysics and Savilian professor of astronomy in the department of physics at the University of Oxford. He is the author of several other books on cosmology and cosmogony. This book covers more than the title suggests. Its eighteen chapters deal not only with the Big Bang itself, but also with the subsequent development of the universe up to the present time and speculation about its future. Although Silk does not identify it as such, it is clear that *The Big Bang* is intended to be an introductory college textbook for a course in cosmology.

The first four chapters introduce cosmology as a science, survey the history of cosmology, and provide a background in observational astronomy, with special reference to the measurement of distance and time, and survey the evidence for the Big Bang. These chapters are factual and evidential in nature.

Chapters 5-7, in contrast, deal with cosmological models. Silk surveys various models regarding the curvature of space, the expansion of the universe following the singularity (i.e., the beginning of the Big Bang), superstrings, quantum gravity, inflation, strings (not to be confused with superstrings), particle formation and annihilation, and mini-black holes—and all of these before the universe was one second old!

Chapters 8-16 are perhaps less controversial; or rather, the topics covered are better integrated into a coherent picture of the evolution of the universe from the end of the first millisecond after the singularity to the present. Silk takes up the thermonuclear detonation of the universe, the emergence of the primitive fireball, the origin and evolution of galaxies and the theory of galaxy formation, the clustering of galaxies, ratio galaxies and quasars, the formation of stars, the morphology of galaxies, the origin of heavy elements and of the planets, and the formation of earth and the emergence of life on earth. Chapters 17-18 deal with possible scenarios for the future of the universe and with alternative cosmologies to the Big Bang.

*The Big Bang* is a thorough introduction to the field of cosmology, but it is not for the casual reader. Chapters 5-7, in particular, are apt to be confusing. I certainly found them so, until I realized that Silk is simply presenting ideas currently being discussed and debated by cosmologists, ideas that do not constitute a unified theoretical scheme. (When I stopped trying to fit the pieces together, they made a lot more sense!) Each section in these chapters should be read as an introduction to a particular hypothesis or concept rather than as a part of a single model. Nevertheless, even considering those hypotheses one by one, I did not find Silk's discussion of them satisfying. I wished

that he had either explained some topics (in particular, superstrings, quantum gravity, strings, and mini-black holes) more fully, or else omitted them entirely.

*The Big Bang* is written from a secular perspective. It is, of course, incompatible with young-earth special creationism (YEC). It is also incompatible in part with any old-earth creationism (OEC) that posits direct divine intervention at various points in time. Christians who, along with Howard Van Till, believe that God created the world with a robust formational economy will find nothing theologically objectionable in the book.

I recommend this book for anyone—YEC, OEC, or Van Tillian—who wants to get an up-to-date picture of current cosmological thinking and is willing to work for it. The material is accessible for the reader with some background in physics; the reader who lacks a physics background will struggle. One feature of this book that may make it superior to others in the field is its incorporation of relatively recent observational evidence obtained from microwave-detecting satellites and the Hubble telescope, evidence of great importance for cosmological theory that was not available until 1989 and thereafter.

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

**ORIGIN OF THE HUMAN SPECIES** by Dennis Bonnette. Amsterdam, Netherlands: Rodopi, 2001. 202 pages, index. Paperback; \$19.95. ISBN: 904203745.

Bonnette, chairman of the philosophy department at Niagara University, received his Ph.D. from Notre Dame in 1970. He has written one earlier book, *Aquinas' Proofs for God's Existence*, but nothing in the area of anthropology.

This book has fourteen chapters with the first third of the book devoted to evolutionary concepts like natural selection, what is a species, the possibility of inter-specific evolution and scientific creationism. The book then discusses topics like the origin of the human soul, extraterrestrial life, the metaphysical structure of natural species, the first humans, and the end of human evolution.

Bonnette argues for a progressive creationist interpretation of earth history. He tries to show that evolution does not really happen. He continually cites several unpublished works (c. 1950) of an Australian named Austin M. Woodbury, who defines life in such a way that it cannot transform (for Platonic category reasons). Woodbury asserts that any existing being is its own category and thus transitional forms are not possible. This defines the problem away. Bonnette, again citing Woodbury, argues that an effect cannot be greater than its cause, which ignores the modern knowledge coming out of nonlinear dynamics.

Bonnette then turns to the human soul and offers Woodbury's definition of true intellect: speech, progress, knowledge of relations, knowledge of immaterial objects. When these ideas are applied to the fossil record, looking for the first human, Bonnette claims that intellectual activity is what one must find. He claims (p. 108) that such evidence appears in the fossil record 700,000 years ago in the form of the symmetrical Acheulean hand ax. The symmetry is not utilitarian and thus evidence of art and aesthet-

ics. He rejects *Homo erectus* as the tool-maker, saying that even if one were found holding such a tool, it would be no more than a dog bringing home the evening paper. He then cites Cremona and Thompson's *Forbidden Archaeology*, for the concept that anatomically modern man existed that long ago and was the tool-maker. This source is universally rejected by all anthropologists!

The only strength in the book is Bonnette's correct assessment of ape-language studies. Other than that, Bonnette's anthropological knowledge is positively paleolithic! The average age of his anthropological references being 1980 with only three references to the literature of the 1990s. Indeed, the average age of the scientific reference is 1978. Because of this, the book abounds with falsified claims. He erroneously claims that the only species of hominid found before two million years ago is *Australopithecus* (there are at least four), that there has been no description of *Homo habilis* (Tobias in 1991), that *Australopithecus* did not use fire (they did at Swartkrans), that Acheulean handaxes first occur 700 thousand years ago (the truth: 1.4 million years ago), that computers can only play chess at a "routine level" (they have beaten the world champion), and claims that animals cannot lie (baboons have been observed doing so). Furthermore, he engages in intellectual equivocation, believing that any claims against the scientific view made by anybody are all equally to be believed and taken seriously. This tendency forces the reader to wade through lots of arguments already known to be false.

Bonnette also appears to advocate the rejection of observational data if it violates philosophical principles, thus placing philosophy rather than observation as the arbiter of reality. Indeed, he states that only the methodology of philosophy can give us true knowledge. This retreat to a form of medieval scholasticism in which static substantial forms are the standard and things are believed a priori rather than a posteriori makes this book quaint even in its philosophical content.

Who would be interested in this book? I was, until I saw the pitiful level of science. With an endorsement of Michael Behe, it would imply that those of the Intelligent Design bent might be interested in the book. The only problem is that with all the factual errors, its ancient philosophical approach, and lack of discernment about good from bad scientific arguments, anyone reading this book will depend upon it at their own risk.

*Reviewed by Glenn R. Morton, Ramsden Lodge, 103 Malcolm Road, Peterculter, AB14 0XB Scotland.*

**AN EVOLVING DIALOGUE: Theological and Scientific Perspectives on Evolution** by James B. Miller, ed. Harrisburg, PA: Trinity Press International, 2001. 532 pages, index. Paperback; \$40.00. ISBN: 1563383497.

Miller is Senior Program Associate for the Program of Dialogue, Science, Ethics and Religion at the American Association for the Advancement of Science. This book is a collection of reprinted essays that are organized into five different sections ranging from basic science education to theological models and intelligent design. The first two sections address the science of evolution. The first section



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explains the classic Darwinian theory of evolution and is an attempt to provide an educational base for the subsequent sections. The second section deals with how the theory of evolution can be addressed to questions that go beyond Darwin. Topics include the origin of life at its most rudimentary molecular level and the challenges of evolution to explain the formation of molecules such as RNA and DNA. The lack of evidence in the fossil record for gradual change of species is addressed in an essay by Stephen Gould on the idea of punctuated equilibrium.

The remaining three sections discuss historical, theological, and philosophical approaches to the issue. The third section traces the historical development of the evolution-creationism issue and includes an unflattering, but honest, assessment of the young earth creation movement by Ronald Numbers. Progressive creationism and theistic evolution are also mentioned. The latter part of the third and the entire fourth section address philosophical and theological approaches to the interaction between science and faith. The case for the separation of science and faith into two different "magisteria," or areas of authority that are "nonoverlapping," is made by Stephen Gould and others. There is also an argument made by Elizabeth A. Johnson for a "contact" approach which integrates the terminology of evolution and the probability of quantum mechanics and evolution into a theology of free will. It applies not only to persons but also to the physical world to allow for a creation process which includes a record of life with the many branches and dead ends as seen in the fossil record and explained by evolution theory.

The fifth section addresses the philosophical and scientific approach of intelligent design. The case for design is made by William Dembski, Michael Behe, and Kenneth Miller. These authors endeavor to cast doubt upon the probability of the evolution of the most rudimentary forms of molecular structure for the origins of life, and the evolution of "irreducible systems" in the area of biochemistry. An attempt is also made to present intelligent design as a quantifiable science rather than a philosophy. These essays are countered by critiques of intelligent design by authors such as Fitelson and Grizzle. The sum of the critique is that intelligent design is not a science, but a philosophy, and that the same proposed quantitative means for measuring irreducibility can be favorable to evolution theory.

Overall, the impression one takes from this particular set of essays and the manner in which they are arranged is a case for theistic evolution. Science is presented from the assumption of evolution, young earth creationism is severely debunked, theological models which are inclusive of chance and probability are proposed, and intelligent design is presented and rebuffed. The book is weak in its lack of an honest discussion of the testability and verifiability of evolution theory, though some mention is made of bio-molecular and genetics techniques. Additional scientific articles addressing the weaker points of evolutionary theory from a scientific perspective would have allowed for a better discussion of the shortcomings of current evolution theory. Some of the essays which fall into the category of science education are also weak as scientific arguments. I think especially of the essay on punctuated equilibrium by Gould and Eldridge. A better essay which explains the science of punctuated equilibrium could have been chosen.

This is a book that can be read for its discussion of science and theology as it relates to the topic of evolution theory. The essays are all well written and contain scientific information about evolution, summaries of the historical debates, and theological and philosophical perspectives. It is a good volume to have for those in the sciences and for those in theology with an interest in the evolution issue.

*Reviewed by Gary De Boer, Assistant Professor of Chemistry, LeTourneau University, Longview, TX 75607-7001.*



## PHILOSOPHY & THEOLOGY

**EVOLUTION AND THE PROBLEM OF NATURAL EVIL** by Michael A. Corey. Lanham, MD: University Press of America, 2000. 366 pages, index, notes, bibliography. Paperback; \$54.50. ISBN: 076181812X.

The title could not be passed up, but the content of this strange volume is a disappointment. The publisher gives the author's credentials as those of "an investor and a real estate developer." The book itself says nothing about the author. Internet research reveals he has a Ph.D. from Claremont in philosophy. Since writing on marital and drug rehabilitation issues in the 1980s, he has written several books on science/religion issues.

Claremont may have taught him well in philosophy; his arguments for a solution to the theodicy problem takes a classical Christian approach, and it is fairly adequate. But his misunderstandings of the scientific enterprise, for example, mistaking methodological naturalism for atheism (p. 42), and his embracing of "theistic science" (on the basis of Ockham's razor, [p. 141]), makes a good deal of the book simply useless. On page 136, he asserts that modern science affirms scientism. Somewhere along about there I stopped reading the book seriously and only skimmed the rest. This book is not recommended.

*Reviewed by John Burgeson, Stephen Minister, First Presbyterian Church, Durango, CO 81301.*

**THE ABC OF ARMAGEDDON: Bertrand Russell on Science, Religion, and the Next War, 1919-1938** by Peter H. Denton. Albany, NY: State University of New York Press, 2001. 174 + xxvi pages, bibliographical references, and index. Hardcover; \$54.50. ISBN: 0791450740. Paperback; \$20.95. ISBN: 0791450740.

Russell started writing in 1888 and wrote mainly on logic and philosophy before and during the World War I. He wrote *Principia Mathematica* 1910-1913 with Whitehead. As third earl, Russell, born into an old noble family, was a member of the House of Lords, where he had socialist tendencies. He tried to help establish a just society. As an atheist, philosopher, and politician, he wrote about science, religion, and politics. Though this book is more philosophy than science, I recommend it.

Because he hated war, he thought about ways to prevent it. He wrote in 1923: "The Americans surpass even the British in sagacity, apparent moderation, and the skillful



use of hypocrisy by which even they themselves are deceived" (p. 137). Against such a formidable combination of advantages, he said, no other state could hope to be victorious.

Denton claims that the conflict between science and religion may be traced to two books, one published in 1874 by J. W. Draper and one in 1896 by A. D. White. Russell quotes some philosophers who wrote later and dismisses them because they were trying to arrive at conclusions about reality that were based on metaphysical speculations (p. 106). According to Russell, the theistic standpoint floundered on its inability to account for evil in a universe created by an omnipotent God. In his opinion, there was no more to life than physical and mechanical processes.

*Reviewed by Jan de Koning, 20 Crispin Crescent, Willowdale, ON, M2R 2V7 Canada.*

**RELIGION AND SCIENTIFIC NATURALISM: Overcoming the Conflicts** by David Ray Griffin. Albany, NY: State University of New York Press, 2000. 345 pages, index, notes, bibliography. Paperback; \$25.95. ISBN: 0791445631.

Griffin, Claremont professor of philosophy of religion and theology, has written a watershed book, one that received the 2000 Book Award from the (UK-based) Scientific and Medical Network. This book argues a Whiteheadian based philosophy for a religion that does not require supernaturalism and a science that does not require materialism. He describes himself as a panentheistic Christian, one who sees God as more than the universe and yet the universe as part of God. He sees God at work in the universe in a "persuasive" rather than in a "coercive" way.

A person can benefit from this book without subscribing to pantheism. Both Whitehead, writing in 1925, and Griffin see a middle ground between materialism and supernaturalism. Griffin uses the term "theistic naturalism" for this world view. Defining two unusual, but very specific terms, "naturalism(sam)" and "naturalism(ns)," he argues that naturalism(ns) is sufficient for science and is compatible with a theistic religion.

Griffin defines naturalism(ns) as being simply a rejection of supernatural interventions which interrupt causal relations, and naturalism(sam) as including naturalism(ns) plus sensationism, atheism, materialism, determinism, reductionism, no causation from mind to body, upward causation only, no transcendent source of religious experience, no variable divine influence, and no ultimate meaning to life (nihilism). He observes that other writers call naturalism(sam) by the names reductionistic naturalism, materialistic naturalism, and atheistic naturalism. I would add the terms "philosophical naturalism" and "metaphysical naturalism." To harmonize religion and science, Griffin sees three things as necessary: (1) They must share a world view; (2) Science must insist only on naturalism(ns); and (3) Religion must accept naturalism(ns) as foundational.

Griffin thinks theism need not require supernaturalism to be genuine and "robust." Contrary to the claims of supernaturalistic theism, he believes that the basic casual principles of the world are never interrupted. A generic

idea of God includes: (1) a personal, purposive being; (2) supreme in power; (3) perfect in goodness; (4) creator of the world; (5) acting providentially; (6) experienced by human beings; (7) the ultimate guarantee for the meaning life; (8) the basis for the victory of good over evil; and (9) alone worthy of worship.

Theistic naturalism retains all nine of these features, he says, by modifying the traditional understanding of (2), from coercive power to persuasive power. This, in turn, modifies the traditional meaning of (4), (5) and (8). He sees God, neither omniscient nor omnipotent, as a casual influence on every event.

In chapter 6, Griffin addresses the mind-body problem, asserting that it has been the central problem for modern philosophy. We have some "hard common sense" (non-negotiable) beliefs about ourselves, he writes, which we presuppose in practice. These include: (1) conscious experience; (2) partial free will; (3) freedom to act on the body, and therefore; (4) at least a degree of responsibility for our bodily actions.

While there are those who argue that science has proven false one or more of these ideas, Griffin effectively rebuts them, arguing that if one eliminates a belief in the reality, self-determination, and causal efficacy of conscious experience, one's belief still remains. If someone tells you that you should eliminate beliefs in these three things, he must necessarily assume that: (1) You can understand what he is saying; (2) You can freely choose, or reject, his advice; and (3) You can freely choose, in the future, to tell others of it. To deny this is irrational, a "performative self contradiction."

Griffin describes "Darwinian Evolutionism," as a mix of fourteen separate ideas: (1) microevolution; (2) macroevolution; (3) naturalistic; (4) uniformitarianism; (5) no theistic guidance; (6) positivism; (7) predictive (in principle) determinism. No teleology; (8) macroevolution equated to long-term microevolution; (9) natural selection as the sole cause; (10) gradualism; (11) nominalism; (12) atheistic; (13) amoral; and (14) nonprogressive. Griffin accepts the first four of these ideas, but he rejects the next ten. Griffin points out that one implication of theistic naturalism that many will find problematic is that it provides no basis for arguing that Christianity is "The One True Religion." An advocate of religious pluralism, he sees this to be a benefit, arguing that classical theism's depiction of God is, itself, unbiblical.

This book is highly recommended to my ASA colleagues. It is a "keeper."

*Reviewed by John W. Burgeson, Stephen Minister, First Presbyterian Church, Durango, CO 81301.*

**THE ONE IN THE MANY: A Contemporary Reconstruction of the God-World Relationship** by Joseph A. Bracken. Grand Rapids, MI: Eerdmans Publishing Co., 2001. xii + 234 pages. Paperback; \$22.00. ISBN: 0802848923.

Bracken aims to reconstruct the metaphysical tradition of the West, taking into account modern thought, especially the process-relational philosophy of Alfred North Whitehead. His approach is based on "a logic of inter-

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subjectivity.” An important theme of this logic is that community in the Trinity is a pattern for community in creation. Bracken explores the implications of this view for the relationship between God and the world, as well as for relationships within creations.

The book ends with a chapter on “The Need for Common Ground in the Religion and Science Debate.” Part of this is a presentation of how the mind-brain problem can be conceived in this framework.

The book is stimulating reading, even for those who are not followers of Whitehead.

*Reviewed by David T. Barnard, University of Regina, Regina, SK, S4S 3X4 Canada.*



## RELIGION & CHRISTIAN FAITH

**THE SECULAR MIND** by Robert Coles. Princeton: Princeton University Press, 2001. 189 pages. Paperback \$14.00. ISBN: 0691088624.

It will not surprise readers of this journal that one can find evidence of a broad pattern of continual seeking after meaning in human experience. Coles says that his book explores “our secular thinking and its constant search for moral, if not spiritual, sanction.”

Coles describes the limited place of the sacred in the twentieth century. He has wide interests, as evidenced by the range of things he reads and references. His own construction of meaning is interesting. For example, he summarizes part of his argument like this:

With God gone for so many intellectual pioneers of the last two centuries, the rest of us, as students and readers, as seekers mightily under their influence, have only ourselves left as “objects” of attention. The theologians were supplanted by the philosophers, the religiously committed philosophers by the skeptical, secular philosophers, who, in turn, have been supplanted in worldwide influence by a biologist, an economist, a psychiatrist, a physicist, each of whom (Darwin, Marx, Freud, Einstein) has an inclination to be contemplative in a particular secular way: to wonder about things, about the secrets that await our triumphs of discovery.

Coles claims to be relentlessly oriented to the future. Looking to the future, and looking for meaning in a life oriented to the future, he describes a form of prayer.

One prays at the very least on behalf of one’s kind, though unsure, in a secular sense, to whom or what such prayer is directed, other than, needless to say, one’s own secular mind, ever needy of an “otherness” to address through words become acts of appeal, of worried alarm, of lively and grateful expectation: please, oh please, let things go this way, and not in that direction—the secular mind given introspective, moral pause, its very own kind of sanctity.

While Coles’ description of the secular mind’s search for meaning is heartening, with its encouraging orientation to the future and to others, in the end, that search

comes to a different position from what is affirmed by members of the Affiliation that sponsors this journal.

*Reviewed by David T. Barnard, University of Regina, Regina, SK, S4S 3X4 Canada.*

**BUILDING THE CHRISTIAN ACADEMY** by Arthur F. Holmes. Grand Rapids, MI: Eerdmans Publishing Co., 2001. 122 pages. Paperback; \$12.00. ISBN: 0802847447.

Holmes, emeritus professor of philosophy at Wheaton College, is a respected senior contributor to the debate about Christian academic development. In this book, he focuses on the specific contributions made by Christian institutions. He describes seven formative episodes where educators faced problems and brought their faith and philosophy to bear. In these, he sees four “recurring emphases” that he describes as the “heart and soul” of the Christian academy. These four emphases are: (1) the usefulness of liberal arts as preparation for service to both church and society; (2) the unity of truth; (3) contemplative (or doxological) learning; and (4) the care of the soul (what we call moral and spiritual formation). Of course, many secular institutions would resonate with aspects of these four emphases. Although in secular institutions, a range of other emphases also would be important in making key decisions.

The seven episodes or movements considered are the Alexandrian School, Augustine, monastery and cathedral schools, the Scholastic university, the Reformation, Francis Bacon and modern science, and Newman and secularization (each treated in a chapter). A final chapter considers the twentieth century, not focusing on a specific crisis or episode, but on the diversity of our recent history.

This stimulating book crams many ideas into a few pages, yet it is readable and recommended.

*Reviewed by David T. Barnard, University of Regina, Regina, SK S4S 3X4 Canada.*

**QUALITY WITH SOUL: How Six Premier Colleges and Universities Keep Faith with Their Religious Traditions** by Robert Benne. Grand Rapids, MI: Eerdmans Publishing Co., 2001. 217 pages. Paperback; \$19.00. ISBN: 0802847048.

To maintain a Christian commitment, an educational institution must keep these three components publicly relevant: its vision, its ethos, and the Christian persons who bear that vision and ethos. To support this thesis, Benne divides his book into two parts. The first deals with principles and general ideas; the second part deals with examples.

Institutions that began with specific Christian orientations and foundations move away from them for a variety of reasons. Benne identifies both external and internal pressures. External pressures include the need to recruit students in an increasingly secularized world, and the Enlightenment focus on science as the explanation of all things. Internal pressures result from an inadequate theology with respect to the specific mission of the institutions,

as well as weak accountability and support. In summary, "Deep down, both church leaders and faculty members no longer believed the Christian faith to be comprehensive, unsurpassable, and central."

Turning to examples of institutions that have maintained their "soul," Benne begins with a typology that identifies four variations: Orthodox, Critical-Mass, Intentionally Pluralist, and Accidentally Pluralist. These are differentiated according to the following aspects: major divide; public relevance of Christian vision; public rhetoric; membership requirements; religion/theology department; religion/theology required courses; chapel; ethos; support by church; and governance. The six examples chosen are: a Reformed college (Calvin), an evangelical college (Wheaton), two Lutheran schools (St. Olaf and Valparaiso), a Catholic university (Notre Dame), and a Baptist university (Baylor). The detailed examination of these examples leads to the conclusion stated at the beginning of the book—and of this review—that the essence of commitment derives from vision, ethos, and the embodiment of these in persons, especially leaders and faculty members.

This book is easy to read and compelling. It is well researched and documented. All those interested in the development of academic traditions will find it of value.

*Reviewed by David T. Barnard, University of Regina, Regina, SK, S4S 3X4 Canada.*

**WILL THE CIRCLE BE UNBROKEN? Reflections on Death, Rebirth, and Hunger for a Faith** by Studs Terkel. New York: The New Press, 2001. 408 pages. Hardcover; \$25.95. ISBN: 1565846923.

Terkel is a Pulitzer Prize winner (for *The Good War*) who has recorded the thoughts and lives of ordinary people on a variety of topics. Perhaps his most impressive research is contained in his book, *Working*. In this volume, Terkel turns his attention to a topic relevant to everyone: death. Terkel has received wide notice for this book with reviews and interviews, including one on *60 Minutes*.

This book is divided into four parts (I am not sure why) and contains over fifty interviews. In these interviews, people comment on their lives and perceptions of death. Included among them are people from a variety of backgrounds: police officers, firefighters, health professionals, an AIDS worker, a Hiroshima survivor, a death-row parolee, a folk singer, an architect, and a retired teacher.

A church worker relates that she has read obituaries since she was nine years old and still does. A graduate student tells what she thinks of organized religion: "I dislike it immensely. I think it's done more harm than good." A civil rights worker observes: "I think one reason people are so desperate about dying is that they haven't lived yet. ... I think life is miserable for most people." But there are people who give affirmations of faith including a Dutch Reform pastor who says when death comes, "Jesus Christ is going to be with me, He's going to hold my hand, and he's going to walk with me through the valley of the shadow of death."

This is not a book to give to someone who is depressed or is seeking dogmatic answers to the big questions of life. The ruminations by people with religious backgrounds, as well as by religiously indifferent folk who seek meaning in life, offer no definitive answers. However, this book illustrates above all else that most people give considerable thought to the biblical truth that "it is appointed unto man once to die."

Terkel wrote this book after his wife died. They had been married sixty years. Sickly and asthmatic as a child, Terkel has survived a quintuple bypass, and at 89 years of age, indicates he might write another book. High praise for this book from the likes of John Kenneth Galbraith and Oliver Sacks might encourage him to do so.

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

**SIX MODERN MYTHS ABOUT CHRISTIANITY AND WESTERN CIVILIZATION** by Philip J. Sampson. Downers Grove, IL: InterVarsity Press, 2001. 197 pages, index. Paperback; \$12.99. ISBN: 083082281X.

Sampson, who holds a doctorate in social sciences from the University of Southampton in England, co-edited *Faith and Modernity* in 1994. *Six Modern Myths* discusses topics that modern critics claim are problems for Christianity. Sampson points out that these supposed problems are built on myths. He intends to defuse them by demythologizing them.

The first myth is about the Galileo event. It was claimed that Galileo, using the telescope and reason to defend the truth, was persecuted by the church which insisted that the earth was at the center of the universe. However, Aristotle and Ptolemy, not Christianity, were the originators of the earth-centered theory. At Galileo's time, the observational data did not tip the balance toward the heliocentric theory. Regarding the world view implication, the earth-centered theory did not elevate humanity's status as critics implied. Aristotle emphasized the corruption of the earth under the pristine heaven. The Copernican heliocentric system rejected the idea that earth was a cosmic sink; thus it actually elevated humanity.

The second myth concerns Darwin's evolution theory. The myth was that heliocentric theory put humanity in its place in the cosmos, and Darwin's theory put humanity in its place on earth. Again, the fact of evolution can be interpreted that humanity evolved to be the very peak of nature. Darwin claimed that evolution enables humanity to progress toward perfection. Regarding the scientific evidence, the theory of evolution as proposed by Darwin did not have sufficient data to convince most eminent scientists during his lifetime. The mixed reception in the religious circle was similar to that of the scientific community. It took about seventy-five years before the evolution theory was accepted by the scientific world.

The third myth is about the Christian exploitation of nature. This myth blames the ecological crisis on the Christian teaching of humans' mastery over nature and on the subsequent emergence of exploitative technologies in the Western countries. However, the concept of using

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nature for the benefit of humanity was originated by Aristotle. The anthropocentric idea of domination was common in ancient Greek and Roman philosophies. The exploitation of the environment is not only a modern phenomenon and not a feature unique to Western culture.

The fourth myth concerns the stories of oppression of other races and their cultures by missionaries. The error of this myth came from the identification of Western civilization with Christianity. Missionaries accepted the idea of a common humanity and treated the native people with more dignity than their own national governments did. Many missionaries preached against the exploitation of natives by the colonial governments and the slave trade. Regarding the change of cultures, the naive and romantic idea of innocent native cultures was unsubstantiated, and the process was caused more by Enlightenment and evolutionary ideologies.

The fifth myth is about the suppression of the human body. It was claimed that Christianity considered the body as evil, so many natural desires were suppressed through church teaching. However, the idea of sinful flesh came from the Greek philosopher Plato. He also proposed that man is the "superior sex." The alliance between Greek thought and Christian understanding existed throughout the Medieval period and was corrected by Protestant Reformers. The real effect of Christianity included the equality of genders and the stability of families.

The sixth myth concerns the persecution of witches. The myth claimed that religious superstition and intolerance caused the persecution of these women. However, the number of witchcraft prosecutions was exaggerated, and the church was not the prime mover in the prosecution of witches. Instead, both Catholic and Protestant churches were found to have a moderating effect on these prosecutions. The incidents at Salem, MA, during the Puritan period was not typical.

This book provides much information to counter the six modern myths which accuse the Christian faith of many wrongs. The research and documentation are excellent. It may deflate the accusation of the sin of commission, but it may not extricate the church from the sins of omission. Since Western civilization was intertwined with Christian faith, the church could have and should have exerted more moral influence.

*Reviewed by T. Timothy Chen, Southwestern Baptist Theological Seminary, Fort Worth, TX 76122.*

**GOD EXISTS** by Joseph Davydov. Rockville, MD: Schreiber Publishing, 2000. 240 pages, index, 4 appendices. Hardcover; \$24.95. ISBN: 1887563512.

Davydov completed his Ph.D. in 1967 at the Moscow Institute of Energy. In 1977 he graduated from the University of Marxism-Leninism in "scientific" atheism. In 1990, Davydov emigrated to the United States where he is now a Christian, a full member of the New York Academy of Sciences, and President of the International Science Center in Brooklyn.

The book under review has two parts: "God and the World" and "Six Biblical Days." Part I discusses the rela-

tionship between a transcendental God and the physical world while Part II is a scientific interpretation of the six days of Genesis.

The book is fascinating to read because of the author's knowledge of the communist atheistic propaganda concerning science and religion. The communists were irrevocably opposed to the Big Bang as the origin of the universe since it contradicted their materialistic beliefs. However, in 1977, the communists capitulated (twelve years after the acceptance of the Big Bang in the West with the discovery of the cosmic background radiation in 1965). It is no accident that Davydov graduated in "scientific" atheism in 1977 when the communists were preparing their scientists to acknowledge the Big Bang.

Davydov's emphasis in Part I of the book is that God is outside the materialistic universe. We all recall the impression the first cosmonaut Gagarin made when he announced he could find no God during his trip into space. This was the kind of evidence the Soviet Union was using to prove that there is no God. Davydov thus uses scientific arguments to demonstrate that God must be outside the physical universe so that he would not be discovered by cosmonauts.

However, the science Davydov uses is not easily translated into Western science. For example, on pages 92 and 94, Davydov refers to a "fundamental law of nature" which states that *relative matter* cannot exist in space and time without its *absolute opposite*, which exists outside of any space or any time. This must be a law of Communist science; it is not a recognizable law of Western science. It must be said here, however, that the leading Soviet scientists use Western science and, indeed, were pioneers in the understanding of the Big Bang in spite of communist orthodoxy.

"The fundamental law of nature" is not an isolated instance of the strangeness of Davydov's science. On page 97, Davydov refers to "the three scientific laws of nature." The first scientific law is that no material system can exist eternally. But this law of nature did not prevent the proposal of the Steady State Universe by Bondi, Gold and Hoyle, three highly respected physicists. Eventually, the Steady State Universe was abandoned because of experimental evidence. It was not abandoned because it violated the first of the three scientific laws of nature.

Davydov gives the second scientific law of nature as the cause of the formation or birth of a given material system always lies *outside* the system. This law is not like Newton's law of gravity or Maxwell's laws of electromagnetism where values for masses or charges are inserted and forces or fields are calculated. The law is more similar to the Second Law of Thermodynamics which states that certain things are impossible. But, in none of these physical laws, is "cause" considered. Davydov's second scientific law appears to be more a philosophical principle than a scientific law based on experimental evidence.

Davydov's third scientific law is that matter in the universe develops in a highly purposeful way. This law is not generally accepted, particularly by evolutionists. Until recently, the National Association of Biology Teachers has defined evolution as being a "purposeless" process. While this claim has been withdrawn, it was not withdrawn

because the claim was acknowledged to be wrong but because the claim could not be proven.

The same kind of scientific difficulties are associated with Part II of the book. Enough examples have been presented to convince the reader that the message of the book is difficult to accept because of the different kind of science used by Davydov.

However, I am glad that I have had the opportunity to review the book. Only a Christian scientist educated in the Soviet system has the knowledge and understanding to expose the dishonest and fallacious arguments used by the Soviet Union to discredit the Bible. For this exposure, we all owe Davydov our thanks and admiration.

*Reviewed by John A. McIntyre, Professor of Physics Emeritus, Texas A&M University, College Station, TX 77843.*

**WALKING AWAY FROM FAITH: Unraveling the Mystery of Belief and Unbelief** by Ruth A. Tucker. Downers Grove, IL: InterVarsity Press, 2002. 240 pages. Hardcover; \$16.99. ISBN: 0830823328.

Tucker has chosen a difficult task in trying to unravel the mystery of belief and unbelief. While she may not have totally succeeded, she does offer some stimulating insights and illustrative anecdotes. The author identifies variables which play a role in faith and its absence, but it is unclear why these variables affect people in such different ways.

What are some of the variables in belief and unbelief? Tucker identifies many variables including reflections on the Bible, history, science, philosophy, theology, biblical criticism, psychology, social issues, God, and Christians. One factor she identifies which drives people from faith is the conclusion that God is inactive in both their own lives and the events of the world. "Losing faith is one way of responding to God's silence in the face of pain and suffering" (p. 153). When people conclude, often with sorrow and pain, that God is absent in the world, atheism or agnosticism follows.

Tucker gives many examples of faith abandonment along with the ostensible reasons. The most famous example is Chuck Templeton, a friend of Billy Graham. After conducting successful evangelistic campaigns, Chuck walked away from faith because he found it impossible "to believe that there is anything that could be described as a loving God who could allow what happens in our world daily" (p. 39).

Of all the reasons Tucker gives for the loss of faith, perhaps the Achilles' heel of faith—its greatest conundrum, puzzle, enigma, riddle (whatever it may be called)—relates to the problem of pain (or evil) in the world. The puzzle is this: if God is all powerful, he could stop the pain; if God is all loving, he should want to stop the pain. But there is pain in the world. Why? Despite the many books written on the subject by both theologians and philosophers, no adequate explanation has been agreed upon.

Tucker points out that Christians have developed an impressive array of apologetic responses to unbelief. However, as she frequently shows in her examples, these are rejected because the evidence is equivocal. This is illus-

trated by a philosopher who said that if he could say one thing to God, it would be: "Not enough evidence." Of course, if the evidence in the debate overwhelmingly supported one side, there would be no debate.

I particularly like the way Tucker deals with those who lose faith. She is sympathetic, compassionate, and understanding. She confesses that she never saw an atheist she disliked. She sees clearly the reasons faith falters, because she herself has struggled with unbelief. She is candid and honest when she wonders if the Christian college where she taught would have terminated her if they realized the extent of her struggle with faith. Tucker reflects this struggle with a quote from F. H. Jacobi: "I ... am a heathen in my reason and a Christian with my whole heart" (p. 26).

For some, as Tucker indicates, the fact that confessing Christians lose faith may present a dilemma for the Calvinist. She suggests two explanations: either the individual was never a believer or still is. But she writes that this seems to fly in the face of avowed disbelief by those who walk away from faith. Perhaps Tucker's last chapter entitled "Real Stories of Returning to Faith" gives a glimmer of hope to those Calvinists who believe in the "P" of TULIP.

I was unaware of some of the information Tucker presents: the traumatic struggle people go through to hang on to faith; the number of web sites dedicated to this topic; the significant number of books, many autobiographical, written on this topic. If you are interested in further study of this subject, Tucker's bibliography will be of great assistance. She lists about 75 books on the topic. Tucker's book has an index, but it is truncated and omits many topics.

Tucker is associate professor of missiology at Calvin Theological Seminary. The author of fourteen books, she has also served as a missionary and a college teacher. Tucker has written a difficult, but needed book. It will help and inform those on both sides of this important issue.

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

**RELIGIONS OF STAR TREK** by Ross S. Kraemer, William Cassidy and Susan L. Schwartz. Boulder, CO: Westview Press, 2001. 246 pages, notes, index, list of Series, Episodes and Films. Hardcover; \$22.00. ISBN: 0813367085.

Is there a god? What happens when you die? Can science save your soul? Questions like this are answerable in secular terms, as well as religious. The humanistic creator of *Star Trek*, Gene Roddenberry, tackled such questions frequently in the American success story that is *Star Trek*; in doing so he necessarily incorporated religious concepts. The three authors, all professors of religious/human studies at different academic institutions, created this volume with the intent of using it as a text in teaching religion. The book examines the history of the four *Star Trek* TV series and the nine feature films, examining how its views on religious topics changed over the years as the American culture evolved.

Perhaps all Americans can fairly be divided into two camps: those who are "Trekkies" and those who are not. Again, perhaps all Americans can be divided into two other camps: those Christians who are very much inter-

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ested in liberal religious studies and those who are not. My guess is that the intersection of these two classifications (Trekkie Christians studying liberal religion) is not large. It is that intersection, of course, that the book targets. For such persons, the book might be interesting.

This book could have been written as an evangelistic outreach, perhaps in the genre of C. S. Lewis. I see nothing in it, however, that would tempt a secular reader, even a die-hard Trekkie, to take religious issues any more seriously after reading it than before. Indeed, by "explaining" some of the puzzling events of earth history as entirely materially based, the book probably will have a negative effect on the critical thinking which one wishes was possessed by every seeker after answers to ultimate questions.

If you are a Trekkie, the book may be worth reading, although probably not worth owning. It should have been titled "A Christian Vision of Star Trek: Going Where No Ethos Was Meant to Go."

*Reviewed by John W. Burgeson, First Presbyterian Church, Durango, CO 81301.*

**BETWEEN EDEN AND ARMAGEDDON: The Future of World Religions, Violence, and Peace Making** by Marc Gopin. New York: Oxford University Press, 2000. 312 pages, index. Hardcover; \$35.00. ISBN: 019513432X.

It would seem that since the end of the Cold War, religion—especially in its most conservative manifestations—has been the major source of violence and destructive conflict in the world. Is this really the case? Gopin, a consultant, researcher, and trainer in conflict resolution and a Jewish rabbi, addresses this question in *Between Eden and Armageddon* and offers readers a nuanced understanding of the relationship of religion and violence.

The short answer is: "Yes, but." To be sure, Gopin notes, religion has been "a major contributor to war, bloodshed, hatred, and violence." Specifically, the more "conservative, strident—fundamentalist, if you will—expressions of modern religion" have been the ones "to evoke the most conflict and violence in the modern world." But religion is also a "barometer of social dissatisfaction" and, as such, should be understood as a diagnostician of society's failings. Gopin, moreover, suggests ways in which religion might actually lead the way in creating peaceful societies.

What Gopin is really attempting in this book is to integrate the study of religion with the social science of conflict resolution, indeed, to outline the contours of a new field of study: religion and peacemaking. This is no small task. Constructive engagement between religious systems and conflict resolution faces many barriers. The field of conflict resolution has a rationalist, cosmopolitan bias that appeals to liberal religious orientations and Western notions of tolerance and pluralism. But, as we all know, "many religious people around the world do not share this universal, 'secular' moral discourse."

Gopin is perhaps most helpful in exploring the very different universe of religious contexts that are rooted in premodern categories of thinking and feeling. Often these are outlooks of "buried injuries, resentments, and highly adversarial interactions with the rest of the world" held

together by a very vivid perception and fear of cultural annihilation. It is vital, Gopin rightly argues, for peacemakers to bridge the gap "between the angrier expressions of each religion and the rest of the world." And traditional methods of conflict resolution based upon rational dialogue, he predicts, will prove woefully inadequate.

Using several interesting case studies and specific examples, Gopin argues that constructive engagement between conflict resolution and religion can only occur if we ask a new set of questions regarding religion and violence, ones no longer based on why and when things go wrong, but on why or when things go right. One of Gopin's major points is the necessity of using theological notions to help construct ethical outlooks wherein "nonbelievers can coexist equally in a given society." This amounts to nothing short of the "humanization of the Other" and "the treatment of the Other with absolute dignity." Here it is imperative either to recover or to develop myths and stories from various religious traditions to replace some of the darker concept of religious identity that depend upon the existence of "a demonic enemy who must be eliminated." Easier said than done.

This is a challenging and dense book about a topic of enormous significance. While it assumes some prior knowledge of conflict resolution theory, the generalist will certainly profit from it. His chapter on Judaism and conflict resolution provides a wealth of information that is very helpful in understanding the context of the current violence in Israel and the Palestinian Authority.

Gopin's dream that "religion can play a critical role in constructing a global community of shared moral commitments" is a noble one. I am just not as sanguine as Gopin about either a solution to the "seemingly intractable religious militancy" or the prospects for religious peacemaking. I hope I am wrong.

*Reviewed by Donald A. Yerxa, Professor of History, Eastern Nazarene College, 23 E. Elm Avenue, Quincy, MA 02170 and Assistant Director, The Historical Society, 656 Beacon Street, Mezzanine, Boston, MA 02215-2010.*



## SOCIAL SCIENCE

**THE BALANCE WITHIN: The Science Connecting Health and Emotions** by Esther M. Sternberg. New York: W. H. Freeman and Company, 2001. 250 pages. Paperback; \$14.95. ISBN: 0716744457.

This is a great book. It is masterfully written, well-documented, and unfolds in places with the grace and flow of a novel. As the title suggests, the book is an attempt to explain how we have come to understand that mental health and physical health are related.

Sternberg is eminently qualified to write on this topic and plays a significant role in the story that she tells in the book. The Director of the Molecular, Cellular, and Behavioral Integrative Neuro-Science Program, she heads the section on Neuroendocrine Immunology and Behavior at the National Institute of Mental Health and National Institutes of Health. She has won the Public Health Service Superior Service Award and has written over one hundred



scientific papers or views and book chapters on the subject of brain immune connections, including articles in *Scientific American* and *Nature Medicine*.

The book is organized historically, which is very helpful for this cutting-edge subject. Sternberg starts with a discussion of very early notions of health, such as those held by physicians in classical Greece. At that time, the influence of emotions on disease seems to have been greatly appreciated, even though the science of medicine was relatively unsophisticated. She outlines the history of medicine in some detail through several chapters and then introduces Descartes as the culprit who split apart the emotional and physical in the infamous "Cartesian dualism." This split was so dramatic that it created two unrelated and uncommunicating specialties: medical doctors who study illnesses of the body; and psychiatrists who study illnesses of the mind. She articulates the breakdown of Cartesian dualism as researchers on each side of the Cartesian divide repeatedly encountered influences coming from the other side of the mind/body barrier.

Sternberg's own specialty relates to the immune system. In a couple of chapters, she outlines the scientific developments which made it clear that the brain-immune "system" is a two-way street. She gives historical examples in which the immune system and the brain communicate.

Sternberg brings her subject into the present with her discussion of the important role that social life plays in disease. She shows how having a healthy network of social and familial support provides measurable health benefits. She describes some of the recent studies that have shown a connection between religious belief and health. She argues that, although the phenomena may be entirely explicable in terms of the placebo effect, the intuition of religious people praying for health is effective.

The book concludes with an exhortation to the medical community to continue to move in the direction of treating patients holistically. Sternberg calls for medical doctors to pay especially close attention to patients' descriptions of their mental and emotional states.

The book succeeds on a number of levels. Although, like any book dealing with medical science or biology, it can get aggressively poly-syllabic in places, and there are chapters where a number of acronyms are introduced that pose some challenges for the nonspecialist. In general, however, the book is so well written and so authoritative that it will repay any reader who is looking for a good introduction to this important and emerging discussion of the relationship between physical and mental health.

*Reviewed by Karl Giberson, Editor of Research News & Opportunities in Science and Theology, Professor of Physics, Eastern Nazarene College, 23 East Elm Ave, Quincy, MA 02170.*

**WHERE GOD LIVES: The Science of the Paranormal and How Our Brains Are Linked to the Universe** by Melvin Morse. New York: Harper Collins Publishers. 190 pages. Paperback; \$13.00. ISBN: 0061095044.

Morse is a practicing pediatrician in Seattle who had worked intensively with children with near death experiences. This is his fourth book and he has appeared twice on the Oprah Winfrey show.

His basic thesis is that children who have had near death experience (NDE) become more creative, compassionate, disciplined, even-tempered, and altruistic. He credits this to the stimulation of the right temporal lobe during NDEs. Morse is aware that mock NDE experiences can be created in the lab which also cause the subject to have a sense of being out-of-the-body and feeling bathed by Divine Light. However, he is no materialist and believes that NDE are real spiritual encounters with God. He calls the right temporal lobe the spot in our brain that communicates with God.

To document his stories, Morse covers too many topics such as memory, homeopathy, hauntings, past life readings, the power of prayer, hypnotism, psychic phenomenon and so on. The lack of footnotes make it hard to check Morse's stories. What if it could be documented scientifically that subjects who had NDE really saw things while unconscious that they could only see if they really were outside their body? This would poke a hole through naturalism so large as to cause naturalism to sink. Advocates of naturalism are fully aware of this and work diligently to try to discredit such findings. This book, which is written for lay audiences, does not present enough documented evidence to persuade a scientist that there is more to the mind than the brain. But it does have an excellent bibliography for further reading on all sides of the mind/body debate.

*Reviewed by Leland Gamson, Marion, IN 46953.*

**LEADERSHIP AND THE NEW SCIENCE** by Margaret J. Wheatley. San Francisco: Berrett-Koehler Publishers, 1999. 197 pages. Hardcover; \$24.95. ISBN: 1576750558.

This book is a revised and expanded edition that seeks to bring insight from modern science to managerial practices. Wheatley's thesis is that a new era of leadership can be ushered in by applying quantum science to management theory. An audio book of the 1992 edition is available.

Wheatley is enamored with science, but she has in mind an unusual understanding of science heavily featuring the works of Fritjof Capra. The premise of the book is that science has profoundly influenced society, and based on recent discoveries in particle physics, this trend will continue. Wheatley believes that an analogous quantum leap forward will occur in managerial practices by applying insight from modern science.

Each chapter summarizes an area of science, often interspersed with anecdotal managerial practices, culminating in some great insight into how science provides support for Wheatley's new managerial practices. She is so convinced that science will herald a new era in leadership that she has "spent hours staring at [s-matrix diagrams describing particle physics], knowing they have something to teach me about organizational structure and how we might chart roles and relationships differently" (p. 71). This sure beats astrology.

The science vignettes tend to be simplistic synopses that suffer from over-analysis by a nonscientist. For example, Wheatley believes that "the Second Law of Thermodynamics applies only to isolated or closed systems, to

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machines, for example. The most obvious exception to this law is life" (p. 77). Having exempted life from the second law of thermodynamics she moves on to declare that "the source of life is new information—novelty—ordered into new structures. We need to have information coursing through our systems, disturbing the peace, imbuing everything it touches with the possibility of new life" (p. 96). Now these statements may appear contradictory but "if this is hard to comprehend, remember that the quantum realm is weird even to scientists" (p. 41).

Amazingly, after using concrete examples from science, Wheatley concludes the final, more philosophical, chapter with some stunning comments. "If we look at ourselves truthfully in the light of this fire and stop being so serious about getting things 'right'—as if there were still an objective reality out there—we can engage in life differently, more playfully" (p. 162).

The book provides numerous illustrations demonstrating the dangers of scientism. Unfortunately, many people without expertise in science will be unable to recognize that Wheatley's analysis has serious problems. "Perhaps these are just the ramblings of one whose mind has gone fuzzy (like all quantum phenomena) from trying to understand quantum physics" (p. 73). Perfect insight.

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

**THE PHYSICS OF CONSCIOUSNESS: The Quantum Mind and the Meaning of Life** by E. H. Walker. Cambridge, MA: Pereus Publishing, 2000. 368 pages. Paperback; \$18.00. ISBN: 0738204366.

The theme of this book is well expressed by its subtitle, "The Quantum Mind and the Meaning of Life." The author wants to find the meaning of life from quantum mechanics. Like so many in our postmodern generation, he starts out with an easy dismissal of historical Christianity: "Can anyone who claims to be rational today—when religion no longer serves as an explanation of where we came from or how we got this way—believe that anyone was raised from the dead?" He openly embraces science, in particular, physics, as the new religion, the new absolute truth. But this leaves a problem: How do we fill that void in our hearts? Throughout the book, Walker includes vignettes of how the death of his girlfriend caused him to ask deep questions: "Where is home? Is there any home?" "What are we really?" "Where do we go for salvation?" Walker finds the answers in a religion which he says is scientific: Zen Buddhism. After scoffing at the idea of the Resurrection as irrational, he finds the following statements to be perfectly wise:

The student Doko came to a Zen master and said, "I am seeking the truth. In what state of mind should I train myself, so as to find it?"

Said the master, "There is no mind, so you cannot put it in any state. There is no truth, so you cannot find it."

"If there is no mind and no truth to find, then why do you have these monks gather before you

every day to study Zen and train themselves for this study?"

"But I haven't a inch of room here," said the master, "so how could the monks gather? I have no tongue, so how could I call them together to teach them?"

"Oh, how can you lie like this?" asked Doko.

"But if I have no tongue, how can I lie to you?" asked the master.

Then Doko said sadly, "I cannot follow you. I cannot understand you."

"I cannot understand myself," said the master.

Christianity is foolishness, but this is wisdom to the postmodern man. Walker has written another book in what is now an industry of books mixing New Age religion with much hand-waving, mysterious-sounding explanations of Quantum Mechanics and cosmology, a trend started with books like *The Tao of Physics* and *The Dancing Wu Li Masters*. The heart of these books is a complete embracing of the Copenhagen interpretation of Quantum Mechanics, which says that mental observations cause jumps in the quantum mechanical wave functions. Because some well-known scientists have taught this interpretation, the mind-over-matter connection is taken as an incontrovertible deduction of absolute Science. The Copenhagen interpretation is not a deduction from the data, however, but an interpretation put on the data, and many, if not most scientists today, reject the Copenhagen interpretation.

Space does not allow me to give an overview of modern interpretations of Quantum Mechanics, but suffice it to say that most quantum physicists I know do not put the human mind in such a special role; they would say that the interaction of particles with *any* macroscopic system would give the same type of quantum jumps.

Even if one accepts the Copenhagen interpretation, however, it is a long way to the leaps of imagination which Walker and other similar writers accomplish. Walker says that the idea that "1/10 of 1%" of our minds are shared in common with other people's minds is "forced on us by physics." He goes from this to the conclusion, also found in other similar New Age/Quantum books, that we are God and God is us. This allows him the comforting conclusion that his deceased girlfriend is still with him and in him. Some people may find comfort in these ideas and Zen philosophy, but it is utter nonsense to say that physics forces us to accept these beliefs.

About two-thirds of the way through the book, Walker adds a few new twists. As a brain scientist, he gives an overview of the workings of the brain and argues that the fact that electrons must tunnel quantum mechanically across synapses proves that Copenhagen mind-over-matter choices occur in the brain. Quantum mechanical tunneling through barriers is a ubiquitous phenomenon, however, and Walker gives no evidence why tunneling in the brain has cosmic implications while tunneling in, say, a mammal liver or in electrical tunneling diodes or in the decay of radioactive elements does not. In particular, Walker does not address the important quantum mechanical issue of *coherence*. According to his calculations, seven

electrons must tunnel across a synapse at the same time to give a signal. If these electrons do not tunnel *coherently*, that is, with correlated wave functions, then the information of their wave functions will be lost, and the signal will be no different from any other electrical signal. From my own study of biophysics, I can say that almost certainly the tunneling in the neurons is incoherent and therefore not intrinsically different from any other electrical signals.

Walker also proposes some radical new ideas in physics, without alerting the reader to just how radical these ideas are. He proposes a change in the Dirac equation which would allow a consciousness term; he also argues that the Arrow of Time (our sense of time passing) is not related to the Second Law of Thermodynamics. A change in the equations of Quantum Mechanics would be a truly revolutionary step deserving a Nobel prize; so far no one has succeeded at such a program. In the case of the Arrow of Time, Walker argues that quantum state jumps give the direction of time. One might argue this, but it is not the standard view and relies, again, on the assumption that the observation/quantum-jump process of the Copenhagen interpretation is the central fact of physics. By contrast, many quantum physicists are working in the opposite direction—trying to show that the Second Law leads to the appearance of quantum jumps.

Interestingly, Walker gives support to Intelligent Design theorists in several places when he, as a brain scientist, speaks of how the nerves in the brain are “tailor-made” or “designed” for thought. He does not address where this design comes from, but he feels comfortable talking of design. This is my experience with many biophysicists who have spoken at the University of Pittsburgh—they quite freely use phrases like “design” and “fine-tuning” to describe the processes, and do not feel they are being unscientific in doing so.

The main value of this book is in the modern discussion of brain synapses; the New Age philosophy is quite standard by now and can be found in numerous other, similar books.

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**THE GENEALOGY OF VIOLENCE: Reflections on Creation, Freedom, and Evil** by Charles K. Bellinger. New York: Oxford University Press, 2001. 153 pages, index. Hardcover; \$35.00. ISBN: 0195134982.

We have manifold evidence that *Homo sapiens* is a very violent species. And there is no shortage of notions as to why that is the case. In this book, Bellinger argues that Søren Kierkegaard should be added to the list of thinkers who help us to make sense of political violence in history. Bellinger, a theological librarian and an ethics professor at Brite Divinity School, demonstrates convincingly that Kierkegaard is a rich—and largely overlooked—resource for understanding the roots of violence.

Bellinger anchors the Kierkegaardian understanding of violence in the uniquely human experience of angst (anxiety, fear), which—contra David Hume and Ernest Becker—

does not arise out of fear of death. Rather, angst is the product of human beings coming into existence as spiritual creatures. The call to live in genuine communion with God is the call of creation drawing individuals into more mature forms of selfhood. Nevertheless, humans resist the call because immature egos experience it as angst-producing pressure. Sin, according to this understanding, is a function of “ego protection” and has its origins in “the illegitimate way human beings try to control or reduce their feelings of angst” (p. 6). Humans in this angst state are desperately seeking to control their own selfhood, but they succeed only in avoiding the possibility of spiritual growth. The inward pressures to become more mature persons generate frustration and anger that is the root of violence toward others. Instead of addressing their internal alienation, humans project their anger outward. He states:

When an entire society is made up of persons who exist in this psychological state, the society as a whole acts on the basis of this spiritual sickness. The society develops the need to identify and attack an Enemy. The society selects scapegoats and sacrifices them as a way of reinforcing its impulse to ego-protection (p. 67).

*The Genealogy of Violence* is a thoughtful work of theology, one that both contributes to the literature on Kierkegaard and explores the basic elements of a Christian understanding of violence. But Bellinger's project is much more ambitious conceptually. He is deeply concerned with questions related to what historian George Marsden has labeled “the outrageous idea of Christian scholarship.” Specifically, Bellinger argues that Christian theology can be expanded into a fully developed social science, one that approaches the empirical data of human behavior from a theological interpretive framework. Doing so, Bellinger maintains, promises to yield more satisfactory insights than a thoroughly secular social science limited by “methodological atheism.” He asserts that mainstream social science is bound to a “flattened secular landscape” that rules out the most critical factor to understanding the human condition: the self exists before God (pp. 92–3). Consequently, “secular approaches to social understanding are self-crippling; they can never comprehend the human condition adequately” (p. 8).

These are extremely provocative claims, and although I wish Bellinger had developed them further, he is to be commended for his bold critique of the limitations of “methodological atheism.” He is, I believe, entirely correct to suggest “that the closure to transcendence inherent in methodological atheism prevents its theorists from fully understanding the phenomenon they are seeking to grasp” (p. 96). It is important to recognize, however, both the limiting and the enabling nature of “methodological atheism.” The reductionistic methodologies of the sciences have been wildly successful when employed in the service of relatively circumscribed questions that lend themselves to empirical investigation. There is nothing untoward about the stance of “methodological atheism” for a vast array of problems ranging from fixing one's car to examining spectral lines in distant stars.

The rub, of course, comes when reductionistic methodologies are pressed inappropriately into service to provide authoritative and often exclusive answers to questions that probe the deeper meanings of human experience. Clearly,

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those questions require all the knowledge, insight, and wisdom we can muster. If the kind of Christian scholarship that Bellinger seems to be advancing involves a genuinely transdisciplinary dialogue within the academy wherein theology provides an important interpretative lens for scientific inquiry, I am in full agreement. I fear that anything less than this—whether it be a functional compartmentalization of faith and science, a so-called dialogue between science and religion that patronizes theology or tries to bully it into accommodationist stances, or a hybridized empirical-theological method (whatever that might be)—does not respect the enormous potential of science and theology in full dialogue. Given the demands of attempting to understand the human experience, better make additional room at the table for some historians, artists, and poets. They will come in handy.

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**CHRISTIANITY INCORPORATED: How Big Business Is Buying the Church** by Michael L. Budde and Robert W. Brimlow. Grand Rapids, MI: Brazos Press, 2002. 191 pages, index; bibliography. Hardcover; \$22.99. ISBN: 1587430266.

Walter Brueggemann recommends this volume, and for many, that is reason enough to read it. Written by two Roman Catholic laymen, one an economist, the other a philosopher, its primary focus is on Catholicism and Pope John Paul II's *Centesimus Annus*, promulgated in 1991. There is also an assessment of several similar Protestant position papers.

The authors begin with a consideration of the chaplaincy function within the U.S. military, arguing that, in many ways, it not only subordinates the function of Christianity to military structures and goals but also is, itself, counter-productive to the Christian message. They then extend this analysis to corporations, who use (misuse) "spirituality" concepts to further their own capitalistic goals and structures. If that were not sufficiently disconcerting, they also discuss how the churches (in this case, primarily the Roman Catholic church) have abandoned their historical role as a critic of the structures of society to become advocates and supporters of those structures. In so doing, they argue, they are "losing their souls," in the sense in which Stephen Carter uses that term in his recent book, *God's Name In Vain*. For those who have read Carter's book, this work is a natural sequel.

The book makes excellent reading for those who are alarmed to see modern Christianity becoming synonymous with the celebration of "America." The authors show how the political and economic forces in our society that see prosperity and comfort as the highest goals have infiltrated the churches, leading them to become agents of programs not properly part of the Christian message. In short, their goal in this book is to show "... how the workings of the world economy in particular steer the Christian gospel and its expressions into safe, domesticated forms" (p. 24). "John Paul's logical starting point ... as expressed in *Centesimus* is that of all liberal theorists from Hobbes

and Locke to Rawls: the individual person ... [His] argument is indistinguishable from that of Locke in *The Second Treatise of Government*" (p. 114). They see the *Centesimus* as confused, using a "phony distinction" (p. 117) by constructing a framework in which Christians can supposedly hold a primary allegiance to both Christ and the state. These two goals cannot both be maximized, they assert, and if a person tries to do so he or she must seriously compromise one or the other. Seeing the church as simply a corporate citizen of the state makes it inevitable that the state's structures will dominate.

This book is recommended for ASA members who are Roman Catholics. It is also worthwhile reading for the rest of us, for those who see Christianity as properly in the role of a critic of the structures of society, never as an advocate. For those who conflate Christianity and "America" as synonymous, the book will be an offense.

A sampling of the views of the authors, leaders in the Ekklesia Project, an ecumenical organization, may be seen on the Internet at <[www.ekklesiaproject.org](http://www.ekklesiaproject.org)>.

*Reviewed by John W. Burgeson, Stephen Minister, First Presbyterian Church, Durango, CO 81301.*

**WHO RULES IN SCIENCE: An Opinionated Guide to the Wars** by James Robert Brown. Cambridge, MA: Harvard University Press, 2001. xii + 234 pages, notes, bibliography, index. Hardcover; \$26.00. ISBN: 0674006526.

Brown refers to the so-called "Sokal" affair, based on an article Sokal wrote in 1996. The article was a hoax because Sokal wanted to rescue left-wing politics from idiotic thinking. This is expressed in the Preface:

The dichotomy of an anti-science Left against a pro-science Right is a common perception. Snow misread his scientists (in 1959) and we very likely misread ours today. The real value of the now infamous Sokal affair is to bust this simple-minded dichotomy and give some elbow room to a left-wing alternative that is (with important qualifications) broadly pro-science.

Brown thinks the argument revolves around epistemology because good epistemology ultimately influences government. As Brown observes, the winner of the "science wars" will have an unprecedented influence on how we are governed, mentioning as examples, the environment and the alarming increase of commercialization of science, thus patenting knowledge to the possible detriment of science. The science wars will only be settled after we first "explore the issues of objectivity, values, and social influences. Then we can move on."

The point is, of course, that "objectivity" and "values" are terms based on certain philosophical assumptions. Brown spends a complete chapter dealing with these assumptions revolving around words like "realism," "objectivity," and "values." This is a useful book for those interested in the politics of science and how epistemology relates to it.

*Reviewed by Jan de Koning, 20 Crispin Crescent, Willowdale, ON, M2R 2V7 Canada.*

# Letters

## God's Sovereignty in Creation—A Reply to Howard Van Till

Howard Van Till has considered my proposal "Creative Providence in Biology" carefully.<sup>1</sup> I thank him for his response "Does God Choose Among Hidden Options?"<sup>2</sup> as well as for initiating the vigorous discussion of my paper in ASA's online Discussion Group.<sup>3</sup>

While there is full agreement among theists that our world began with a marvelous divine creation, opinions diverge with regard to the modes of God's continued activity in providence. Of course, a full understanding of God's relation to his creation is beyond our ken. Yet we have some indications in both of his "books of revelation," nature and the Bible, as to how he may be working. It is clear that the Creator is involved in all so-called "natural" processes, and Christ, through whom he created the universe, continually upholds it by his word of power (Hebrews 1:2-3).

Van Till and I agree on this general picture, but disagree on *how* the Creator may have implemented his providential activity in creation. Whereas Van Till opts for a concentration of the provision of all that is necessary for the entire historical development of the creation at its very beginning, I prefer to view it as distributed over time. While it may be difficult to distinguish these two options based on *biblical* evidence, I believe the weight of *scientific* evidence is on the side of a distributed gifting. In particular, the information required to specify functional biological structures and organisms appears to be neither storable in a prebiotic universe nor capable of spontaneously emerging.

Van Till does not deny the possibility of further divine miracles (like Christ's resurrection) after an initial creative act, but emphasizes the "functional integrity" of creation from the outset. He believes that this would eliminate any need for later "interventions." He also underlines God's continued blessing, which acts like "persuasion"—a concept Van Till borrows from process theology, being "effective in stimulating the desired outcome without forcibly violating the object of his influence." It is a "*giving of being*—equally essential at every moment of time," an "enabling," a "constructive presence." However, what does this *mean*? What is a blessing, persuasion, stimulation, or giving of being, devoid of any supernatural intervention in an already fully equipped, gapless economy not lacking anything? *How* does it work, in a scientific, as opposed to theological-philosophical, language? What distinguishes this "naturalistic theism" from a deism just plainly calling (created) matter autonomous? I believe Van Till's protestation that he has no intention of becoming a deist, but I do not understand what distinguishes his view of providence from a deistic one, although he tries to explain it with the terms mentioned.

The physical universe and its history reveal an impressive amount of fine-tuning, which allows for the formation of a home for humans. It is easy to perceive God's blessing in this. In addition, it is quite easily conceivable that this

outcome is a consequence of the set of initial laws and conditions provided at the outset, 15 billion years ago. None of the events conceived or shown to have been building blocks in the entire cosmological process looks extremely improbable. The combination of many parameter restrictions evokes wonder. In combining all known restrictions, the estimated improbability of a habitable Earth just about reaches transastronomical numbers.<sup>4</sup>

With life, however, the orders of magnitude change radically. Different physical laws, parameters, and entities need not even be combined to reach inconceivably small probabilities. The Earth is a simple self-organizing system, but the rotor of a bacterial flagellum is not. Virtually every one of even the smallest known functional biopolymers represents a parameter space of transastronomical magnitude, unlike anything found in nonliving things. Here, the parameter space is not the global environment, but the configurational space of a single molecular entity. Since these are coding or coded polymers, their potential information content can, in principle, be calculated. There are multiple ways of satisfying a biochemical requirement. Therefore, the informative part of this structural information, what I have called the semantic information content, is much smaller than the parameter space as a whole. It is claimed that, during the evolution of such molecules, natural selection provides the guiding principle during the otherwise random mutational walks through parameter space.

The usually silent assumptions are:

1. All intermediate stages of all required evolutionary paths are viable, and
2. A sufficient number of all combinatorial possible sequences are functionally equivalent.

If they are seen at all, these assumptions are usually justified by the "fact that we are here"—which obviously explains nothing. Although atheists do not have this choice, believers in divine creation are free to seriously consider these questions. Because of the transastronomical sizes of the relevant configuration spaces, they cannot be answered explicitly. It will always be impossible to satisfy Van Till's demand to know "*all possible formational pathways*." Nevertheless, both of the silent assumptions can be approached by experiments to arrive at partial answers. My calculation of the probability of random emergence of a minimal novel enzymatic functionality<sup>5</sup> suggests feasible experiments to get at an answer for assumption 1. In addition, experiments may find tractable ratios of possible to functional sequences, thus helping to answer the question of sufficiency in assumption 2. So far, to my knowledge, very few such experiments have been published—all of them tending rather to call into question the silent assumptions. Unfortunately, it seems to be much more profitable to develop new proteins of commercial promise by *systematic artificial* selection experiments, which hardly give any information regarding the questions, considered here, which must be based on *random natural* selection only.

Van Till is convinced that God put all information required for the "natural" production of the biosphere into the creation from the outset. It seems that, based on this theological presupposition, he sees no reason to question the silent assumptions at all. Twice in his response, he explicitly concedes that he cannot "prove" his view of an

initial functional integrity of the created universe. He suggests, however, some arguments to support it, even in the realm of biology. One is the detection of organic molecules such as glycolaldehyde in space. Apparently, astronomers did not anticipate this, although they knew of the existence of the conditions required for their formation. In retrospect, no chemist is surprised that on catalytic dust grains such compounds can form from the simple basic small molecules, radicals, or ions available. It eludes me, however, what connection Van Till sees between the formational probabilities of glycolaldehyde or glycine and, say, a replicating, code-bearing biopolymer? These are worlds apart! The difficulties mainly start with code-bearing and coded polymers having huge configuration spaces of  $4^{3N}$  for DNA, or  $20^N$  for proteins, where  $N$  begins to become biologically relevant at a few dozen.

In such a situation, selection is needed, but natural selection may be insufficient in many cases, due to assumptions 1 and/or 2 being violated. Now, divine selection can be applied in the invisible realm of quantum uncertainties to effect positive mutations, enabling evolution to proceed because guided. There is no "forc[ing] creatures to act in ways contrary to or beyond what they could otherwise have done." All elementary particles, atoms, and molecules act exactly "naturally." They just have multiple choices, which they cannot sort out intelligently by themselves—which certainly is not an "insufficiency of creation" as Van Till claims! America's network of roads is not defective because a robot car cannot go from Miami to Seattle without any informational (map and traffic) input. In addition, when I buy a computer, I would prefer to always be free to install, at any given time, those programs I need.

Van Till's other approach is theological. He suggests that I would have to believe that God must have deliberately designed transastronomical improbabilities into his creation, so that he would have to introduce the required information later. However, Van Till's parody "withhold now, compensate later" begs the question. I emphasized that the hidden choices are among events of "natural," relatively high probabilities inherent in the physical laws and parameters of the universe given in the beginning—and which are required for the universe to work properly. The low probabilities are logically inherent, not designed. So, there is no unreasonable deviousness implied. The high improbabilities arise from combinations of several or many such selections with a particular required outcome, which would have to be satisfied at once. Try to design an enzyme, even if it is one of just only minimal, barely detectable functionality, but *not* derived from a known enzyme, and you know of what I am talking. It would be an easy task if silent assumption 2 were true.

In a second step, Van Till compares the model of God's "hidden options" with occasionalism that "denies true cause-effect relationships in the creaturely world." He justifies this opinion with the claim that, in the hidden-options model, "particular outcomes are entirely determined by divine choice," thereby replacing authentic creaturely action by a mere appearance of it, and "God becomes a divine puppeteer." As I never specified the percentage of choices specifically affected by God, but rather considered them to be rare events at particular important bifurcations, my model has nothing to do with such deter-

minism or divine make-believe. As a rule, random events will be truly random. However, in very many cases, this just will not do in a huge parameter space—unless the silent assumptions were true.

Furthermore, Van Till tries to draw the hidden-options model into the god-of-the-gaps trap. He claims to be unable to see a fundamental difference between my model and views that invoke "supernatural," "coercive" or "form-conferring intervention" because God's creation contained "gaps," was not "sufficient," or "lacked" something which God "withheld." None of this was claimed or is implied in my model—apart from the fact that God's introducing information, by effecting a selection of available outcomes, is supernatural by definition. So is divine blessing, providence, "persuasion," etc., although, with this fully general, nondescriptive, metaphysical terminology, no operational mechanisms are suggested that could be discussed, criticized, or possibly even tested. Making use of the hidden options envisaged definitely does *not* constitute "particular acts in which the continuity of the creaturely cause/effect system was interrupted and superseded by coercive divine action"—or else the options would not be *hidden*. However, this constitutes a proposal as to *how* God's blessing and providence might work—which Van Till's model lacks.

Van Till's "robust formational economy principle" requires that from the beginning the creation was "fully equipped ... to actualize ... every form of living organism that has appeared." This forces him, like the atheists and deists, to believe the two silent assumptions—without any evidence. The only possible alternative would be for God to have stored, somewhere in an abiotic cosmos, the information required for the biosphere, which remained unused for ten billion years between the big bang and the origin of life. This looks rather contrived, at best, and physically impossible, at worst.

The basic question is whether God is free to act in his creation in whatever manner he chooses, at any time he chooses. Van Till criticizes the traditional view of God as "an all-powerful, transcendent, person-like being" involving a "radical distinction between the Creator and the creation." I hold this view to be essentially biblical and true. However, Van Till links it with the derogatory term "coercive intervention," calling such pictures "museum pieces ... of centuries past" that can no longer be treated as adequate. He opts rather for process theology's "intimate relationship of Creator and the creation that is envisioned by pantheism—the world is *in* God, but God is *more than* the world." Admittedly, he limits divine action only by what follows "from the character of God and of the God/world relationship," perhaps thinking of logically inherent restrictions like "God, being good, cannot do evil." Nevertheless, the limits he does impose on the Creator in his "functional-integrity-of-creation" model are not necessarily inherent in what the Bible reveals of God. Why then this degradation of a fully sovereign God to a God inextricably bound to his creation and limited by the results of his own doing? Is it because of a perceived logical impossibility of combining divine sovereignty with creaturely freedom? Or of predestination with free will? Is it an attempt at solving the problem of theodicy by whittling down God's possibilities? Is it a question of either completely overpowering the creature or no intervention at all?



A fully sovereign God can certainly have as intimate a relationship with his creation as he sees fit, but without binding himself to arbitrary principles like "never act intrusively." I agree with Van Till that God's *usual* way of acting in the creation is through "natural" processes, and I have come to believe this because of the human freedom which must necessarily be linked with the possibility of genuine faith and love. However, it certainly does not follow that God *inherently cannot* introduce new information into his creation whenever he wants to do so. As I argued before, there is no reason to believe a "functional-integrity" mode of creation to be more suitable or worthy for God than one using a continuous intimate but sovereign relationship using insertions of information during an evolving creation which didn't start out "all set" at the big bang. Why should anything be "lacking" in a creation God decided to perform not all at once? The "perfect-all-at-once" misconception is one of the basic errors of young-earth creationism.

No theist doubts that, according to the Bible, God sometimes does intervene in human affairs in response to prayer, good or evil acts, and other decisions of his creatures endowed with free will. However, none of this needs to be described by Van Till's negative characterization of "interventions." Often, there may not even be any *discernable* "supernatural" aspect. God's action is perceived by faith, not science.

My proposal of God's "hidden options" is subject to further discussion and possible modification.

## Notes

<sup>1</sup>P. Rüst, "Creative Providence in Biology," *PSCF* 53, no. 3 (September 2001): 179–83.

<sup>2</sup>H. Van Till, "Does God Choose Among Hidden Options?" *PSCF* 54, no. 1 (March 2002): 67–70.

<sup>3</sup>asa@calvin.edu; with archive at [www.calvin.edu/cgi-bin/archive](http://www.calvin.edu/cgi-bin/archive)

<sup>4</sup>H. Ross, *Big Bang Refined by Fire* (Pasadena, CA: Reasons to Believe, 1998), 13.

<sup>5</sup>P. Rüst, "Spezielle und allgemeine Evolutionstheorie: Fakten und Spekulation," in: *Zur Diskussion um Schöpfung und Evolution*, eds. E. Gutsche, P. C. Hägele and H. Hafner (Marburg, Germany: Symon & Wagner, 1984), 59–115; P. Rüst, "The unbelievable belief that almost any DNA sequence will specify life," Conference "Sources of Information Content in DNA," Tacoma, WA (1988); P. Rüst, "How has life and its diversity been produced?" *PSCF* 44, no. 2 (June 1992): 80–94.

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## Response to Moorad Alexanian, "Humans and Consciousness"

In response to Moorad Alexanian's letter (*PSCF* 54 [March 2002]) regarding my communication (*PSCF* 53 [June 2001]), I am quite thankful to hear from my colleague on the other side of the scientific spectrum. As psychology is generally treated as a "soft" science with physics being the hardest of the "hard" sciences, his comments reveal some of the

differences between our disciplines. This is one of the wonderful things about the science of human consciousness; we all have something meaningful to contribute to the conversation. Alexanian's critique reveals that questions about human consciousness can fall into ontological and epistemological categories as well as theological ones. This further illustrates the necessity of interdisciplinary dialogue on this subject.

With regards to his epistemological concerns, Alexanian comments that "consciousness cannot be determined or measured with physical devices and so it is not the subject matter of science." Defining the playing field and rules is a necessary part of this research. However, what constitutes a physical device for a physicist is quite different for a psychologist. This is, not surprisingly, a matter of concern for many in my discipline. Does a psychological test (i.e., IQ test, Myers-Briggs, MMPI) count as a physical device? Some would argue yes, some no. As a psychologist with a limited understanding of particle physics, measuring sub-atomic particles looks as curious as a Rorschach analysis might to a physicist. The standards for what qualifies as a physical device are, in many ways, discipline defined. Nonverbal responses and verbal self report have long been considered an important tool in psychology's investigation of consciousness (i.e., signal detection theory). If we take a physicalist view of consciousness, then brain waves would certainly be considered a valid measure (as long as consciousness is equated with neural firing). But it is impossible to address the questions of methodology without including a discussion of the nature of consciousness.

To address the issue of ontology, the main points of the letter get to the question of substance dualism. If we maintain that consciousness (or soul) is of fundamentally different "stuff," and that science is *a priori* disqualified from measuring that "stuff"; then I think Alexanian's comments cut to the quick of any science of consciousness. It just is not possible. If we maintain, however, that consciousness is not of different stuff or that our definitions of what Nature is should be expanded to include the spirit-stuff as a primitive (i.e., Chalmers<sup>1</sup>), then a science of consciousness is not only possible, but promising. He points out that "... consciousness cannot be limited to the methods of sciences," but if you are not a substance dualist I would argue that it is not immediately disqualified. The paradigm and discipline-specific methodologies we work from are quite important. The difficulty in studying consciousness has been that we have been too narrow in our conceptualization and investigation. To effectively research human consciousness, we must take an interdisciplinary approach to frame the nature of consciousness and utilize the relative strengths of each disciplines' methodology. My position is not one of substance dualism, but more of a modified naturalism similar to Chalmers. If consciousness is included as a primitive to reality, then many of the problems that we face now may dissolve as easily as when the physicists began their work on electricity.

When dealing with the theological role of miracles in the Christian world view, I would agree that defining Nature is important for the questions of epistemology and ontology of consciousness. The scientific investigation of human consciousness has a more limited metaphysical importance in Christian theology. Clearly Scripture teaches

# Letters

that we are created in God's image despite its relative silence on these other issues. If consciousness is a natural primitive, an embodied soul, or a ghost in the machine, then our moral place in the universe is still the same. We answer to the Lord Jesus. My concern is not that we will lose our morality, our uniqueness as humans, or our wonder at God's miraculous power, but that we have a clearer appreciation for how we have been created rather than a refusal to give up the "ghost."

## Note

<sup>1</sup>David Chalmers, *The Conscious Mind: In Search of a Fundamental Theory* (Cambridge: Oxford University Press, 1996).

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## Dissimilarity of Theory Testing in Historical and Hard Sciences: A Response to Keith Miller

Recently Keith Miller wrote an interesting article emphasizing similarities between historical sciences, such as geology, astronomy, and evolutionary biology, and "hard" sciences, such as chemistry and physics ("The Similarity of Theory Testing in the Historical and 'Hard' Sciences," *Perspectives on Science and Christian Faith* 54, no. 2 [June 2002]: 119–22). While one can overstate the difference between these two types of sciences, as Miller credibly argues, one can also underestimate that difference. Consideration of Ian Hacking's work on scientific realism suggests that a nontrivial difference between the two types of science exists. Reflection on the doctrine of providence, which has both ordinary and extraordinary aspects, emphasizes the distinction between the two types of sciences.

According to Miller, "[h]istorical sciences are just as predictive, and testable, as the 'hard' sciences" (p. 120). He also argues that the objects of study in the two sorts of sciences are comparable in their degrees of accessibility, because, for example, some physical processes are unobservable, whereas some astronomical processes are observable. Certainly there is some truth in this statement. Before conceding the point to Miller wholly, however, one should recall Ian Hacking's work on experimentation and scientific realism.<sup>1</sup> According to Hacking, when the powers of a theoretical entity (such as the electron once was) become understood well enough that one uses it to construct devices that manipulate other aspects of the physical world, then one must admit that the theoretical entity really exists, as indeed everyone does today in the case of electrons. (Quarks would be a suitable theoretical entity today.) But what can the historical sciences offer as analogs to the electron in this regard? One can hardly use and manipulate the Cretaceous period, or, for that matter, a historical flood, to achieve some result today. Of course,

Hacking's condition is intended to be sufficient, not necessary, for realism about the entity in question. Even so, the inapplicability of his condition to the historical sciences serves to remind us that their objects of study just are not as available to the scientist as are those of the "hard" sciences.

With this reminder in mind, let us recall a relevant aspect of an exemplary doctrine of providence, drawn from the traditional Presbyterian doctrinal standards: "God, in His ordinary providence, maketh use of means, yet is free to work without, above, and against them, at His pleasure."<sup>2</sup> It is clear that the "hard" sciences pertain to God's ordinary providence, so it would be theologically inappropriate to appeal to special providence to explain, say, the motion of a falling object. Historical sciences, on the other hand, involve both ordinary and special providences, assuming that God has acted in special ways in history. As Christians, we must admit that God has at least occasionally acted in special ways, or, in other words, performed miracles. But if miracles have occasionally occurred, and if historical sciences are aimed at truth (as Miller admits), then on what grounds should historical sciences—or at least those *prima facie* relevant to biblical stories—admit only law-uniform theories, and not also theories positing miracles? But the admission of miracles implies that theories about the past are underdetermined by the data existing today or in the future. How, then, does one choose among the infinity of empirically adequate theories in some historical science? Various criteria might be proposed, but presumably agreement with relevant genuine divine testimony, if any, is one of them. Such a criterion generally does not appear in the "hard" sciences. We are led, then, to see a rather important difference in theory testing between historical sciences and "hard" sciences, *pace* Miller.

## Notes

<sup>1</sup>I. Hacking, "Experimentation and Scientific Realism," in *Science and the Quest for Reality*, ed. A. I. Tauber (New York: New York University, 1997); reprinted from *Scientific Realism*, ed. J. Lepplin (Berkeley: University of California, 1984).

<sup>2</sup>*The Westminster Confession of Faith*, chap. 5, section 3.

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