

# PERSPECTIVES on Science and Christian Faith

JOURNAL OF THE AMERICAN SCIENTIFIC AFFILIATION

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

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

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

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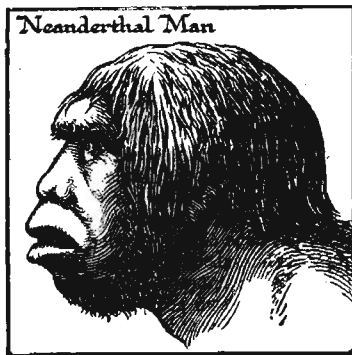
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## Were Neanderthals Created in God's Image?

**W**hat is our human biological heritage? The creation of humans climaxes the scene of the first chapter of the Bible: "Then God said, 'Let us make man in our image, in our likeness, and let them rule ...'" (Gen. 1:26a, NIV). What does it mean to be made in the image, in the likeness of the Creator? The biblical commentator, John Walton, [John Walton, *Genesis: The NIV Application Commentary* (Grand Rapids, MI: Zondervan, 2001), 131] defines image as "a physical manifestation of divine essence that bears the function of that which it represents; this gives the image-bearer the capacity to reflect the attributes of the one represented and act on his behalf." Assuming that this functional view of God's image (*imago Dei*) applies to modern human beings (*Homo sapiens*), does it also apply to early hominid groups? Were *Homo sapiens* miraculously shaped as a singularity from river-bed mud by the Creator's hands six millennia ago? Or, are *Homo sapiens* the end product of a long lineage of divinely created hominid products, extending back three million years to "Lucy" (*Australopithecus afarensis*) discovered by Donald Johanson in 1974?

Neanderthals (*Homo neanderthalensis*) inhabited Europe and parts of the Middle East from 120,000 to 35,000 years ago. Soon after 1856, when the first Neanderthal remains were discovered in Germany, this hominid group was popularized as the primitive ancestors of modern Europeans. Subsequent discoveries demonstrated Neanderthal's large cranial capacity, burial practices, and caretaking characteristics as similar to *Homo sapiens*. Consequently, a "Multi-regional Evolutionary hypothesis" dominated anthropological explanation of human origins.

More recent archeological discoveries and forensic genetics revealed that early modern Europeans, Cro-Magnon, were not descendants of the Neanderthals, but migrated from Africa to Europe 45,000 years ago ("Out-of-Africa hypothesis") and co-existed with European Neanderthals. European *Homo sapiens* were "cousins" to Neanderthals rather than their progeny.

As Christians, who believe the Scriptures are inspired by God and trustworthy, where do we place the role of biblical Adam within the hominid story? Frequently,

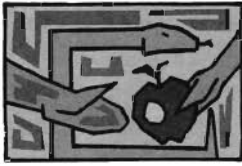
diverse views of human origins have initiated harsh debates. Popularly the issue of origins is misconceived as warfare with two ideological battle lines: "biblical creationism" (humans divinely created 6000 years ago) fighting "atheistic evolution" (humans descending from a 20 million-year-old apelike ancestor through evolution). This limited perspective of only two alternatives has become a watershed issue of orthodoxy in many Christian circles. Unfortunately in those debates, the term "evolution" is frequently conflated and becomes a profanity! Too little recognition is given to the multiple Christian voices between these two extremes who are attempting to interpret with integrity the books of nature and Scripture. Why do we viciously debate this cloudy issue characterized by emerging, rather than conclusive evidence? Why are we so certain that our interpretation is the correct one? Can we commit to discovering truth, while holding our favorite theory with humility?

This issue of *PSCF* proposes novel answers to historical anthropological questions. Inspired by the early chapters of Genesis and insights from paleoanthropology, John McIntyre dialogues with respondents, Perry Yoder, James Hurd, and David Wilcox, by divulging an uncommon perspective on the essence and transmission of the Adamic sin nature. George Murphy's article brings a Christocentric perspective to the same topic. By describing Mesopotamia geological characteristics, the two subsequent articles by Carol and Alan Hill provide perspective on the Noachian flood, described in the later Genesis chapters of human history. Subsequent articles on another group of early hominids by Glenn Morton as well as the issue of death before Adam's fall by Perry Phillips contain both interesting and stimulating ideas. These authors may enlarge your perspective on the early chapters of Genesis or challenge basic premises that support your understanding of human origins. ✱

Stepping cautiously into the fray!

**Roman J. Miller, Editor**

P.S. The first Neanderthals preceded biblical Adam by 100,000 years!



# The Real Adam and Original Sin

John A. McIntyre



John A. McIntyre

*The purpose of this paper is to present the character of an Original Sin that is based on the nature of this new Real Adam.*

*A Real Adam has been proposed whose nature is in agreement with both Scripture and science. However, the nature of this Real Adam is significantly different from that of the traditional Adam of the confessions. As a result of this difference, the injustice of Original Sin has been eliminated, the noetic effects of sin have been explained, and a falsifiable prediction for the propagation of Adam's sin has been proposed.*

**A** recent paper has proposed a Real Adam whose history and nature are consistent both with Scripture and with science.<sup>1</sup> However, the nature of this Real Adam is inconsistent with the nature of the traditional Adam described in the confessions produced at the time of the Reformation. As a consequence of this inconsistency, the Original Sin of the Real Adam has a different character than the traditional Original Sin described by the confessions.

The purpose of this paper is to present the character of an Original Sin that is based on the nature of this new Real Adam. The character of Original Sin depends on four components: (1) the nature of Adam before he sinned, (2) the consequences of Adam's sin, (3) the noetic (intellectual) effects of Adam's sin, and (4) the propagation of Adam's sin to the human race. These four parts of Original Sin will be used to compare the character of the traditional Original Sin for the confessions with the character of Original Sin for the Real Adam.

## Adam before He Sinned The Real Adam

We summarize here the nature of the Real Adam which has been described elsewhere.<sup>1</sup> Beginning with the second chapter of Genesis, Scripture presents Adam as a historical figure connected by genealogies to Abraham, the head of the chosen people. According to Scripture, God formed Adam from the dust of the ground in Mesopotamia about 4000 BC where Adam disobeyed God by eating of the tree of the knowledge of good and evil. Adam's son Cain is a farmer while Abel, his brother, is a shepherd. Cain kills his brother Abel and, fearing for his life, emigrates to the east where he builds a city.

Remarkably, little more is recorded about Adam in the Old Testament. However, in 1 Corinthians 15, the Apostle Paul quotes from Gen. 2:7 to provide more insight on the nature of Adam before he disobeyed God:

<sup>45</sup>Thus it is written, "The first man Adam became a living being"; the last Adam (Christ) became a life-giving spirit ... <sup>47</sup>The first man was from the earth, a man of dust; the second man is from heaven.

In his commentary on Gen. 2:7, John Calvin refers to this evaluation of Paul:

Whatever the greater part of the ancients might think (that this passage describes Adam as an image of God), I do not hesitate to subscribe to the opinion of those who explain this passage of the animal life of man; and thus I expound what they call the vital spirit, by the word, *breath* ... the state of man

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In 1950, **John 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 Professor 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. McIntyre has served on the Executive Council of the American Scientific Affiliation. As an active fellow in the ASA, he currently is serving on the Editorial Board of our journal. John and his wife Madeleine are charter members of a new congregation of the Presbyterian Church in America in Bryan, Texas. He may be contacted at: [jmcintyre@physics.tamu.edu](mailto:jmcintyre@physics.tamu.edu).

was not perfected in the person of Adam ... Before the fall of Adam, man's life was only *earthly*.<sup>2</sup>

For Calvin, Adam in Gen. 2:7 was a normal man of the earth.

Something happened to Adam, however, when he ate of the tree of the knowledge of good and evil: "his eyes were opened and he knew that he was naked." Knowing good and evil, Adam is no longer simply a part of nature. He now, like God, transcends the natural world and can evaluate the events that occur there. A familiar saying is that one cannot proceed from an "is" to an "ought." Now, with the knowledge of good and evil, Adam had proceeded from an "it" in the natural world to an "I" outside the natural world. Adam had become a person, an image of God.

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A comment here may be helpful for connecting the "image and likeness" of God in Gen. 1:26-27 with the events in Genesis 3. History in the Bible begins in Gen. 2:4b where God creates the earth and the heavens. History then continues with the formation of Adam (Gen. 2:7), the formation of Eve (Gen. 2:22), the acquisition of the image of God when "their eyes were opened" (Gen. 3:7), and on through the genealogies to Abraham and the history of Israel. On the other hand, Gen. 1:1-2:4a appears to be an "overture" to this history. Like an overture to an opera, this overture introduces the themes of the history so that Gen. 1:26-27 contains the history of Adam, Eve, and the image of God in one verse: "So God created man in his own image, in the image of God he created him; male and female he created them." This overture in Genesis is similar to the first eighteen verses of the Gospel of John which, in like manner, presents an overview of the historical Gospel that follows.<sup>3</sup> We see here, too, the perception of John Calvin who, in his interpretation of Gen. 2:7, opposed the general opinion and did not find the image of God in the formation of Adam.

Another consequence also followed the eating of the forbidden tree. Before eating of the tree, Adam was an innocent creature even though he followed the desires of his animal nature. Being innocent, he was guiltless but not righteous. Also, he was aware of God's eternal power and deity (Rom. 1:20) but had not yet acquired the knowledge of good and evil. This awareness of God's deity was what made Adam's disobedience of God's command a sin. However, in Adam's acquiring the knowledge of good and evil, God's law was written on Adam's heart. Now his formerly innocent animal desires led him to sin. For "apart from the law sin lies dead" (Rom. 7:8).<sup>4</sup> But not only would his innocent animal desires lead to sin, his newly acquired self-esteem as an image of God also would lead to sins such as pride and envy unrelated to his animal nature. An inevitable feature of being a human in the image of God, and knowing good and evil, is to be a sinner.

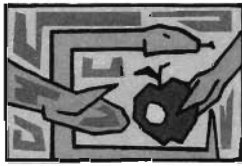
Science, of course, has no knowledge of any of this. However, science can contribute knowledge about the world in which Adam lived. The scriptural description of Adam's sons farming and herding in Mesopotamia in 4000 BC fits in well with archeological knowledge. In addition, Cain's building a city in the east agrees with the archaeological evidence that the first cities were built about 4000 BC in Mesopotamia and shortly thereafter in the Susiana plain some 250 km to the east.

Of more immediate interest for Adam is the archeological evidence that thousands of *Homo sapiens* lived in the Mesopotamian valley in 4000 BC. *Homo sapiens* is a scientific term that we will reserve for creatures that have not acquired the knowledge of good and evil. *Homo sapiens* then are not human beings who are sinners in the image of God.

It is, of course, difficult to demonstrate that the *Homo sapiens* of science are not sinners. This conclusion must simply be accepted if we are to believe Paul's assertion in Rom. 5:12 that "sin came into the world through one man (Adam)." We have therefore accepted this conclusion and assumed that sin came into the world through the Real Adam.

Since the nature of the Adam of Scripture before disobeying God and the nature of the Adam of science (a *Homo sapiens* in Adam's community) differ only in the description of their ancestry, we will assume from here on that the Adam of Scripture and the Adam of science are the same person, the Real Adam. God presumably selected this Real Adam from among the men in the Mesopotamian community just as, two thousand years later, God would also select a man Abraham from among the Mesopotamians to be the father of his chosen people.

As we will now see, the nature of this Real Adam is significantly different from the nature of the Adam described



## Dialogue: Article

### *The Real Adam and Original Sin*

*The Confession presents a righteous Adam, contradictory to Scripture which according to Calvin describes an Adam who is earthly. This assumption of a righteous Adam before his disobedience of God is the primary error in all of the confessions, both Roman Catholic and Protestant.*

in the confessions. As a consequence, the doctrine of Original Sin for the Real Adam will be significantly different from the traditional doctrines of Original Sin described in the confessions. We will use the doctrine of Original Sin described in the *Westminster Confession*<sup>5</sup> to represent the other confessions.

#### **The Westminster Confession**

The *Westminster Confession* describes Adam before his sin:

IV.2 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 unto change.

At his creation, Adam (the man) was endued "with knowledge, righteousness, and true holiness ... yet under a possibility of transgressing." The *Confession* presents a righteous Adam, contradictory to Scripture which according to Calvin describes an Adam who is *earthly*. This assumption of a righteous Adam before his disobedience of God is the primary error in all of the confessions, both Roman Catholic and Protestant.

#### **Summary of Adam before He Sinned**

Adam, before he sinned, is described by Scripture as the Real Adam, an *earthly* Adam with an animal nature. It is this Adam, without God's law written on his heart, who disobeyed God's command not to eat of the tree of the knowledge of good and evil.

#### **The Consequences of Adam's Sin**

##### **The Westminster Confession**

Since the nature of the Real Adam before his sin is so different from that of the traditional Adam of the confessions, the doctrine of Original Sin for the Real Adam will be significantly different from that of the confessions. However, there is insufficient space here to develop a doctrine of Original Sin for the Real Adam directly from Scripture. We turn therefore to the generally accepted *Westminster Confession* as a basis for selecting

the most appropriate available doctrine of Original Sin for the Real Adam.

Original Sin is described in the *Westminster Confession*<sup>4</sup> in the following terms:

VI.2. By this sin (eating the forbidden fruit) they (Adam and Eve) fell from their original righteousness and communion with God, and so became dead in sin, and wholly defiled in all the faculties and parts of soul and body.

VI.3. They 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.

Original Sin, then, has four points:

1. by their sin of eating the forbidden fruit, Adam and Eve lost their original righteousness;
2. by their sin, Adam and Eve became dead in sin and wholly defiled;
3. the guilt of their sin was imputed to their posterity; and
4. their corrupted nature was conveyed to their posterity by ordinary generation.

Clearly, the first point contradicts the Real Adam who did not have any original righteousness to lose; thus any confession that omits this point will be a candidate for accommodating the Real Adam. The third, like the first point, is eliminated for the Real Adam, since Adam cannot be guilty of depriving humanity of a righteousness that Adam never possessed himself. The second and fourth points connect the generally admitted sinfulness of the human race to the sinfulness of Adam after his disobedience. We now consider briefly the arguments that have been presented in support of the various points.

#### **Evaluation of the Westminster Confession**

Since the *Westminster Confession* is a confession of the Reformed (Calvinistic) churches, we have selected the writings of three Reformed theologians to evaluate the content of the *Confession*. Not surprisingly, all compare John Calvin's views on Original Sin with those of the *Confession* and all find, perhaps surprisingly, that Calvin disagrees with this *Confession* of the Reformed churches.

**John Murray**, professor at Westminster Seminary in Philadelphia (1937–1966), has summarized Calvin's interpretation of Original Sin as follows:

Calvin's view of original sin is radically different from that of Rome. According to Calvin the original sin which is conveyed by natural generation (Points 2 and 4 above) is itself, intrinsically, natural depravity. The protestant polemic was directed with vigour against the Romish view that original sin consisted simply in the privation of original righteousness and integrity (Points 1 and 3) and the concupiscence which resulted from the loss of integrity (Points 2 and 4) was not itself truly and properly sinful, and the Romish polemic was directed with equal vigour against the protestant doctrine that original sin involved a radical corruption of our moral and spiritual nature (Points 2 and 4).<sup>6</sup>

According to Murray, then, the Roman Catholics accepted only Points 1 and 3 of the *Westminster Confession* doctrine on Original Sin while Calvin and the Protestants accepted only Points 2 and 4.

**Charles Hodge**, professor at Princeton Seminary (1820–1878), evaluates Calvin's interpretation of Original Sin in the following terms:

According to this (Calvin's) interpretation, the doctrine of the apostle is, that the inherent, hereditary corruption of nature derived from Adam, is the ground or reason why all die.<sup>7</sup>

Hodge thus recognizes, as Murray did above, that Calvin's interpretation of Original Sin includes only Points 2 and 4 of the *Westminster Confession*. Because of his devotion to both Calvin and the *Confession*, Hodge proceeds to excuse Calvin for his "error":

He (Calvin) lived in a day when the imputation of Adam's sin was made, by the theologians of the Romish Church, so prominent as to leave inherent depravity almost entirely out of view. The whole tendency of the Reformers, therefore, was to go to the opposite extreme ... We need not then be surprised that inconsistencies appear in the writings of Luther and Calvin (in the sixteenth century), which are not reproduced in those of Hutter and Turretin (in the seventeenth).<sup>7</sup>

The question remains, however, why did the Protestants in the seventeenth century introduce Point 1 and 3 into the *Westminster Confession* when Protestants of the sixteenth century, like Calvin, did not? Hodge, of course, (in the nineteenth century) gives good scriptural reasons for believing that the *guilt* of Adam's sin is imputed to his posterity (Points 1 and 3). Commenting on Rom. 5:12–21, he writes:

It is distinctly taught that "judgment came on all men on account of the offense of the one man." This

therefore is Paul's own interpretation of what he meant when he said "all sinned." They sinned in Adam. His sin was regarded as theirs.<sup>8</sup>

We have insufficient space here, however, to enter further into these controversies over the doctrine of Original Sin.

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*There is agreement ... among [Murray, Hodge, and Berkouwer] Calvinist theologians that, although the Westminster Confession is the official confession of Calvinist churches, Calvin himself subscribed only to Points 2 and 4 of the confession.*

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In his book, *Sin*, **G. C. Berkouwer**, professor at the Free University of Amsterdam (1945–1973), traces the evolution of the doctrine of Original Sin in the confessions from the sixteenth century to the present. Like Murray and Hodge, he expresses great respect for Calvin. After discussing the development of the doctrine of Original Sin in the confessions over the centuries, Berkouwer writes:

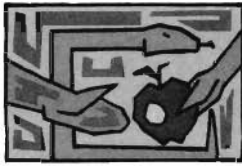
It makes good sense to look at Calvin since the various principals in later debates appealed to him so consistently ... It is a tribute to the sober and careful way in which Calvin addressed himself to this topic.<sup>9</sup>

In his discussion of the *Gallican Confession*, Berkouwer writes:

Is Article 10 of the *Gallican Confession* also "deficient"? Does it lack something for the confession of our guilt? ... Furthermore, the *Gallican Confession* is largely in line with the plan of Calvin.<sup>10</sup>

In following Calvin, the earlier *Gallican Confession* also omitted Points 1 and 3 of the *Westminster Confession* leading to Berkouwer's query about the deficiency in the *Gallican Confession*.

There is agreement then among the three Calvinist theologians that, although the *Westminster Confession* is the official confession of Calvinist churches, Calvin himself subscribed only to Points 2 and 4 of the confession. And, since Points 1 and 3 of the confession are the points in disagreement with the Real Adam, we will now investigate whether Calvin's doctrine of Original Sin fits the nature of the Real Adam.



## Dialogue: Article

### *The Real Adam and Original Sin*

*Adam's  
posterity, who  
have the same  
Homo sapiens  
nature as  
Adam, also  
become slaves  
to sin when  
they become  
aware of  
God's law.  
Although  
humans  
would not  
have known  
sin without  
Adam's sin,  
they themselves  
are sinners  
because  
they sin and  
not because  
Adam sinned.*

#### Calvin Fits Like a Glove

In his discussion of Original Sin, Calvin wrote:

For, since it is said that we became subject to God's judgment through Adam's sin, we are to understand it not as if we, guiltless and undeserving, bore the guilt of his offense but in the sense that, since we through his transgression have become entangled in the curse, he is said to have made us guilty ... And the apostle himself most eloquently testifies that "death has spread to all because all have sinned" (Rom. 5:12). That is, they have been enveloped in original sin and defiled by its stains.<sup>11</sup>

Here, Calvin carefully describes the propagation of sin from Adam to the human race. First, Calvin notes that "since we through (Adam's) transgression have become entangled in the curse, he (Adam) is said to have made us guilty." Applying this to the scriptural Real Adam described earlier, Adam's transgression was to disobey God's command forbidding him to eat of the tree of the knowledge of good and evil. It was through this disobedience that Adam's posterity became "entangled" in Adam's sin since it was through this disobedience that Adam became aware of God's law, the knowledge of good and evil. And, it was through the knowledge of this law that Adam's posterity, with their innocent animal natures, became sinners. For "apart from the law sin lies dead" (Rom. 7:8).<sup>4</sup> Calvin's doctrine of Original Sin can thus be used for the Real Adam even though Calvin himself believed that Adam's corruption came from the "fall" and not from an inherited animal nature.

#### The Injustice of Original Sin

Catholics and Protestants have always objected to the injustice of Original Sin as presented in the Roman Catholic Council of Trent (1545) and in the Protestant *Westminster Confession* (1647). Blaise Pascal, a Catholic wrote (1659):

The transmission of sin seems to us not only impossible, it even seems very unjust; for what could be more contrary to the rules of our sorry justice than the eternal damnation of a child incapable of willpower for a sin in

which he seems to have played so small a part, and which was committed six thousand years before he was born?<sup>12</sup>

And this discomfort with the guilt of Adam's sin being transmitted to his posterity is still present today. In his 1971 book, *Sin*, Berkouwer introduced the chapter on Alien Guilt (the imputation of the guilt of Adam's sin to the human race) with the comment:

We now enter an area in which a strenuous and emotional debate has been constantly waged throughout the entire history of the Church and her theology. The debate is still going strong in our own day.<sup>13</sup>

But, as we have seen, the Original Sin of the Real Adam as interpreted by Calvin avoids this transmission of guilt. Humans are guilty because of their own sins.

#### Summary of the Consequences

When the *Homo sapiens* Real Adam disobeyed God's command, he sinned. Eating of the tree of the knowledge of good and evil, he became aware of God's law and became a slave to sin because this law contradicted his heretofore innocent animal habits and desires. Adam's posterity, who have the same *Homo sapiens* nature as Adam, also become slaves to sin when they become aware of God's law. Although humans would not have known sin without Adam's sin, they themselves are sinners because they sin and not because Adam sinned. The Real Adam therefore eliminates the unjust imputation of the guilt of Adam's sin to his posterity found in the confessions.

#### The Noetic Effects of Sin

We now turn to Points 2 and 4 of the *Westminster Confession* (Section III.A) which comprise the content of Original Sin for the Real Adam:

2. By their sin, Adam and Eve became dead in sin and wholly defiled.
4. Their corrupted nature was conveyed to their posterity by ordinary generation.

These statements are generally accepted because they just describe the contemporary human condition which all can observe. Nevertheless, many questions can be raised about the application of these statements

to human actions. We select for discussion, the noetic (intellectual) effects of sin, an area of particular interest to those who use their reason to find truth. Are human beings forever separated from the truth because their reason has been wholly defiled?

### Some Human Thinking Is Futile

John Calvin identifies two kinds of human thinking when he evaluates the cognitive abilities of the ancient world:

Shall we deny that the truth shone upon the ancient jurists who established civic order and discipline with such great equity? Shall we say that the philosophers were blind in their fine observation and artful description of nature? What shall we say of all the mathematical sciences? Shall we consider them the ravings of madmen? No, we cannot read the writings of the ancients on these subjects without great admiration.<sup>14</sup>

However, these accomplishments of the classical world did not extend to the moral law. Calvin remarks about the ineffectiveness of the Greek philosophers concerning God's Kingdom and "spiritual" insight:

In these matters the greatest geniuses are blinder than moles! Certainly, I do not deny that one can read competent and apt statements about God here and there in the philosophers, but these always show a certain giddy imagination ... They saw things in such a way that their seeing did not direct them to the truth, much less enable them to attain it!<sup>15</sup>

Here, Calvin is writing from the perspective of a Christian and he recognizes the limitations of pagans in understanding spiritual matters. For example, Calvin criticizes Plato for saying that sin results from ignorance.<sup>16</sup>

In his book, *The Noetic Effects of Sin*, Stephen Moroney also finds this same distinction between sound thinking concerning earthly matters and futile thinking about heavenly matters.<sup>17</sup> Moroney defines "heavenly matters" as those associated with God's law: "you shall love the Lord your God with all your heart and you shall love your neighbor as yourself." Human beings become futile in their thinking when dealing with matters associated with the moral law, the knowledge of good and evil. We need only look at the record of the twentieth century for confirmation of these observations. Never in history has science progressed more rapidly than in this century of unprecedented moral evil.

### The Explanation for Futile Thinking

The connection of futile thinking with the knowledge of good and evil, noted by Calvin and Moroney, immediately reminds us of the Real Adam who became a sinner when he acquired the knowledge of good and evil. Before this acquisition, the Real Adam was a clever *Homo sapiens* who had survived in the world because of his ability to observe

and respond to his surroundings. He had learned to use the law of the lever when he pried up rocks with sticks; with this kind of "practical" knowledge he had built shelters and learned to farm and to raise livestock. Thus, Adam's acquisition of the knowledge of good and evil had no effect on these capabilities. These are the "earthly matters," recognized by Calvin and Moroney, where human thinking is sound.

On the other hand, where the knowledge of good and evil is pertinent, human thinking is futile. Here we find humans, with their animal natures, resisting God's law to love God and their neighbors as themselves.

### Summary on Noetic Effects

From observation, most people have concluded that the noetic effects of sin do not affect human conduct in "practical matters" such as science and medicine. On the other hand, humans become futile in their thinking wherever the knowledge of good and evil is concerned. This distinction is explained by the Real Adam (and his posterity) whose animal inheritance and self-esteem conflict with his ability to follow God's law.

## The Propagation of Adam's Sin

### The *Westminster Confession*

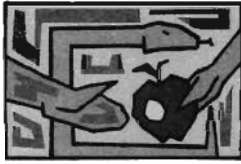
We have now arrived at the last stage of Original Sin, the propagation of Adam's sin to his posterity. Again, we turn to Points 2 and 4 of the *Westminster Confession* which apply to the Real Adam. These points are printed in italic type:

VI.2. *By this sin (eating the forbidden fruit) they (Adam and Eve) fell from their original righteousness and communion with God, and so became dead in sin, and wholly defiled in all the faculties and parts of soul and body.*

VI.3. *(Adam and Eve) being the root of all mankind, the guilt of this sin was imputed, and the same death in sin and corrupted nature (was) conveyed to all their posterity, descending from them by ordinary generation.*

We see immediately that this 1647 expression of Christian belief is scientifically untenable today. *Homo sapiens* crossed over into North America before 22,000 BC.<sup>18</sup> Yet Adam, the Mesopotamian farmer of Scripture, lived half a world away some time after 9000 BC.<sup>19</sup> It is inconceivable that Adam's sin and corrupted nature could be conveyed by ordinary generation to the American Indians of today whose ancestors colonized the Americas before 22,000 BC.

The American Indians, however, are not the only part of the human race unrelated to Adam. Thousands of *Homo sapiens* lived at the time of Adam. Thus, anyone reading this article is thousands of times more likely to be descended from one of these *Homo sapiens* than to be descended from Adam. So, how did we acquire our sinful natures?



## Dialogue: Article

### *The Real Adam and Original Sin*

*The propagation  
of a common  
morality (the  
knowledge of  
good and evil)  
from a single  
center (Adam)  
coincides with  
the propagation  
of sin from  
Adam to the  
Homo sapiens  
of the world.  
Thus, the  
existence of a  
common  
morality is  
objective  
evidence  
that all of  
human sin  
is derived from  
a single source.*

#### The Real Adam

This question is answered by the Real Adam. With the Real Adam we have inherited our animal natures from our *Homo sapiens* ancestors. We have then become sinners through the acquisition of the knowledge of good and evil from the teaching of Adam's descendants as they spread across the world. The propagation of sin from Adam into the world has occurred in much the same manner as the righteousness from Christ was propagated into the world through the preaching of the gospel. Thus, to follow the propagation of sin across the world we need only follow the propagation of the knowledge of good and evil across the world.

#### A Single Source of Morality

C. S. Lewis has noted that the same morality appears in all cultures across the face of the earth. After collecting examples of this agreement in moral principles for a number of cultures, Lewis commented:

It is at least arguable that every civilization we find has been derived from another civilization and, in the last resort, from a single center—carried like an infectious disease or like the Apostolical succession.<sup>20</sup>

The common morality exhibited by the human race thus implies that this morality had a single source that was propagated over time from its origin.

But the propagation of a common morality (the knowledge of good and evil) from a single center (Adam) coincides with the propagation of sin from Adam to the *Homo sapiens* of the world. Thus, the existence of a common morality is objective evidence that all of human sin is derived from a single source.

However, we do not know how sin was propagated from this source. We know that sin followed morality but there is no written record of the propagation of morality. Thus, our knowledge of the propagation of morality must be obtained from some other source that has left a record that can be found by archeology.

#### A Marker for Morality

We therefore cast about for some archeological marker that, like morality, has spread across the earth from a single source. A can-

didate for such a marker is the origin of cities. Cities, like the knowledge of good and evil, first appeared in Mesopotamia about 4,000 BC. Commenting on the origin of cities, Robert J. Wenke writes:

The same kinds of changes (the origin of cities) that we have been describing for Mesopotamia also happened—largely independently—in various other areas of the ancient world, in Egypt, the Indus valley, China, Peru, Mesoamerica, and a few other places ... By now the reader will not be at all surprised to learn that the question that has fascinated archaeologists for centuries is: Why?<sup>21</sup>

One difference between Wenke and his cities and Lewis and his morality is that Wenke asserts that the similar cities developed independently while Lewis surmises that the similar moralities point to a common source. But Wenke, like Lewis, has no explanation for the worldwide appearance of the similar phenomena.

We will now show how a connection between Adam and the building of cities can provide a marker for the propagation of good and evil (morality). Since the knowledge of good and evil originated with Adam, the demonstration of a connection between Adam and the first cities will demonstrate a connection between the knowledge of good and evil and the origin of cities. And, since sin is associated with the knowledge of good and evil, the archeological dates for the building of cities can be used as a marker for the propagation of sin.

#### Adam and Cities

We find then in Scripture indications that Adam and his associates built cities. For, when Adam ate of the tree of the knowledge of good and evil, he was transformed from an "it" bound to the natural world to an "I" who transcends the natural world. He now had the capability to organize and administer the operations required to build a complex organization such as a city. And indeed, we find Adam's son Cain building a city (Gen. 4:17). Furthermore, archeology has found that the first cities were built in Mesopotamia about 4000 BC,<sup>22</sup> a date near the time of Adam. (We note that Wenke's cities are technically defined by their functional complexity. For example, the large

community at Jericho in 8000 BC did not exhibit this complexity and so is not defined as a city by Wenke.)

We have evidence therefore associating Adam, who had acquired the knowledge of good and evil, with the origin of the complex cities of archeology. We will assume in the following then that the origin of cities in a region can be used as a marker for the arrival of the knowledge of good and evil in that region. And sin follows the knowledge of good and evil for "apart from the law sin lies dead" (Rom. 7:8).<sup>4</sup> Thus, the origin of cities in a region can be associated with the arrival of sin in that region.

## The Propagation of Sin

**A proposed route.** Using the origin of cities as a marker for the arrival of sin, and the archeological evidence for the origin of cities, we can follow the propagation of sin across the world.<sup>23</sup> The archaeological record for the first appearance of cities is shown in Fig. 1.

The heavy horizontal lines denote the time of the appearance of cities at different locations, the abscissa being the date (in years).<sup>24</sup> The ordinate on the graph is the distance of the cities from lower Mesopotamia (in kilometers) and has been measured from an atlas along the routes by which humans dispersed across the world.<sup>25</sup> We are assuming that, even after the appearance of Adam in 4000 BC, the routes of original population movement remained in use for trade and communication. Thus, the distance to Mexico from Mesopotamia is found by first taking the distance over the old silk road from Mesopotamia to the confluence of the Yellow and Wei Rivers, the center of the early cities in northern China. This distance is then added to the distance from this confluence to the Bering Strait and thence south to Mexico. To assist the eye in following the course of the dispersion of cities over the course of history, two lines have been drawn connecting the locations on the graph.

As discussed above, the arrival of sin at a location is associated with the origin of cities at that location. Thus, the times for the origin of cities, the primary archeological data in Fig. 1, are also assumed to be the times for the arrival of sin at those locations. The graph in Fig. 1, then, exhibits the propagation of sin across the earth.

**Falsification.** Commentators consider the scriptural account of Adam and Eve to be a story,<sup>26</sup> a myth,<sup>27</sup> or a narrative,<sup>28</sup> but not a history of real events. Consequently, there have been no constraints on the propagation of Adam's sin to the human race. In this article, however, we have assumed the record of Adam and Eve to be historical and have proposed a historical account of the propagation of sin from Adam to the human race. And, since the propagation of sin occurred in history, this historical account can be falsified by historical evidence. It is important to recognize, however, that, even if the proposed historical account were to be falsified, other unfalsified historical accounts could still be considered to be viable. We therefore present

a list of historical events that would falsify the proposed account of the propagation of sin from Adam to the human race:

1. *The presence of sin before Adam.* Scripture states that "sin came into the world through one man" (Rom. 5:12) and so there can be no sin in the world before this man Adam.
2. *The presence of sin before 9000 BC.* Since Scripture describes Adam as a farmer living in southern Mesopotamia, the earliest archeological date for Adam is 9000 BC.<sup>3</sup>
3. *The discovery of sinners in a region before the arrival of cities.* Such a discovery would destroy the postulate that the arrival of cities is a marker for the arrival of sin.
4. *The discovery of inhabitants of early cities who are not sinners.* The presence of such people would also destroy the origin of cities as a marker for the arrival of sin.
5. *The absence of communication routes between cities for the times shown in Fig. 1.* Without such routes of communication, the knowledge of good and evil and, hence, sin could not propagate between the cities.

## Summary of propagation

Since humans, with their animal inheritance, become sinners upon receiving the knowledge of good and evil, the course of the propagation of sin from Adam to the human

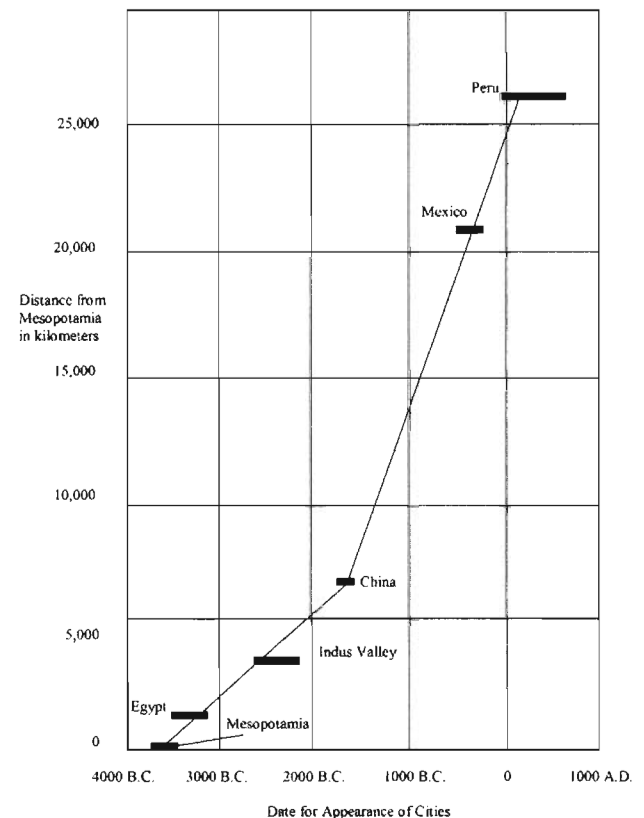
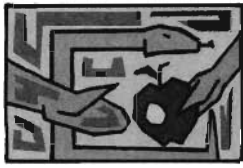


Fig. 1. Propagation of sin in time



*The arrival  
of sin at  
a location is  
associated with  
the origin  
of cities  
at that location.  
Thus,  
the times for  
the origin of  
cities ... are  
also assumed  
to be  
the times  
for the arrival  
of sin  
at those  
locations.*

## Dialogue: Article

### *The Real Adam and Original Sin*

race can be determined by simply following the propagation of the knowledge of good and evil (morality). The founding of cities across the world has been shown to be a possible marker for the arrival of the knowledge of good and evil (morality). Thus, the archeological dates for the origin of cities can be used to determine the dates for the arrival of sin (Fig. 1). Since the propagation of sin from Adam to the human race has occurred in history, it can be tested empirically. Five tests for falsifying the proposed propagation of sin have been presented.

### Summary of Original Sin

The nature of the Real Adam is significantly different from that of the traditional Adam of the confessions. As a result of this difference, the injustice of the confessions associated with Original Sin has been eliminated, the noetic effects of sin have been explained, and a falsifiable prediction for the propagation of Adam's sin has been proposed. ☼

### Notes

- <sup>1</sup>John A. McIntyre, "The Real Adam," *Perspectives on Science and Christian Faith* 56 (2004): 162–70.
- <sup>2</sup>John Calvin, *Commentaries on the Book of Genesis* (trans. John King, Latin original, 1554, Grand Rapids, MI: Eerdmans).
- <sup>3</sup>Masanobu Endo, *Creation and Christology* (Tübingen, Germany: Paul Mohr Verlag, 2002).
- <sup>4</sup>John Calvin, *Commentary on Romans* (trans. Ross Mackenzie, Latin original 1540, Grand Rapids, MI: Eerdmans, 1960) calls this statement in Rom. 7:8 a general observation.
- <sup>5</sup>*The Confession of Faith* (Richmond, VA: Presbyterian Church in the United States, 1969), Standard Book Number: 8042-3936-3.
- <sup>6</sup>John Murray, *The Imputation of Adam's Sin* (Phillipsburg, NJ: Presbyterian and Reformed, 1959), 17.
- <sup>7</sup>Charles Hodge, *Commentary to the Epistle to the Romans* (1864; reprint, Grand Rapids, MI: Eerdmans, 1950), Chapter 5, Verse 12, second class of commentators.
- <sup>8</sup>*Ibid.*
- <sup>9</sup>G. C. Berkouwer, *Sin* (Grand Rapids, MI: Eerdmans, 1971), 479.
- <sup>10</sup>*Ibid.*, 475.
- <sup>11</sup>John Calvin, *Institutes of the Christian Religion*, ed. John T. McNeill (Philadelphia, PA: Westminster, 1960), II.i.8.
- <sup>12</sup>Blaise Pascal, *Pensees: The Provincial Letters* (New York: Modern Library, 1941), No. 434.
- <sup>13</sup>Berkouwer, *Sin*, 424.
- <sup>14</sup>Calvin, *Institutes of the Christian Religion*, II.ii.15.
- <sup>15</sup>*Ibid.*, II.ii.18.
- <sup>16</sup>*Ibid.*, II.ii.22.
- <sup>17</sup>Stephen K. Moroney, *The Noetic Effects of Sin* (New York: Lexington, 2000), 13.

<sup>18</sup>Stephen Oppenheimer, *The Real Eve* (New York: Carroll and Graf, 2003), inside back cover.

<sup>19</sup>Robert J. Wenke, *Patterns in Prehistory* (New York: Oxford, 1999), 296.

<sup>20</sup>C. S. Lewis, *The Abolition of Man* (1947; reprint, New York: Collier, 1962), Appendix.

<sup>21</sup>Wenke, *Patterns in Prehistory*, 332.

<sup>22</sup>*Ibid.*, 283–304.

<sup>23</sup>Zimmer has already carried out a similar exercise to determine the spread of speech alone talk: J. Raymond Zimmer, "The Evolution of Talk and the Emergence of Complex Society," *Semiotica* 138 (2002): 205–33.

<sup>24</sup>Wenke, *Patterns in Prehistory*, Mesopotamia (3800–3500 BC), 404–10; Egypt (3650–3200 BC), 447; Indus Valley (2600–2100 BC), 494; China (1800–1650 BC), 523; Mexico (500–200 BC), 577; and Peru (1–600 AD), 636.

<sup>25</sup>Locations selected for distance measurements: Mesopotamia (confluence of Tigris and Euphrates Rivers); Egypt (Memphis); Indus Valley (Rawalpindi); China (confluence of Wei and Hwang Rivers); Mexico (Valley of Mexico); Peru (Lima).

<sup>26</sup>Bruce Vawter, *On Genesis* (Garden City, NY: Doubleday, 1977), 72.

<sup>27</sup>Gerhard von Rad, *Genesis* (Philadelphia, PA: Westminster, 1961), 98.

<sup>28</sup>Claus Westermann, *Genesis* (Grand Rapids, MI: Eerdmans, 1967), 28.

### Upcoming ASA Conferences

#### July 28–31, 2006:

**Location:** Prince Conference Center  
Calvin College  
Grand Rapids, MI

**Theme:** "Embedding Christian  
Values in Science and  
Technology"

**Program Chair:** Hessel Bouma III

**Local Arrangements Chair:**  
Larry Molnar

#### August 3–5, 2007:

**Location:** University of Edinburgh  
Edinburgh, Scotland

**Theme:** "New Frontiers in Science  
and Religion"

**CiS Program Committee:**  
Denis Alexander  
Ruth Bancewicz  
Caroline Berry  
John A. Bryant  
Hugh Reynolds

#### August 1–4, 2008

**Location:** George Fox University  
Newberg, OR



# Will the Real Adam, Please Stand Up!

Perry Yoder

**T**he problem of reconciling church doctrine with modern science is a real and perhaps insoluble one. Indeed, more generally, the tension between church dogma and reason has had a long, troubled history in the West. A classic example is the difficulty the church had of coming to terms with a solar-centered orbit for the earth. The tension between church doctrine and science continues today in segments of the Christian church that are unable to come to grips with the "historical" sciences: geology, paleontology, and evolutionary genetics.<sup>1</sup>

Original sin is especially problematic today in the light of modern genetics, and for many the notion is simply absurd. Which molecules that make up the DNA inheritance of the human species carry "sin"? Can we create a sinless people by eliminating this "sin" genetic material as we hope to "cure" other genetic defects by manipulation of a person's DNA? An original sin that passes biologically from parents to child no longer seems sensible in this context. In the same way, does it still make sense to assume a "fall" when the nature of human beings underwent a substantial change, perhaps even enough of a change to result in a new species carrying with it the freight of original sin?

The abandonment of inherited sin, from my Mennonite tradition, causes little difficulty. In this tradition, children are held to be in a state of innocence until they come to the age of accountability. That is, children are innocent until they themselves become responsible for their own choices to do wrong. There is no "original sin" for which they need cleansing by baptism as infants. Sin may be inevitable, part of the human condition, but it is not logically necessary, imposed upon them, so to speak, through

no fault of their own. This tradition breaks with the dominant Christian position: infants have "original sin" as part of their inheritance and from which they need deliverance by baptism.

Another route is taken by McIntyre. The problem between modern science and dogma is solved by a redefinition of "original sin" so that it refers to something making sense in our current context. This task, the maintaining of the reasonableness and meaningfulness of our traditional Christian vocabulary, is a vital and ongoing task of theology. In this sense, theology is a contextual enterprise directed toward a community of faith with a view toward its understanding and appropriation of its theological tradition. Since there are a variety of contexts and communities, there are a plurality of theologies. We have Lutheran theology, Reformed theology, Catholic theology, etc.

A problem arises for theology when it goes beyond its "theological" language and attempts to show its validity by invoking science or the Bible or both, as in the present article by McIntyre. The difficulties inherent in this task are propounded by the assumption that the Bible can be used to bring about a detente between belief and science; that is, if we interpret the Bible correctly, we can generate a theological position that will be congruent with modern science.

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Perry Yoder

*The greatest  
difficulty with  
McIntyre's  
understanding  
is his  
interpretation  
of the  
statement in  
Genesis 1 that  
humans were  
created in the  
image and  
likeness of God.*



## Dialogue: Response

*Will the Real Adam, Please Stand Up!*

*What  
is described  
here  
[Genesis 1–3]  
is the  
attainment  
of a capacity,  
not a change  
in nature.  
From the  
beginning  
[humankind]  
had and  
retained  
the image  
and likeness  
of God.*

The problem in this approach is, to put it simply, who decides on the correct interpretation of Scripture? Put more broadly, is the study of Scripture heteronymous, under the authority of church and theology, or autonomous, free from theological and churchly authority?<sup>2</sup> Assuming autonomy, so that biblical interpretation can serve as a “corrective” to traditional doctrine, the question becomes “What are the legitimate warrants for a valid interpretation—i.e., what counts as evidence for an interpretation of Scripture—and, given the wide variety of interpretations proposed, how are probable interpretations distinguished from less probable ones?”

This brings us to Genesis 1–3 and the question of the probability of the interpretations suggested by McIntyre. McIntyre interprets this material so that a line can be drawn between “natural” human beings—i.e., humans as they were created by God—and human beings as they were after the Fall, after the first sin. Key to his understanding is his interpretation of what happened to Adam when he ate of the fruit of the knowledge of good and evil. This act, it is argued, changed him from an “it” embedded in the physical world to an “I” external to the physical world (p. 91).

However, there are substantial difficulties with this view. First, already in Genesis 2 Adam has named the animals; thus, in some sense he is transcendent to them. He is not one of them; not one of them is his suitable counterpart. But he does recognize his essential likeness to the first woman. Adam can already distinguish what is like him from that which is not like him. It would seem that at this point, without the knowledge of good and evil, Adam “can evaluate the events that occur there [in the outside world]” (p. 91). Furthermore, in chapter 3 there is already a sense of right and wrong before eating of the tree of the knowledge of good and evil.<sup>3</sup> Eve in conversation with the snake knows that she and Adam are not to eat of this tree and in fact have not done so. Their eating is not an inadvertent trespass; they deliberately do wrong.

The greatest difficulty with McIntyre’s understanding is his interpretation of the statement in Genesis 1 that humans were created in the image and likeness of God.

His claim is that only with the commission of sin (Gen. 3:6) “Adam had become a person, an image of God” (p. 91). He reconciles Gen. 1:26–27 with this claim by interpreting these verses as referring to what humans *came to be* rather than referring to how they were made. This does not seem to be the plain sense of the text, however.

First, there is no apparent indication that Gen. 1:26–27 contains “the history of Adam, Eve, and the image of God in one verse” (p. 91). The word *bara*, “create,” which is used here refers to the making of something initially, not to development. The simplest plain reading is that the “image and likeness” of God refers to the nature, the ontology, of humankind. So also Gen. 9:6 again states that God made humankind in the image and likeness of God. This basic nature of humanity, *all* humanity, gives human life its greatest value. From this vantage point, there were no humans that were *not* in the image and likeness of God.

Finally, and related to his whole argument from Genesis 1–3, it is recognized that humankind was quite distinct from the animals, and this distinction was related to being in the likeness and image of God. According to Hebrew grammar, Gen. 1:26 is best translated, “Let us make humankind in our image as our likeness so that he may govern ...” Humankind has a special task directly related to their being in God’s image. This task is directly commanded in verse 28.

What seems to be driving McIntyre’s interpretation, for which he also cites Calvin on Gen. 2:7, is the need for a “Fall.” Humans need to have a different nature after Genesis 1–2, after disobedience, than they did before. This, however, is a theological need driven by a doctrine of original sin. It is not a conclusion based on the text of Genesis 1–3. What is described here is the attainment of a capacity, not a change in nature.<sup>4</sup> From the beginning they had and retained the image and likeness of God.

It is the notion of the Fall that seems to me to contradict modern science. When McIntyre states: “Adam’s posterity, who have the same *Homo sapiens* nature as Adam” (p. 94), I wonder what genetically changed in the emergence of the species *Homo sapiens* that sets our nature apart from the forerunners

of Adam.<sup>5</sup> My alternative solution to the problem of the Fall and original sin would be that nothing changed. All humans, from the first "Adam" are regarded as bearing the image of God. Genesis 1–3 tells us about the nature of sin, how it came to be in the world, and what its effects were. It does not tell us about a change in the nature of the human being. ☉

## Notes

<sup>1</sup>A concern I have with McIntyre's essays is the apparent lack of historical perspective. From the standpoint of paleontology, the oldest human forms have not been found in Mesopotamia, which was apparently inhabited relatively late. Likewise, there were cities in the Ancient Near East long before 4000 BC; see Kenyon's work on ancient Jericho, for example. All of these humans, if I understand correctly, all that lived before 4000 BC were

sinless. Does this mean murder, theft, etc. were not then sins? Perhaps I have misunderstood this point.

<sup>2</sup>This is not a discussion about "objectivity" but simply a question regarding the process of interpretation—must an interpreter begin with the theological assumptions of the church and must interpretations agree with churchly positions. The history of Protestantism is founded on the notion of the freedom of interpretation from church authority—*sola scriptura*—which demands reason and depends on critical assessment and argument as part of the interpretive process. Of course, the church has resisted interpretative innovations that counter its doctrine just as it has resisted scientific ones.

<sup>3</sup>It should be noted that the Hebrew phrase *da'at tov v'ra'* occurs outside of Genesis 1–3. It occurs in Deut. 1:39, referring to children who do not "know good and evil." Here the phrase seems to refer to a capacity gained in the course of life. In 2 Sam. 19:36, an old man can no longer distinguish "between good and evil." In this usage, it does not have a moral connotation.

<sup>4</sup>See the previous note.

<sup>5</sup>I am assuming that speciation is based on adequate genetic differentiation.

## Books Received and Available for Review

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

Stephen Barr, *Modern Physics and Ancient Faith*, Notre Dame Univ. Press, 328 pages, 2006

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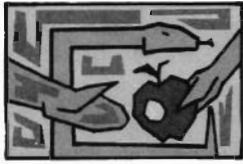
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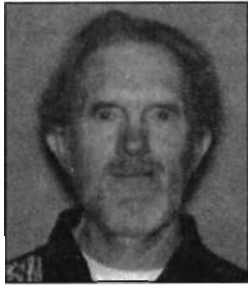
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## Dialogue: Response

Reply to the Real Adam and Original Sin



James P. Hurd

# Reply to the Real Adam and Original Sin

James P. Hurd

*McIntyre offers a very limited definition of Homo sapiens as nonhuman, pre-moral animals. Thus, he banishes all pre-Neolithic Homo sapiens from the (sinful) human family.*

**T**he West must reconcile two great stories of human origins—the story of Genesis and the story of paleoanthropology. Thus far, no comprehensive story that embraces both is without problems. Solving origins issues is like eating M&Ms—you eat one and you cannot avoid eating another. A solution of one puzzle demands a solution of another one. McIntyre wisely refuses to eat all the M&Ms at once. He does not talk about the origin of the species *Homo sapiens*, or trace the patterns of human evolution. He does not try to explain God's purpose for pre-Adamic creatures. Rather, he limits himself to explaining Adam's time period, Adam's fall, and the propagation of sin to the whole human family—in itself a daunting task. I wish to consider a few of McIntyre's claims, and comment on each of them.

### **Claim one: Adam lived about 4000 BC.**

If the Adam of Genesis 2–4 is literal, historical, then we can accept McIntyre's claim that Adam lived in a world of Neolithic culture. He wore skin clothing, worked with domesticated plants and animals, sacrificed animals, and with his contemporaries, built cities. Archeologically, the Neolithic begins about 8000 BC, and is marked by the appearance of grinding stones, storage areas for harvested grains such as wheat and barley, and the appearance of domesticated sheep, cattle, and goats. People were becoming less

nomadic, and population densities were increasing with the appearance of small towns. Thus we will label McIntyre's Adam *Neolithic Adam*.

### **Claim two: Neolithic Adam was not the first *Homo sapiens*.**

McIntyre correctly observes that if Neolithic Adam lived about 4000 BC, other *Homo sapiens* were also alive at that time. Paleontologists trace the first appearances of anatomically modern *Homo sapiens* back to at least 100,000 years ago, in South Africa. Thus, if Adam lived in the Neolithic, he could *not* have been the first *Homo sapiens*.

### **Claim three: *Homo sapiens* were "like the animals," without the knowledge of good and evil.**

McIntyre makes the stunning argument that "*Homo sapiens* ... are not human beings who are sinners in the image of God" (my italics). Apparently these early pre-Adam *Homo sapiens* were not guilty before God, but they were not righteous either. They did not have a moral conscience but rather were like the animals, "earthly" (St. Paul's term), and thus could not be judged sinners. McIntyre bases this on biblical, not archeological evidence, noting that Paul says that "sin came into the world through one man" (Rom. 5:12). Again, "Apart from the law sin lies dead" (Rom. 7:8). Thus, if Adam lived in 4000 BC, no sinners could have lived before he did.

It would seem very hard to sustain the argument that *Homo sapiens* never had sin until Neolithic Adam. McIntyre offers a very limited definition of *Homo sapiens* as nonhuman, pre-moral animals. Thus, he banishes all pre-Neolithic *Homo sapiens* from the (sinful) human family. However, we seem to see God's activity in *Homo sapiens* long before

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the Neolithic, indicating that these early *Homo sapiens* were also human. Between 10,000 and 40,000 BC, we find cultural remains such as art, musical instruments, and sophisticated tools—indisputable evidence of *Homo sapiens* culture. Some of these materials (e.g., grave goods in burials, “Venus” sculptures, and cave art) have been interpreted as evidence of religious activity, evidence that suggests that these humans had a belief in the transcendent and bore the image of God. Further, we discover activities most Christians would classify as sin: human cannibalism, murder, and other such acts. We have no evidence that *Homo sapiens* living 40,000 years ago lacked any of the moral capacities of later humans. As the saying goes, if it walks like a duck and quacks like a duck, it must be a duck. What they lacked was cumulative cultural knowledge, not morality.

**Claim four: God revealed God’s self to Adam but Adam disobeyed God and learned the difference between good and evil.**

If we accept McIntyre’s argument that Neolithic Adam had no knowledge of good and evil, exactly *when* did Adam’s sin occur? How could he engage in a sinful act before he had the knowledge that it was sinful? McIntyre does not clarify this. However, God spoke to Adam, this specially selected Neolithic man, before Adam knew good from evil, and Adam ate of the fruit and sinned by disobeying God’s direct command. Ironically, Adam became like God (knowing good from evil) in the instant that he sinned against God!

**Claim five: This knowledge of good and evil was passed on [culturally] from Neolithic Adam to all of the peoples of the earth.**

For McIntyre, morality has one single source—Adam’s knowledge of good and evil. Most historic creeds, including the Calvin-influenced *Westminster Confession*, proclaim that Adam’s newly acquired knowledge condemned not only him but, by *imputation*, the whole human race that followed. Yet apparently John Calvin does not agree with this Calvinistic statement! After Adam’s sin, Calvin writes, people “have been enveloped in original sin and defiled by its stains.” Calvin bases this on Rom 5:12: “... death has spread to all because all have sinned.” Humans are sinners because they themselves sin, not because Adam sinned. McIntyre agrees, arguing that after Adam became a sinner, this sinfulness passed like a wave throughout the Mesopotamian world and beyond.

**Claim six: True cities did not exist until 4000 BC, when “functionally complex” cities suddenly appeared.**

For McIntyre, the rise of “true cities” serves as a marker for the spread of the knowledge of good and evil, and of sin. Yet McIntyre has a parochial definition of a city (“functional complexity”) that allows him to argue that no cities existed before 4000 BC. However archeologically, we do not see a sharp break in the evolution of city-building that

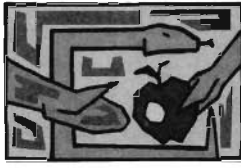
would indicate a quantum leap in complexity. Are we to suppose that the builders of ancient Jericho and Catal Huyuk (8000–6000 BC) were cognitively unable to achieve functional complexity? Were they not able to “transcend the natural world,” as Adam’s contemporaries were? These early city-builders did not lack cognitive skills; they lacked the accumulated culture and acquired technological skills of later peoples, plus the demographic necessity that demanded larger cities. Archeologists refuse to dabble in paleopsychology—they have posited many preconditions for the rise of cities, but the ability to “transcend the natural world” (McIntyre’s term) is not one of them. They explain the rise of cities, not by such cognitive innovations, but rather by more mundane factors such as conflicts between groups, or rising population densities due to a more sedentary lifestyle.

**Claim seven: Sin propagated by contagion to all peoples on earth.**

McIntyre’s thesis about the propagation of sin implies that all peoples in the world eventually acquired the knowledge of good and evil through other people in an unbroken link back to Neolithic Adam. This seems unlikely since we have evidence that humans reached Palli Aike Cave at the southern tip of South America before 6000 BC. Even today some very isolated populations live in the Amazon basin that only recently have had outside human contact. Further evidence against this unbroken link is that until European contact, New World civilizations lacked some of the basic inventions present in the Old World, including the wheel, the Roman arch (with a keystone), plows, and traction animals. Because of this and other reasons, most archeologists see the rise of civilizations and cities in the New World as substantially independent from their rise in the Old World.

In summary, we might question McIntyre’s argument that no true (sinful) humans existed before 4000 BC, since paleontologists have identified *Homo sapiens* that existed at least 100,000 years ago. By 40,000 BC, *Homo sapiens* was exhibiting what seems to be religious behavior, including burial of the dead, suggesting some knowledge of the transcendent. We see no sharp break in the evolution of cities from ancient Jericho and Catal Huyuk down to the cities in the fourth millennium BC, and no sharp uptake in their “functional complexity.” Rather than seeing the root of human sinfulness in contagion from a Neolithic Adam, we might more usefully see it in human nature itself, a nature that, starting long before 8000 BC, has chosen its own way over God’s way. It is rather in this sense that “in Adam’s fall, we sinned all.” ☪

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## Dialogue: Response

*The Original Adam and the Reality of Sin*



David Wilcox

# The Original Adam and the Reality of Sin

David Wilcox

[McIntyre's]  
proposed  
explanation of  
the creation of  
the image of  
God [is]:  
we became  
human –  
in God's  
image –  
by learning  
to sin.

I must state at the outset that I am not a theologian, nor all that familiar with debates in that field. I think there are some problems with McIntyre's discussions of the creeds that are beyond my area of expertise, and I trust the theologians among us will speak to them. Nevertheless, I do feel certain aspects of McIntyre's reconciliation of theological questions and the scientific data raise serious questions.

I agree that there are discrepancies between the description of culture in the early chapters of Genesis and the descriptions of science of the early chapters of modern human existence. Tens, or possibly hundreds, of thousands of years lie between the early moderns and their dynamic stone-age cultures and the first urban civilizations. Thus, to take both narratives seriously, either one must consider the biblical cultural description as a metaphor for culture in general or one must change the meaning of the explanation for how humanity became flawed. McIntyre has chosen the latter. I believe this reconciliation has some serious problems.

First, note his proposed explanation of the creation of the image of God: we became human—in God's image—by learning to sin. Before that, Adam was apparently innocent but not righteous—God's law was written on his heart by disobeying it, by following his here-to-for "innocent animal desires." But surely God's law was placed in Adam's mind by the *command* of God, not by Adam's

failure to obey it. Further, it was not Adam's animal desire (nice fruit!) but the Satanic desire (be like God himself!) which led to the disobedience, i.e., the *first* sin is pride and envy, not gluttony. Adam learned only what rebellion/evil felt like—if he had obeyed, he would have learned righteousness instead.

Further, McIntyre argues that this fall into sin is *how* humanity comes to be in God's image. But Gen. 1:26–29 states that God *created* humanity in his image. The implication would be that human disobedience is God's method of creation, how we "fell up" to become what he intended us to be. This I consider inconsistent with God's holiness. Jesus was the full image of God because he did *not* disobey. Rather than Adam "transcending" the world by disobedience, he became subject to the earthly law of death. His "transcendence" as the master of the Garden was lost in sweat and thistles.

McIntyre argues that the method of transmission of "the image of God/the fall into sin" from the man Adam to other people living at that time was by a sort of cultural infection. Cultural transmissions always mutate as they go. So why is there still a common moral core to human civilizations? C. S. Lewis did speak about the movement of civilization from a common source like an epidemic—but Lewis was arguing that the common Tao of diverse civilizations implied a common *divine* source for moral ideas, a common writing on the hearts of all people. One wonders why no human ethnic group resisted the disobedience and remained innocent.

So, can city formation be used as a marker for this spreading epidemic of transcendent sinners? It is true that city formation can be timed and traced. But I do not think the tie of

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David Wilcox is professor of biology at Eastern University, where he has taught since 1976. David was stimulated by a conference on Christian graduate work to study evolutionary mechanisms, leading to a Ph.D. in population genetics from Penn State. He has contributed through several publications on theoretical aspects of Christianity and evolution. David is a fellow of the ASA and served on the Executive Council, 1993–1997.

city to morality can be falsified—except for McIntyre's #5, page 97. According to Jonathan Haas of the Chicago Field Museum, urban development came to the coast of Peru around 3000 BC, 4,000 years "early" based on McIntyre's time line for communication routes. Beyond that, the suggested tests of the theory simply cannot be applied.

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*McIntyre argues that the method of transmission of "the image of God/ the fall into sin" from the man Adam to other people living at that time was by a sort of cultural infection.*

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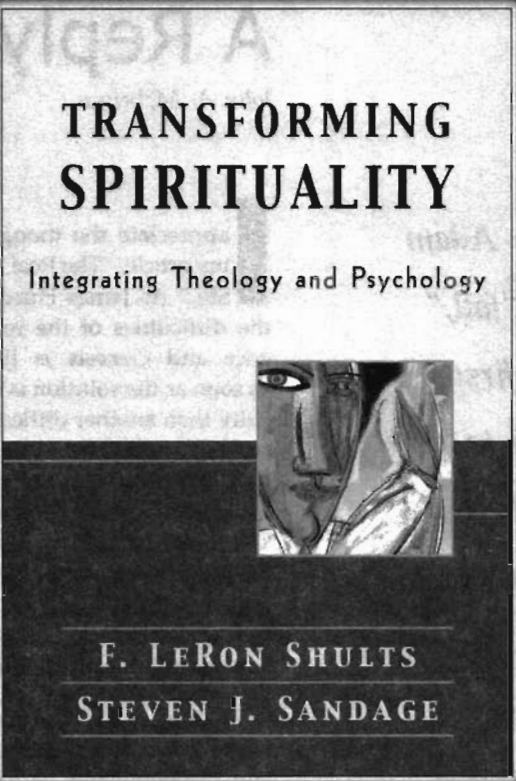
McIntyre defines sin as acts which are wrong *due to the state of the heart of the doer*—as long as the doer of the act is innocent, no act is sin—not even human sacrifice. There is no way to read the state of the heart of long dead people. Thus, we cannot tell if there were sinners before or after Adam, nor if sin existed before 9000 BC, nor if there were sinners among the farmers before the cities, nor if the inhabitants of the cities were sinners. Did the fact that native Australians built no cities mean they were still innocent, unfallen, when Europeans arrived? We cannot falsify the theory.

Personally, I think Adam lived long before the culture of Genesis, that he disobeyed the divine command, choosing the downward *rather than* the upward path and that all of us—his kids, foster or genetic—trail along after him. We are sinners born, not because we are guilty at birth but because we will disobey as soon as we get the chance. That propensity is our "original sin." We are sinners. We are bipeds. We do not become bipeds by taking our first step. It is innate. We do not need medicine, we need a soul transplant. ☺



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## Dialogue: Reply

*A Reply to the Responders*

# A Reply to the Responders

*John A. McIntyre*

*For Adam  
to "fall,"  
he first  
had to be  
righteous.  
But there is  
no evidence  
in the  
historical  
account of  
Genesis 2–3 or  
in Scripture  
that Adam  
is righteous.  
On the  
contrary,  
Adam  
disobeyed God  
almost  
immediately  
after God had  
formed him ...*

I appreciate the thoughtful responses to my article, "The Real Adam and Original Sin." As James Hurd notes, addressing the difficulties of the reconciliation of science and Genesis is like eating M&Ms; as soon as the solution is found for one difficulty then another difficulty appears. Yet as scientists, when we face a complicated situation, we propose a theory and then search for facts to test the difficulties of the theory. The philosopher Karl Popper illustrated this procedure in a lecture when he said to his audience: "Observe." No one knew what to observe. The proposed Real Adam is a theory against which observations can be tested.

In this reply, I will discuss the most important issues raised by the Real Adam and the comments of the responders concerning these issues. Finally, I will compare the advantages of the Real Adam to the alternate proposals.

### Adam's Place and Time

Scripture presents Adam and his sons as farmers and herdsman living near the Tigris and Euphrates rivers. According to science, this places Adam in southern Mesopotamia living among other *Homo sapiens* after the receding of the last ice age, about 10,000 BC. (For purposes of discussion, in the following I will refer to *Homo sapiens* as members of the human race before they acquired the image of God.) Scripture and science complement each other then on the place and time for the Real Adam while Adam is not the first *Homo sapiens*.

### Adam Did Not "Fall"

For Adam to "fall," he first had to be righteous. But there is no evidence in the historical account of Genesis 2–3 or in Scripture that Adam is righteous. On the contrary, Adam disobeyed God almost immediately after God had formed him from the dust of the ground. And, certainly, there is no scientific evidence for righteousness among Adam's precursors, the *Homo sapiens*.

The only reason that Adam is said to be righteous in the church confessions is that "God created man in his own image" in Gen. 1:27 and the confessions associate righteousness with this image. But righteousness is not necessarily associated with the image of God; unrighteous people today are images of God. Furthermore, Gen. 1:27 cannot chronologically precede the creation of the world in Gen. 2:4, which is connected by genealogies to the rest of the history of Scripture. So, when Adam was formed from the dust of the ground in Gen. 2:7, he need not have been either righteous or in the image of God. Yet even though Adam was not righteous, sin still "came into the world through one man" as Scripture asserts. The innocent *Homo sapiens* Adam certainly sinned when he disobeyed a direct command of God.

I am delighted to learn from Perry Yoder that Mennonites agree with the Real Adam on the absence of a "fall" (p. 99). But the Real Adam did change (not a genetic change) when he ate the fruit; his "eyes were opened." My conclusion is that the absence of a "fall" is not a difficulty, but an improvement, for the theory of the Real Adam.

### The Image of God

If Adam did not "fall" from a righteous state, then what is the point of the historical account of the temptation and disobedience of Genesis 2–3? The answer to this question can be found in the rhetorical climax of the account, "and their eyes were opened." Something significant happened to Adam and Eve when they disobeyed God and ate the fruit of the tree of the knowledge of good and evil.

The identity of this significant "something" can be discovered by understanding the scriptural meaning of the word "knowledge." Immediately after being banished from the Garden of Eden, we find that Adam "knew" Eve his wife, and she conceived and bore Cain. Clearly, Adam knew Eve in a cognitive sense long before this, but

Scripture uses “know” to indicate an intimate participation. Thus for Adam and Eve, the events at the tree of the knowledge of good and evil are intimate participations in acts of good and evil.

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*When Adam disobeyed God and ate of the fruit of the tree, he was stepping outside the creation. And by his escape from the natural world of the creation, Adam was no longer an “it” within the creation but had become an “I” outside the creation. He had taken on the character of the Creator. He had become an image of God.*

---

But, in what sense were their eyes opened when they disobeyed God? Yoder recognizes this connection as a “key to the understanding of the Real Adam.” The use of an analogy is helpful for answering this question. Let us replace God and Adam, the Creator and his creation, with Shakespeare and Hamlet, another creator and his creation. Hamlet, like Adam, is restricted to the world created by his creator. Other actors in the play can command Hamlet to do something and, whether he obeys or disobeys, his action is still within the play. But if Hamlet disobeys Shakespeare and, say, refuses to follow his script, Hamlet is stepping outside the play. Similarly, when Adam disobeyed God and ate of the fruit of the tree, he was stepping outside the creation. And by his escape from the natural world of the creation, Adam was no longer an “it” within the creation but had become an “I” outside the creation. He had taken on the character of the Creator. He had become an image of God.

Remarkably, then, the only way for a creature to escape from the creation and become an image of God is to disobey God. David Wilcox has a cogent objection to such an understanding of the acquisition of God’s image: “The implication would be that human disobedience is God’s method of creation, how we ‘fell up’ to become what he intended us to be” (p. 104). My only response is to note that “God so loved the world that he gave his only Son, that whoever believes in him should not perish.”

Sinful human beings had to disobey God before God could demonstrate the depths of his love for them.

Another objection to the image of God described in the Real Adam is raised by Hurd. He points out that there is evidence that *Homo sapiens* believed in the transcendent long before a Mesopotamian Adam is associated with the image of God. But some anthropologists have proposed that the idea of the transcendent is merely an extrapolation of cause and effect. If something happens without an apparent cause, then God did it. Belief in the transcendent need not be associated with the believer standing outside of nature himself.

Yoder raises an interesting objection to the contention that Adam transcended the world only after “his eyes were opened.” For, before he ate, Adam had named the animals, an act requiring the use of language symbols that were not part of the natural world. Adam must therefore have transcended the world before “his eyes were opened.” I would reply to this that, in naming the animals, Adam was demonstrating his ability to step outside the world. Like the children who did not count themselves in the article, “The Real Adam,”<sup>1</sup> Adam had the ability to stand outside nature but had not yet comprehended that he was doing so. His eyes were not yet opened.

This close association of symbolic language with the image of God also clarifies the propagation of the image of God to the human race. Steven Pinker speaks of “the language instinct” that enables humans to learn a language. Similarly, by the time of Adam, the development of the *Homo sapiens* had reached the point that they, like the children in “The Real Adam,” had unknowingly acquired the ability to stand outside nature.

Despite the difficulties mentioned by the responders, I must say that I am charmed with the idea that humans first recognized themselves as images of God when the eyes of Adam and Eve “were opened.” Here, we have the connection between the rhetorical climax of the scriptural account of the origin of the race and the greatest event in the scientific history of the race, the transition from an animal-like “it” to a human “I.”

## Sin Entered the World

I have just asserted that the tree of the knowledge of good and evil was not the source of the cognitive knowledge of good and evil. The Ten Commandments were not written on the fruit of the tree. The tree was simply the location where Adam and Eve met the serpent and first participated in good and evil.

This understanding of the tree, however, invalidates one of the assumptions used to explain the entrance of sin into the world in the article on the Real Adam. For in the article, it was assumed that Adam had acquired the cognitive knowledge of good and evil when he ate of the tree.



## Dialogue: Reply

*A Reply to the Responders*

*The Homo sapiens living before Adam are confined to the world and are subject to their desires. ... Have the prehistoric Homo sapiens escaped from the bondage of their natures ...? If not, then they are not sinners, and sin entered into the world through one man, when Adam sinned by disobeying a direct command of God.*

This knowledge then, combined with the natural instincts inherited from their *Homo sapiens* ancestors, led to all human beings becoming sinners.

Hurd and Yoder object that this account for the entry of sin assumes that prehistoric humans living before Adam were not sinners. As Hurd writes: "It would seem very hard to sustain the argument that *Homo sapiens* never had sin until Neolithic Adam" (p. 102). There is no doubt that the *Homo sapiens* Adam sinned when he disobeyed a direct command of God. The question raised is whether the *Homo sapiens* living before Adam sinned without disobeying a command of God. In other words, are humans sinners if they do not know God's law?

We can answer this question from Scripture since Paul wrestled with this problem when he entered the Greek world with the gospel. In chapters 2 and 3 in his Letter to the Romans, Paul answers the question: "for I have already charged that all men, both Jews and Greeks, are under the power of sin." People are sinners whether they are aware of God's law or not since they disobey the laws set by humans of which they are aware. It would appear then, that if we apply Paul's conclusion to the *Homo sapiens* living before Adam, that they were sinners and that sin did not "enter the world through the one man Adam."

However, it is not obvious that Paul's conclusion can be transferred back to prehistoric times. For the Greeks, who have sinned without the law, are images of God and so are freed from the confines of the creation. They can transcend their natural desires and, consequently, can be held accountable for disobeying the laws set by humans. In contrast, the *Homo sapiens* living before Adam are confined to the world and are subject to their desires. My cat does terrible things to mice but I hardly call him a sinner. Have the prehistoric *Homo sapiens* escaped from the bondage of their natures any more than my cat? If not, then they are not sinners, and sin entered into the world through one man, when Adam sinned by disobeying a direct command of God.

### Evaluation

Difficulties certainly are associated with the Real Adam. Perhaps the greatest difficulty

is that the Real Adam lived at such a late date (after the termination of the ice age in 10,000 BC). Wilcox expresses his preference for an earlier Adam when he writes: "Personally, I think Adam lived long before the culture of Genesis ..." (p. 105).

But difficulties are also present for an earlier Adam. This Adam would be living in a cave with a stone axe. Wilcox suggests that "one must consider the biblical cultural description as a metaphor for culture in general" (p. 104). But this view assumes that the first eleven chapters of the Old Testament are not historical like the remainder of the Old Testament.

Of course, there is also the third alternative that John Polkinghorne accepts as the present theological consensus: "The myth of the Fall can be understood as an ever-contemporary symbol of the human condition."<sup>2</sup> Here, the attempt to bring Adam and Eve into history is abandoned completely with the consequence that the comparison of a historical Adam with a historical Christ in Romans 5 is abandoned as well.

As my present evaluation of the Real Adam, I will quote Winston Churchill's evaluation of democracy as a political system: "It may not be very good but it is better than any of the alternatives." ☼

### Notes

<sup>1</sup>John A. McIntyre, "The Real Adam," *Perspectives on Science and Christian Faith* 56 (2004): 162-70.

<sup>2</sup>John Polkinghorne, *Science & Theology* (Minneapolis, MN: Fortress, 1998), 64.

### Correction:

In a previous issue (PSCF 58, no. 1 [March 2006]: 48), our author description implied that one person was the sole author of the book, *Redeeming Creation: The Biblical Basis of Environmental Stewardship*, published by InterVarsity Press. The following four persons shared the authorship of this book: Fred Van Dyke, David C. Mahan, Joseph K. Sheldon, and Raymond H. Brand.

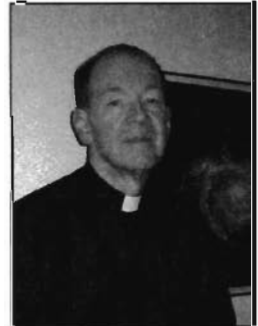
Roman J. Miller, Editor



# Roads to Paradise and Perdition: Christ, Evolution, and Original Sin

George L. Murphy

*After sketching the theological context for discussion, the real problems connected with evolution and original sin are distinguished from superficial ones. Consideration is given to the relevant biblical material, the historical development of the ideas of original sin and original righteousness, and scientific knowledge about human evolution. The main emphasis of this paper is on a model of the beginning of sin in the human race and the conditions it gives rise to, a model that corresponds in broad outlines to the scientific picture of human origins and to some theological understandings of the first humans in the early church. We conclude with reflections on the relationship between death and human sin.*



George L. Murphy

## The Christological Context

Issues connected with original sin have convinced many people that Christianity and evolution are incompatible. There have been numerous discussions about this but the results have not been completely satisfactory, especially for those who feel that attention to the historical origin of sin is needed.<sup>1</sup> Thus a further attempt to deal with the issues seems justified.

This paper is offered as a constructive theological proposal that takes into account scientific realities. Only the most essential aspects of Scripture, the theological tradition, and scientific theories and observations can be included. I will assume that the general scientific picture of biological evolution is correct and that humanity came into being by God working through this process.<sup>2</sup> I also argue that some aspects of relevant biblical texts represent accommodation to the contexts of the biblical writers and are not essential to the theological message the Holy Spirit intends to communicate. More will be said about this in the appropriate place.

We must begin from the proper theological standpoint: God's revelation of his will for creation in Jesus Christ. Our questions should be dealt with in the context of a theology of the Crucified One.<sup>3</sup>

This may seem surprising because Christians have often understood the Incarnation only as God's "Plan B" to solve the problem of sin. God supposedly made a perfect world which was then marred by human sin, so that atonement was required to repair the damage. But this view makes the Incarnation contingent upon human sin. We find language that touches on our topic in the ancient liturgy of the Easter Vigil:

O necessary sin of Adam that is wiped away by the death of Christ!

O happy fault that was worthy to have so great a Redeemer!<sup>4</sup>

This is sometimes seen as a profound mystery but it amounts to a claim that by sinning, humanity *earned* an Incarnation which otherwise would not have happened!

## Issues

*connected with original sin have convinced many people that Christianity and evolution are incompatible.*

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## Article

### *Roads to Paradise and Perdition: Christ, Evolution, and Original Sin*

*Evolution does  
require that  
we rethink  
traditional  
ideas about  
righteousness,  
sin, and  
salvation. ...  
In Romans,  
Paul develops  
an indictment  
of the human  
race as sinful  
and then  
presents Christ  
as God's  
solution  
to this problem  
in chapters 1-3  
before  
mentioning  
Adam's sin  
in chapter 5.*

The question of whether the Incarnation would have occurred had humanity not sinned has been debated for centuries. Some medieval theologians (including Aquinas) said "No" and others "Yes."<sup>5</sup> Ephesians 1:10, which speaks of God's "plan for the fullness of time, to gather up all things in him [Christ], things in heaven and things on earth,"<sup>6</sup> favors the latter response. In modern times, Barth argued forcefully that the Incarnation is the purpose of creation.<sup>7</sup>

Here we take that view. God created a universe able to develop in such a way that intelligent life would come into being so that God could become Incarnate.<sup>8</sup> Neither the world as a whole nor humanity would have been "perfect" initially. "Very good" in Gen. 1:31 does not mean that improvement was impossible. (Otherwise "be fruitful and multiply" would make no sense.) We will see that eastern Christianity has thought of humanity as created in an immature state and intended by God to develop further.

But was the *cross* part of God's purpose? When we reflect on the way in which humanity evolved, we will see that it is hard to imagine how it could have happened without sin coming into the picture. If this is so, if some alienation of creation from God was an inevitable (though not "necessary") aspect of the evolutionary process, we can see why, even before creation, God could have intended the cross as a way to reconcile to himself "all things" (Col. 1:20). 1 Peter 1:19-20 and Rev. 13:8 speak of Christ as the sacrificial lamb destined (respectively) before or from "the foundation of the world."<sup>9</sup>

There is some similarity between this view and supralapsarian Calvinism, in which God's decree of predestination precedes (in a logical, not temporal, sense) the decrees of creation and permission to fall.<sup>10</sup> The emphasis, however, should be on God's election first of *Christ*, and then of others in Christ, of creation for the sake of this election.<sup>11</sup> Our knowledge of creation and the problems connected with sin are to be seen in light of the Incarnation, cross, and resurrection. In Bonhoeffer's words: "The world exists from the beginning in the sign of the resurrection of Christ from the dead."<sup>12</sup>

Our picture of creation is then not one of static perfection but of divine activity in the dynamic universe, which the physical and

biological sciences disclose to us. God intended time and history, and the final state of things will not be just a return to the initial state. In that consummation of history, there is indeed the tree of life (Rev. 22:2) but in the midst of a city, into which people have brought "the glory and the honor of the nations," everything good accomplished in human history.<sup>13</sup>

This has profound implications for our self-understanding. The standard of genuine humanity is not the biblical description of the first man and woman. If that were so, we would know almost nothing about what kind of persons we are to be. Even less is our standard to be whatever science tells us about some early members of the genus *Homo*. The exemplar of humanity, the true image of God (Col. 1:15), is Jesus Christ as he is proclaimed to us in Scripture, and God's purpose for all of us is to grow into maturity in him (Eph. 4:11-16).

## The Real Issues

"If there was no historical Adam and no historical Fall, the need for a savior disappears. The structure of Christianity collapses." Such claims about the implications of evolution are sometimes made both by Christians who reject evolution and by evolutionists who reject Christianity, people who may agree on little else.<sup>14</sup> An honest person supposedly must reject either evolution or Christianity.

Evolution does require that we rethink traditional ideas about righteousness, sin, and salvation but the argument just sketched fails. It can be disposed of quickly as a preliminary to more adequate considerations.

The Christian claim is that a savior is needed because all people are sinners. It is that simple. *Why* all people are sinners is an important question but an answer to it is not required in order to recognize the need for salvation. None of the gospels uses the story in Genesis 3 to speak of Christ's significance. In Romans, Paul develops an indictment of the human race as sinful and then presents Christ as God's solution to this problem in chapters 1-3 before mentioning Adam's sin in chapter 5.

In support of this claim, we may cite Jonathan Edwards. In the eighteenth century, he was unaware of modern evolutionary

theories and read Genesis 3 as history. Yet the first chapter of his defense of the doctrine of original sin is "The Evidence of Original Sin from What Appears in Fact of the Sinfulness of Mankind."<sup>15</sup> In proclaiming the Christian message to people who have not heard it, we do not begin by trying to convince them that there was a sin of the first humans in which they were involved. The basic law-gospel message is instead, "You are a sinner and Christ is your savior."

The crucial distinction here is between the idea of an "original sin" which took place at the beginning of human history and that of a "sin of origin" which affects all human beings from their beginnings and from which they cannot free themselves.<sup>16</sup> The need for a savior is dependent upon the latter belief but not upon the former.

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Sin is an existential reality. Each of us is a sinner and we share a common sinful condition. Modern theologians have tried to keep this point in view without reading Genesis 3 as a historical narrative,<sup>17</sup> and some are explicit about getting rid of Adam and Eve.<sup>18</sup> I agree that Genesis 2-3 should not be read as history. Adam and Eve are theological representations of all humans, and I will not try to locate the first parents of the human race in the paleontological record. But this does not mean that the question of sin's origin is unimportant.

If Adam and Eve represent *all* humans, then they represent also the *first* humans. And if humanity has been sinful from the time that it came into being, without doing anything to *become* sinful, sin would be part of human nature itself. This would mean that in an important sense God was the creator of sin. To avoid this conclusion, we must use biblical texts about creation and sin for guidance in trying to understand how the first human sin might have had a role in bringing about a sinful condition as part of the evolutionary process.

Original sin is sometimes called the most empirically obvious Christian doctrine, but this is misleading. Sin has to do first with our relationship with God. It is obvious that everyone does bad things, but only revelation tells us that everyone is alienated from God and acts contrary to God's will. Discussions of sin from the standpoint of behavioral or social sciences do not in themselves get to the root of the problem.

The traditional western concept of original sin has not been accepted by all Christians. Variants of the doctrine developed by Augustine in the fifth century have been affirmed in all parts of the western church but have not gone unchallenged. The idea that all people are affected by, and actually guilty of, the sin of an ancestor seems irrational and unjust to many Christians. But precisely because original sin was controversial before Darwin and Wallace came on the scene, we need to be careful not to allow evolution to be just an excuse for jettisoning a doctrine which people dislike for other reasons.

The idea that the sin of the first humans resulted in a sinful state of their descendants raises the question of how this condition is transmitted from one generation to another. A contrast is often drawn between Augustine's belief that people are unable to avoid sinning because of a condition inherited from Adam and that of Pelagius, in which people have the freedom to avoid sin but are influenced by a sinful environment, including the example of Adam. But we will see that posing the question as a choice between heredity and environment presents a false dichotomy.

The views of the eastern church about the original human condition and the problem of sin differ significantly from Augustine's. The Orthodox tradition needs to be heard in this area, and provides some guidance for our reflections here.

Though the issue we deal with is usually referred to as "original sin," we will see that the most serious challenge that evolution offers is to "original *righteousness*," the idea that the first humans were created in a "state of integrity" in which they were sinless and could remain so. Such a picture is very difficult to reconcile with what is known of evolution, and thus needs fresh consideration.

## Biblical Background

Detailed exegesis is not possible here but serious theology must begin with Scripture. The most important texts that we need to consider are Genesis 3 and the ways in which Paul uses this story. But the chapters of Genesis which follow the story of the first sin are also significant.

Genesis 3 is about humans distrusting and disobeying God. They do not believe what God has said and transgress God's command.<sup>19</sup> The story is not, first of all, about



*Is it true that  
this first sin  
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or imputed, to  
all descendants  
of Adam?  
The early  
chapters of  
Genesis and ...  
the whole  
Old Testament  
say nothing  
of that. ...  
A general  
sinfulness is,  
however, in  
view. ...  
Psalm 51:5 and  
Job 14:1-4  
suggest that  
this general  
sinfulness  
affects every  
person from  
the beginning  
of life.*

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the sins of one human against another. Sin is, as we noted, a *theological* concept. The First Commandment comes first. Paul makes the same point in Rom. 1:18-32. The sins listed in verses 24-31, such as sexual immorality, murder, and deceit, are consequences of the refusal to honor God described in verses 21-23.

This sin against God does result in fractured relationships of people with one another and with the world. The man blames the woman, who blames the serpent. Sin casts a shadow on childbearing and a curse on the ground. In the following chapters, the situation worsens with Cain's murder of Abel, Lamech's cry for unlimited vengeance, the universal corruption that provokes the Flood, and the Tower of Babel. There is not so much a single abrupt "fall" in Genesis 3 as there is a process of falling in chapters 3-11.

The sin of the first humans is connected with their death: "You are dust, and to dust you shall return" (Gen. 3:19). We will deal with the issue of mortality in our final section.

But is it true that this first sin is passed on, or imputed, to all descendants of Adam? The early chapters of Genesis and, indeed, the whole Old Testament say nothing of that. There is no indication that the writer of Genesis 3 thought of that story as a causal factor in the general sinfulness of humanity.

A general sinfulness is, however, in view. In Gen. 8:21, after the rest of humanity has been destroyed and only Noah's family remains, God observes that "the inclination of the human heart is evil from youth." Psalm 51:5 and Job 14:1-4 suggest that this general sinfulness affects every person from the beginning of life.

It is not clear that the writer of Genesis 2-3 thought of "the man" and "the woman" as historical persons. The point in Genesis at which *'adham* becomes a proper name, "Adam," is debated.<sup>20</sup> Adam as the first man is listed in genealogies (Gen. 5:1-5 and 1 Chron. 1:1) and may be referred to in Hos. 6:7.<sup>21</sup> But the fact that Adam is never mentioned in the Old Testament's recitations of God's acts in history suggests that Israel in that period did not see him as a historical figure.<sup>22</sup> By the time of Christ, however, Jews were understanding Adam and Eve as historical and their sin as the

cause of later human misery. Paul's statements about Adam are to be read in that context. Care, however, is needed against excesses of both "conservative" and "liberal" interpretation.

On one hand, the fact that Judaism of the time, and Paul himself, thought of Adam as a historical figure does not mean that we must. We have a similar situation in Genesis. It speaks of the sky as a "dome" (1:6) and the part of the world known to the writer as "the whole earth," in contrast to what we have learned from more accurate modern astronomy and geography. As Seely has argued, citing Calvin, there is accommodation to cultural context in such matters which are inessential to the text's theological message.<sup>23</sup> This can be seen as condescension by the Holy Spirit who inspired the biblical writers, a type of divine self-limitation which a theology of the cross leads us to expect. This was not just a matter of authors using elementary language to describe things that were unknown to their contemporaries. There is no reason to think, for example, that the writer of Genesis 1 knew about the big bang but chose to speak in terms of ancient near eastern cosmology.

We can understand Paul's references to Adam as a historical individual as similar accommodation. In Rom. 5:12-21, Paul's purpose is to state the importance of Christ for the human problems of sin and death, not to give information about the early history of humanity.<sup>24</sup>

On the other hand, the claim that Adam is not a historical individual in the modern sense does not mean that Paul is talking *only* about the existential situation of all people, or that the origin of sin is not in view in the text. In verse 12, he speaks of sin coming into the world, not as something simply given in creation. The spread of death is due to the fact that "all have sinned." Yet there is some difference between the sin of "all" and the primordial sin, for Paul refers to "those whose sins were not like the transgression of Adam" (5:14). The first sin had causal efficacy: "By the one man's disobedience the many were made sinners" (5:19).

Paul apparently saw more in Genesis 3 than the author of that text intended, but it would be inept even on the level of secular literature to say that he was wrong to do so.

We do not say that Goethe “misunderstood” the Faust story because he reversed its meaning from earlier versions. And if we take the idea of inspiration of Scripture seriously, it is not hard to believe that Paul could have been led to a deeper understanding than that of the earlier biblical author.

Let us also note Eph. 2:3. While it says nothing about an original sin of the first humans, the statement that before faith in Christ all people are “by nature children of wrath” affirms what has come to be called sin of origin.

## Doctrines of Original Sin and Original Righteousness

Original sin did not become a contentious topic among Christians until the fifth century.<sup>25</sup> The issue came to a head in debates between Augustine of Hippo and the British monk Pelagius and their supporters.<sup>26</sup> Their disagreement was not first about the sin of Adam but over the extent to which human beings could do God’s will without saving grace. Augustine insisted that without such grace no one is able to trust and obey God properly – that all are sinners from the beginning of life. One of his main arguments was that the church baptized infants, like adults, “for the forgiveness of sins” (in the words of the Nicene Creed), a practice that would make no sense if infants were not in some sense sinners.<sup>27</sup> Pelagius had a more optimistic view of unaided human powers. Augustine explained the sinfulness of all people by tracing their condition to Adam, “in whom all sinned” according to a Latin translation of Rom. 5:12. For Pelagius, on the other hand, Adam essentially set a bad example that we may or may not follow.

The western church accepted the views of Augustine, although with some modifications. The definitive statement of this is the canons of the Synod of Orange in AD 529.<sup>28</sup> What is meant by “the doctrine of original sin” is usually some version of Augustine’s teaching: All people (Christ excepted) receive the consequences of Adam’s sin and are born not only with a tendency to sin but actually as sinners. Different parts of the Christian tradition have, however, modified this view in various ways, and some Christians, from the fifth century to today, have simply opposed Augustine’s idea. The idea that all people are “born sinful” is unpleasant, and especially since the Enlightenment, many people have held a more positive view of the human condition. They have rejected the idea of original sin, and while they may appeal to evolution to support their position, their basic reason for opposing the doctrine may be different.

A strong statement of original sin in the Augustinian tradition is in Article II of the 1530 Augsburg Confession.

Furthermore, it is taught among us that since the fall of Adam, all human beings who are born in the natural way are conceived and born in sin. This means

that from birth they are full of evil lust and inclination and cannot by nature possess true fear of God and true faith in God. Moreover, this same innate disease and original sin is truly sin and condemns to God’s eternal wrath all who are not in turn born again through baptism and the Holy Spirit.<sup>29</sup>

This is a dark picture of the human condition but not so dark that original sin becomes identified with fallen human nature, making the devil in effect the creator of unredeemed humanity. The later (1580) Formula of Concord, while taking a determined stand against Pelagianism, made that point.<sup>30</sup>

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*The counterpart of “original sin” in classical theology is “original righteousness.” Humanity was supposed to be created without sin and able to avoid sin. ... [T]he Bible says nothing about ... perfection.*

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The discussion of original sin is incomplete if we have nothing with which to contrast it. If sin is a defect or distortion, what is it a defect in or a distortion of? The counterpart of “original sin” in classical theology is “original righteousness.” Humanity was supposed to be created *without* sin and able to avoid sin. Abraham Calovius defined the original condition of humanity according to this view.

It is called a state of integrity, because man in it was upright and uncorrupt (Eccl. 7:29) in intellect, will, the corporeal affections and endowments, and in all things was perfect. They call it also the state of *innocence*, because he was innocent and holy, free from sin and pollution.<sup>31</sup>

In this state, humanity had “true fear of God and true faith in God.” As Calovius’ statement shows, the idea was often elaborated in such a way that Adam and Eve were pictured as perfect in all respects, with physical and mental abilities far beyond those of later people, in addition to possessing complete trust in their creator. Representative of such views is South’s “An Aristotle was but the rubbish of an Adam.”<sup>32</sup>

These speculations have exacerbated the apparent conflict between Christianity and evolution. This is unfortunate and unnecessary because the Bible says nothing



*The first  
humans  
in a  
theological  
sense were  
hominids  
in whom  
reason,  
self-awareness,  
and  
communication  
had developed  
to an extent  
that it was  
somehow  
possible  
for them  
to be aware of  
God's address  
to them.*

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about such perfection.<sup>33</sup> Genesis 1-3 does not state that the first humans were intellectually brilliant or had amazing physical powers. Even their ability to trust in God does not mean that they were skilled theologians.

In the traditions of the Eastern Church, we find a picture of early humanity different from that of the west, and more in line with a developmental picture. The second-century apologist Theophilus of Antioch explained the prohibition of the tree of knowledge by saying: "Adam, being yet an infant in age, was on this account as yet unable to receive knowledge worthily."<sup>34</sup> According to Irenaeus: "The man was a young child, not yet having a perfect deliberation" and "It was necessary for him to reach full-development by growing in this way."<sup>35</sup> While for Augustine and the western church, the perfection of humanity was actually realized in Paradise before the entry of sin, for Irenaeus and much of the eastern tradition, humanity was created with the potential to grow toward perfection. God gave humanity the ability to progress, with divine grace, toward full union with God.<sup>36</sup>

## Human Origins

Our assumption that God has created humanity through the processes of evolution needs to be fleshed out to some extent. While we need not try to pin down exactly when or where humanity came into being, there are aspects of the scientific picture that need to be taken into account.

The theological proposal to be made here does not depend on the number of hominids to be considered the first humans or on when they came into being. But it does seem unlikely that the present human race can be traced to a single male-female pair. As one example of the difficulty this idea faces, development of the present diversity of alleles of human histocompatibility genes from such a pair would require between five and ten million years.<sup>37</sup> Unless we want to consider "Adam and Eve" the biological ancestors of all hominids, and perhaps even pongids, we must rule this out.

There is scientific debate today about how the first modern humans arose. Did a relatively small group emigrate from Africa recently and replace older *Homo* populations? Or did modern humans develop in different

locations, with interbreeding between different populations to avoid speciation. The "Out of Africa" theory has greater similarity to a literal reading of Genesis than does the "Regional Continuity" theory, but the theological model suggested in the next section can be applied to both.

It is important to recognize, however, that the creatures described by the biblical term 'adham, "human being," cannot automatically be equated with the species *Homo sapiens* or with "anatomically modern humans." The first humans in a theological sense were hominids in whom reason, self-awareness, and communication had developed to an extent that it was somehow possible for them to be aware of God's address to them. They could have known, at least dimly, God's will for them. From this point on, I use the term "human" to refer to humans in the theological sense defined here.

In any case, humanity came into being through an evolutionary process in which natural selection was at least a major factor. Our ancestors would have been members of their species who were most successful in competition with others for food, breeding opportunities, protection from predators, and other survival needs, by fair means or foul.

The latter phrase does not apply to creatures who are not moral agents with knowledge of "fair" and "foul." Our prehuman ancestors cannot be called "immoral," let alone "sinful," because they killed, deceived, were sexually promiscuous, and did other things that would be sinful for their human descendants. But when the first humans, as we have defined them, came into being, they would have had strong propensities for the same types of behavior. When they began to become aware that such actions were contrary to God's will, these creatures would have been moral agents for whom such acts were sinful. But because of their inherited tendencies, it would have been difficult for them to avoid those acts.

These implications of natural selection are theoretical, but we need not rely on theory alone. Studies of our primate relatives have found that they behave in ways consistent with what natural selection leads us to expect.<sup>38</sup> Humanity did not develop through a bloodthirsty "war of all against all." There are many examples of cooperative behavior

among other primates. But natural selection presents a serious challenge to the idea that the first humans lived in a sinless state of integrity for any period of time. It is not hard to believe that creatures who evolved through natural selection could have sinned. It is harder to make sense of the idea that the first humans were created in a condition of original righteousness in which they had a real possibility of *not* sinning.

## Lost in the Woods

How could a sin committed by the first humans result in a condition in which all later humans are sinners from the beginning of their lives? This condition has sometimes been called "hereditary sin" (*Erbsünde*), but it need not be understood as "genetic" in the sense that it is coded for by DNA. We know of conditions which are "hereditary"—inherited from a parent—but not "genetic," such as fetal alcohol syndrome. That condition is "environmental," being caused by conditions of the uterine environment which are due to the mother's consumption of alcohol.

Let us imagine the first group of hominids—it is not necessary here to decide how large that group may have been, or where or when they lived—who had evolved to the point of self-awareness and linguistic ability.<sup>39</sup> We regard the evolutionary course by which this condition was reached as one in which God was continually at work through natural processes as secondary causes.<sup>40</sup> These humans have developed abilities to reason and communicate, and are able in some way to receive and, at least faintly, understand God's Word, to trust in that Word, and to know and obey God's will for them. We do not know in what way the expression of God's will may have come to them, or what command may have corresponded to the prohibition of the tree of knowledge in Genesis. It might have concerned the way in which people should live together, but about that we can only speculate.

These first humans are at the beginning of a road along which God wants to lead them and their descendants to full maturity and complete fellowship with God. In principle, they can follow that road, but it will not be easy. They have inherited traits which enabled their ancestors to survive and to pass on their genes. And those traits, as we saw, will predispose them toward selfish behavior and away from the kind of community—with God, one another, and creation—which God intends for them. Such behavior is not "hardwired" into them, but tendencies toward it are very strong. They can refuse to trust and can disobey what they know, however faintly, is God's will for them.

History indicates that this is what happened. We may note first the evidence for religious ideas in burials, cave art, and perhaps even earlier artifacts.<sup>41</sup> Some people may take such signs of "spirituality" as a positive feature of early humanity, but spirituality itself is ambiguous. The

basic human problem, as Paul describes it in Rom. 1:18–31, is not that people are atheists but that they worship creatures rather than the Creator. Primitive religions may well be a sign of estrangement from the true God. And it is all too obvious that humanity has been involved in conflict from its beginnings.

The biblical story indicates that this is an accurate *theological* description of what happened. The first humans took a wrong road, one "that leads to destruction" (Matt. 7:13), away from the goal that God intended. They and their descendants were soon alienated from God. Humanity was lost in the woods and darkness had fallen.

The previous paragraph is not an attempt to read the early chapters of Genesis as history. Purely secular history shows us that humanity has generally not known or worshiped the God of Israel and has been involved in conflict from its beginning. What the biblical story does is to provide a theological understanding of that history.

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*These first humans are at the beginning of a road [that] they can follow ..., but it will not be easy. They have inherited traits which ... will predispose them toward selfish behavior and away from the kind of community ... which God intends for them.*

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This image of "taking the wrong road," like that of "the Fall," is a metaphor for the human condition, not a historical narrative. But the picture of gradual departure from the course God intended is, as we noted earlier, one which the early chapters of Genesis convey. It is important to emphasize that it is not the condition of being on a journey, of being in process, which is itself sinful. Being participants in the evolutionary process means being God's creatures, which is good. The problem of sin is not that we are on a road, but that we are on a *wrong* road.

Humanity can be understood as a "symbiosis" of genes and culture.<sup>42</sup> Both are good, in that they help to transmit to each person the essence of what we consider human. But both can also contribute to deviation from God's intention for humanity. Our genetic makeup, conditioned by natural selection, gives us powerful tendencies toward



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### *Roads to Paradise and Perdition: Christ, Evolution, and Original Sin*

selfish behavior. The cultures in which we are conceived, born, and live exacerbate those tendencies in various ways. We are born as members of a tribe that is lost in the woods.

To say that there is a genetic component of original sin does not mean that there is a "gene for sin." Whether an action is sinful generally depends on the context in which it takes place as well as the action itself. And contrary to the "gene myth" which says that all our properties and behaviors are determined by DNA,<sup>43</sup> genes give us, at most, tendencies for certain behaviors.

To say that there is a cultural component of original sin means that sin is in part a result of our environment, an effect of "nurture" as well as "nature."<sup>44</sup> This differs from the naive view attributed to Pelagius, that Adam simply provides a bad example for us. The effects of our environment can be far more pervasive than that, as the analogy of fetal alcohol syndrome suggests. They are not things that we freely choose to accept or reject, but influences that we take in "with our mother's milk."

The universality of sin thus means more than that all people happen to sin. There is a solidarity in sin,<sup>45</sup> so that people make up a "sinful mass" in the classic phrase. More modern language speaks of "structures of sin" such as racism and the culture of abortion in human societies. A person born in a racist society is not predestined to be a racist, but it will be very "natural" to become one. None of this, of course, means that individual sin is unimportant, or can be blamed entirely on society.

The word commonly used in the New Testament for sin, *hamartia*, means literally "missing the mark." It can designate specific sinful acts but in Paul and John it refers to "the sinful quality of life and the state of alienation from God."<sup>46</sup> A person who starts in the wrong place will have missed the mark even before he or she begins. Thus our sin of origin truly is sin. As Tillich put it: "Before sin is an act, it is a state."<sup>47</sup>

Neither strict Augustinians nor determined Pelagians will be satisfied with this formulation. Unregenerate people are not compelled to sin but all people are sinners and would need saving grace even if they could theoretically avoid "actual sins." This

approach preserves the essence of what the western church has insisted upon without the use of theories about human history and the transmission of sin, which are now seen to be untenable.

If the human problem is as we have described it, salvation means being put on the right road. It is a renewal of creation, not as a return to a perfect primordial state but as a reorientation of creation to its proper goal. God begins this process with the call of Abram. Throughout Israel's history (e.g., Joel 2:13), people are called to "return" to God.

Finally God himself comes to share in the human condition, inviting and enabling people to follow him. The work of Christ is re-creation, and anyone in Christ is a new creation (2 Cor. 5:17). Part of this process is life in the Christian community, a culture of those called to follow Christ. But because this community exists in the real world, it never provides a perfect context in which the effects of sin are completely overcome. The state of integrity is an eschatological prospect.

## Sin and Mortality

I have kept till last the issue that is most troublesome for some people, mortality and "death before the Fall." An evolutionary picture implies that creatures died for aeons before humanity and sin appeared, and natural selection means that death is even a component of the evolutionary process. For some Christians, that is sufficient reason not only to reject evolution but also to insist on a young earth.

It must be said bluntly that this extreme view has no basis in either theology or science. Biblical texts that connect sin and death, Gen. 3:19, Rom. 5:12-21 and 1 Cor. 15:21-22, refer to humanity and there is no reason to insist that they have other animals in view. The scientific evidence for the dying of animals before the advent of humanity is, of course, overwhelming. In the last analysis, the rejection of "death before the Fall" rests on the belief that God created an originally perfect world in which all destructive processes were absent. I argued at the beginning of this paper that there is no reason to hold that view. Those who believe that God was

willing himself to enter into death to bring creation to fulfillment will have less trouble with the idea that God made a world in which creatures would die.

There is no scientific reason to distinguish between humanity and other animals as far as biological death is concerned. And while "In the day that you eat of it you shall surely die" (Gen. 2:17, NKJV) is spoken to the human, this verse should not be understood literally. In the *day* that the man and woman eat, they *do not* die. Christians have long seen that the threat must refer first to spiritual death as a result of separation from God.

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*This tree [of life], mentioned briefly at the beginning of the Bible, reappears at the very end. ... [It] is a historical object, one that reverses conventional expectations about immortality. The tree of life is the cross of Christ.*

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The Septuagint translated the Hebrew *moth tamuth* by *thanatō apothaneisthe*, "dying you shall die," which suggested to Athanasius that the penalty for humanity's departure from its proper path was "not dying merely, but also abiding ever in the corruption of death." Without sin, the first humans would have experienced death as a physical process but not as corruption and separation from God.<sup>48</sup> (The point is not that the Septuagint is correct here but that a prominent church father understood humanity's original condition to include biological mortality.)

Paul does say that all die "in Adam" (1 Cor. 15:22) but there are at least two ways to understand that. We need not think that human death, merely as a biological phenomenon, is a result of sin. Sin makes death fearful because of the final separation from God that it implies, the "second death" of Rev. 20:14. Again Athanasius's view is rather different from the idea of original immortality in the western tradition.<sup>49</sup>

James Barr has pointed out that the story of Genesis 3 can best be read as one not of lost immortality but of a lost *chance* for immortality.<sup>50</sup> Humanity is "dust" and, in the natural course of things, returns to dust. After the first humans sin, they are kept from the tree of life (3:22) and thus cannot "live forever."

This tree, mentioned briefly at the beginning of the Bible, reappears at the very end. In Rev. 22:2, the tree of life is found not in a garden but in the middle of a city in which "death will be no more" (Rev. 21:4). Immortality is not something that humanity once had and forfeited but an eschatological hope. Yet the tree of life is a historical object, one that reverses conventional expectations about immortality. The tree of life is the cross of Christ.<sup>51</sup> ☉

## Notes

<sup>1</sup>Discussions that have been helpful in the present work include: Christophe Boureux and Christoph Theobald, eds., *Original Sin: A Code of Fallibility* (London: SCM, 2004); Robin Collins, "Evolution and Original Sin," in *Perspectives on an Evolving Creation*, ed. Keith B. Miller (Grand Rapids, MI: William B. Eerdmans, 2003), chap. 20; Philip Hefner, *The Human Factor* (Minneapolis, MN: Fortress, 1993); Reinhold Niebuhr, *The Nature and Destiny of Man 1* (New York: Charles Scribner's Sons, 1964); Juan Luis Segundo, *Evolution and Guilt* (Maryknoll, NY: Orbis, 1974); Stephanus Trooster, *Evolution and the Doctrine of Original Sin* (New York: Newman Press, 1968); Tatha Wiley, *Original Sin: Origins, Developments, Contemporary Meanings* (New York: Paulist, 2002); Patricia A. Williams, *Doing without Adam and Eve: Sociobiology and Original Sin* (Minneapolis, MN: Fortress, 2001).

<sup>2</sup>The essays in Miller, *Perspectives on an Evolving Creation*, provide background for this position.

<sup>3</sup>This paper is part of the research program set out in George L. Murphy, *The Cosmos in the Light of the Cross* (Harrisburg, PA: Trinity Press International, 2003).

<sup>4</sup>This translation of the Latin is from *Lutheran Book of Worship: Minister's Desk Edition* (Minneapolis, MN: Augsburg, 1978), 145.

<sup>5</sup>See, e.g., *The Summa Theologica of Saint Thomas Aquinas*, Third Part, Q.I. Art.3 (Chicago, IL: Encyclopedia Britannica, 1952), vol. II, 704 and references there.

<sup>6</sup>Unless otherwise indicated, biblical quotations are from the NRSV.

<sup>7</sup>E.g., Karl Barth, *Dogmatics in Outline* (New York: Harper & Row, 1959), 58.

<sup>8</sup>George L. Murphy, "The Incarnation as a Theanthropic Principle," *Word & World* XIII (1993): 256, and *The Cosmos in the Light of the Cross*, chap. 12.

<sup>9</sup>G. B. Caird, *The Revelation of St. John the Divine* (New York: Harper & Row, 1966), 168 argues for the translation "the Lamb slaughtered from the foundation of the world" (cf. KJV and NRSV margin) in Rev. 13:8.

<sup>10</sup>Heinrich Hepp, *Reformed Dogmatics* (Grand Rapids, MI: Baker, 1977), 146–9.

<sup>11</sup>Karl Barth, *Church Dogmatics* II.2 (Edinburgh: T. & T. Clark, 1957).

<sup>12</sup>Dietrich Bonhoeffer, *Creation and Fall*, in *Dietrich Bonhoeffer Works* 3 (Minneapolis, MN: Fortress, 1998), 34.

<sup>13</sup>Caird, *The Revelation of St. John the Divine*, 279–80.

<sup>14</sup>For such arguments against Christianity, see, e.g., H. G. Wells, *The Outline of History—Being a Plain History of Life and Mankind*, 4th ed. (London: Cassell & Co., 1926), 616 or "Evolution or Genesis" by Louis W. Cable at <http://home.inu.net/skeptic/genev.htm>. Typical uses to attack evolution can be found in Ken Ham, *The Lie: Evolution* (El Cajon, CA: Master Books, 1987), 73 and Wilbert H. Rusch, Sr., *Origins: What is at Stake?* (Terre Haute, IN: Creation Research Society Books, 1991), 25–6.

<sup>15</sup>Jonathan Edwards, *The Great Christian Doctrine of Original Sin Defended*, in *The Works of Jonathan Edwards* 3, ed. Clyde A. Holbrook (New Haven, CT: Yale University Press, 1970).

<sup>16</sup>Formally *peccatum originale originans*, "original sin as originating," and *peccatum originale originatum*, "original sin originated." See, e.g., Wiley, *Original Sin*, 5.

<sup>17</sup>See the references in endnote 1.

<sup>18</sup>E.g., Williams, *Doing without Adam and Eve*.

# Article

## Roads to Paradise and Perdition: Christ, Evolution, and Original Sin

<sup>19</sup>Martin Luther, "Lectures on Genesis," in *Luther's Works* 1 (St. Louis, MO: Concordia, 1958), 146-7.

<sup>20</sup>*The Interpreter's Dictionary of the Bible*, s.v. "Adam." The word may be a proper name in Gen. 2:20, 3:17, 3:21 and 4:1. NRSV reads "the man" in all those places with "Adam" in the margin for the first three, while NIV reads "the man" in the first instance and "Adam" in the others.

<sup>21</sup>In the latter case, Adam may be a place name, as in Josh. 3:16. Cf. Hans Walter Wolff, *Hosea* (Philadelphia, PA: Fortress, 1974), 105 and 121.

<sup>22</sup>Claus Westermann, *Genesis 1-11: A Commentary* (Minneapolis, MN: Augsburg, 1984), 276.

<sup>23</sup>Paul H. Seely, "The Date of the Tower of Babel and Some Theological Implications," *Westminster Theological Journal* 63 (2001): 15, especially section VIII.

<sup>24</sup>Karl Barth, *Christ and Adam: Man and Humanity in Romans 5* (New York: Harper & Brothers, 1956).

<sup>25</sup>Wiley, *Original Sin*, Part I, sketches the history. An older work, F. R. Tennant, *The Sources of the Doctrines of the Fall and Original Sin* (1903; reprint, New York: Schocken, 1968) provides a more detailed discussion.

<sup>26</sup>Augustine's anti-Pelagian writings are in *A Select Library of the Nicene and Post-Nicene Fathers* V, First Series (Grand Rapids, MI: Wm. B. Eerdmans, 1971). For Pelagius, see B. R. Rees, *The Letters of Pelagius and His Followers* (Woodbridge, UK: Boydell, 1991).

<sup>27</sup>The traditional doctrine of original sin says not just that babies will become sinners at a certain age, but that they are sinful. It is inconsistent for those who oppose infant baptism to use that traditional doctrine as an argument against evolution.

<sup>28</sup>Available at [www.reformed.org/documents/canons\\_of\\_orange.html](http://www.reformed.org/documents/canons_of_orange.html).

<sup>29</sup>Article II of the German text of the Augsburg Confession in Robert Kolb and Timothy J. Wengert, eds., *The Book of Concord* (Minneapolis, MN: Fortress, 2000), 36-8. (As the translators note, the German word rendered "original sin" here is *Erbsünde*, literally "hereditary sin.")

<sup>30</sup>Formula of Concord, Article I of the Epitome and of the Solid Declaration in Kolb and Wengert, *The Book of Concord*, 487-91 and 531-42.

<sup>31</sup>Heinrich Schmid, *The Doctrinal Theology of the Evangelical Lutheran Church*, 3d ed., revised (Minneapolis, MN: Augsburg, 1961), 220.

<sup>32</sup>Quoted in Arthur S. Peake, *Christianity: Its Nature and Truth* (London: Duckworth, 1908), 116.

<sup>33</sup>There is such a picture of the primordial human in Ezek. 28:11-19 but it is used as "broken myth" to describe the king of Tyre's fate.

<sup>34</sup>Theophilus of Antioch, "Theophilus to Autolytus," in *The Ante-Nicene Fathers* II (reprint, Grand Rapids, MN: Wm. B. Eerdmans, 1979), 104.

<sup>35</sup>St. Irenaeus of Lyons, *On the Apostolic Preaching* (Crestwood, NY: St. Vladimir's Seminary, 1997), 47.

<sup>36</sup>Timothy Ware, *The Orthodox Church* (Baltimore, MD: Penguin, 1963), 224-5.

<sup>37</sup>David Wilcox, "Finding Adam: The Genetics of Human Origins," in Miller, *Perspectives on an Evolving Creation*, 250-2. Glenn R. Morton does date the biblical Adam over five million years ago. See, e.g., his *Adam, Apes and Anthropology* (Dallas, TX: DMD Publishing, 1997).

<sup>38</sup>E.g., Richard Leakey and Roger Lewin, *Origins Reconsidered* (New York: Doubleday, 1992), chap. 16. Chapters 14 and 15 of Carl Sagan and Ann Druyan, *Shadows of Forgotten Ancestors* (New York: Random House, 1992), including the imaginative "first person" chimpanzee reflections on pp. 259-64 are worth consideration.

<sup>39</sup>For brief expressions of the ideas developed here, see George L. Murphy, *The Trademark of God* (Wilton, CT: Morehouse-Barlow, 1986), chap. 8 and "Christology, Evolution, and the Cross," in Miller, *Perspectives on an Evolving Creation*, chap. 16. The approach of Collins, "Evolution and Original Sin," in Miller, *Perspectives on an Evolving Creation*, has similarities with the one taken here.

<sup>40</sup>Murphy, *The Cosmos in the Light of the Cross*, chapters 6 and 8.

<sup>41</sup>Glenn R. Morton, at <http://home.entouch.net/dmd/religion.htm>, interprets a structure at Bilzingsleben dating to 425,000 BP as religious.

<sup>42</sup>Hefner, *The Human Factor*, esp. 28-31. He attributes the idea to Ralph Wendell Burhoe.

<sup>43</sup>Ted Peters, *Playing God? Genetic Determinism and Human Freedom* (New York: Routledge, 1997).

<sup>44</sup>Though it is pre-Darwinian, the discussion in Friedrich Schleiermacher, *The Christian Faith* (Edinburgh: T. & T. Clark, 1928 translation of the 1830 edition) is of interest here.

<sup>45</sup>Cf. Trooster, *Evolution and the Doctrine of Original Sin*.

<sup>46</sup>*The Interpreters Dictionary of the Bible*, s.v. "Sin, sinners."

<sup>47</sup>Paul Tillich, "You Are Accepted," in *The Shaking of the Foundations* (New York: Charles Scribner's Sons, 1948), 155.

<sup>48</sup>Athanasius, "On the Incarnation of the Word," in *A Select Library of Nicene and Post-Nicene Fathers of the Christian Church* IV, Second Series (reprint, Grand Rapids, MN: Wm. B. Eerdmans, 1978), 38. See also p. lxxi of the *Prolegomena* by Archibald Robertson.

<sup>49</sup>Athanasius, "On the Incarnation of the Word," 21.1, 47.

<sup>50</sup>James Barr, *The Garden of Eden and the Hope of Immortality* (Minneapolis, MN: Fortress, 1992).

<sup>51</sup>Gordon W. Lathrop, *Holy Ground: A Liturgical Cosmology* (Minneapolis, MN: Fortress, 2003), 220-4.

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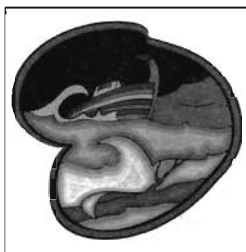
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## Article

*Qualitative Hydrology of Noah's Flood*

# Qualitative Hydrology of Noah's Flood

Carol A. Hill



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*The  
biblical Flood  
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*This paper on Noah's Flood addresses the hydrological questions: (1) How could it have rained for forty days and forty nights? (2) What water sources could have caused prolonged flooding? and (3) Where is the flood sediment left by Noah's Flood? It also discusses the nature of "nature miracles" (such as Noah's Flood) in the Bible.*

**T**he biblical Flood is viewed by many as irreconcilable with an actual hydrological event. If the Flood was universal, then this presents numerous insurmountable hydrological problems such as: Where did all of the water for the Flood come from and where did all the water go to? and Why does the geologic record not support a universal flood? If the Flood was local, then other questions can be asked such as: How could it have rained for forty days and forty nights? What water sources could have caused the floodwaters to have stayed backed up for 150 days in the Mesopotamian hydrologic basin? and Where is the flood sediment left by Noah's Flood? This paper qualitatively attempts to answer these three local-flood questions. A companion paper follows that will quantitatively address the most difficult question of all: How could the ark have gone against the current and landed in the mountains of Ararat?

## How Could It Have Rained for Forty Days and Forty Nights?

Before this question can be answered, it is first necessary to understand the weather patterns (meteorology) of the Mesopota-

mian region and surrounding mountainous terrain. Then these patterns can be compared to the Genesis account of the weather associated with the Flood.

### Weather in the "Land of the Five Seas"

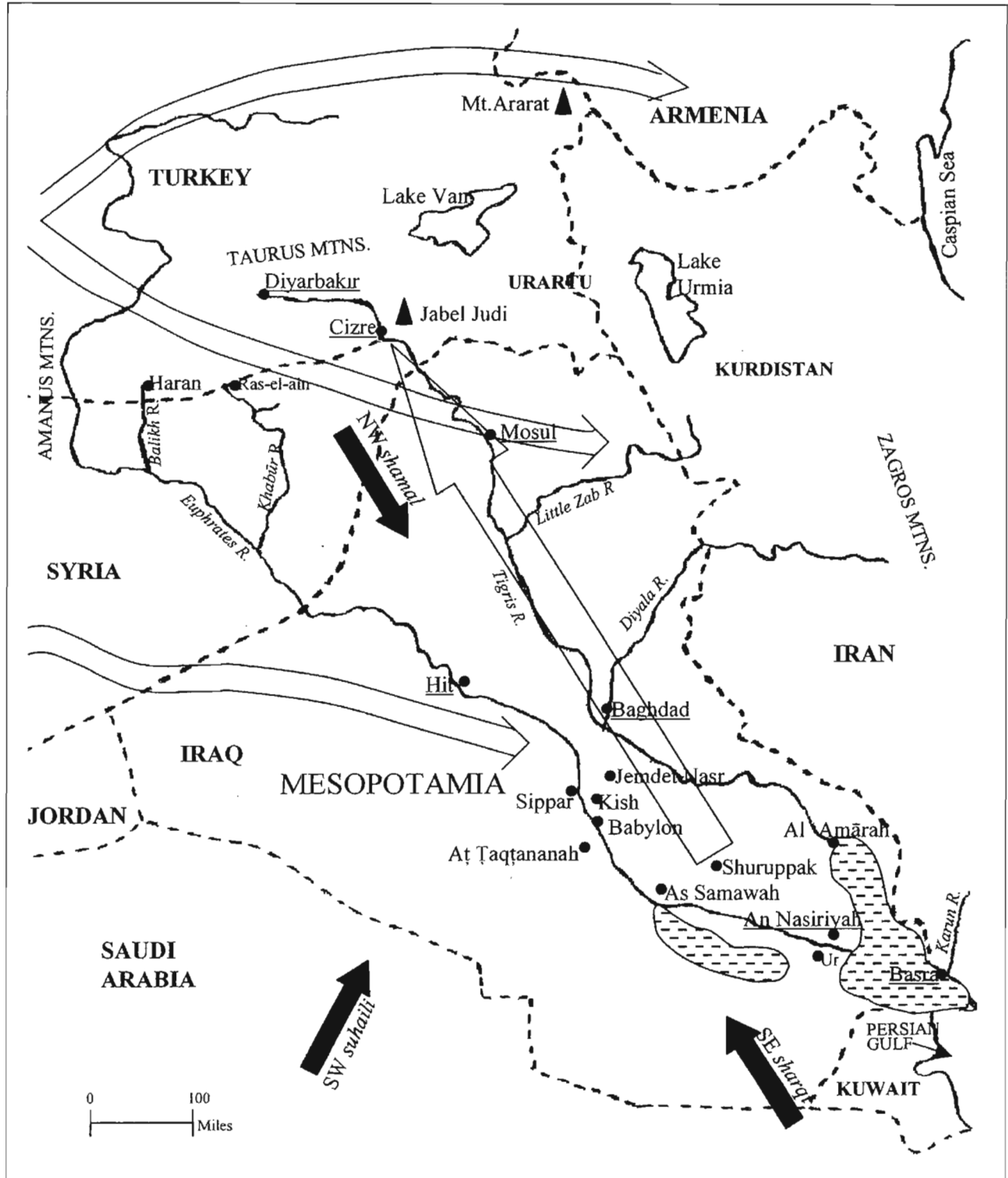
**Cyclonic Storms.** The "Land of the Five Seas" refers to the lands encompassed by the Mediterranean Sea, Black Sea, Caspian Sea, Red Sea, and Arabian Sea.<sup>1</sup> This entire region is (and has been for thousands of years) controlled by the Asiatic pressure system. During winter, storms originating over the Atlantic Ocean sweep eastward along a low-pressure trough that exists over the Mediterranean Sea, and then they penetrate into southwestern Asia during periods of temporary weakening of the Asiatic anti-cyclone.<sup>2</sup> These storms bring cold-season rainfall to this region except for the southern part of the Arabian Peninsula.

During a temporary breakdown of the anti-cyclonic system, migration depressions (cyclonic storms) travel along the low-pressure Mediterranean trough to the region of the Aegean, and then, still traveling eastward, these storm tracks bifurcate either to the north to the Black and Caspian Sea areas and the mountains of Turkey, Armenia, and Iran, or to the south to the Palestine, Syria, Iraq, and Persian Gulf areas (Fig. 1). For each of these winter tracks, there are about three storms a month that move across the Mesopotamian region, with the peak of rainstorm activity occurring in March and April.<sup>3</sup> During the summer, the low-pressure system over the Mediterranean is replaced by high pressure, and the paths of resulting storms are

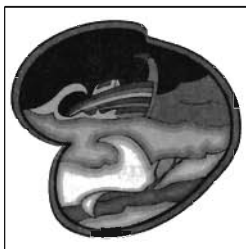
**Carol A. Hill** is a consulting geologist who has authored the books *Cave Minerals of the World*, *Geology of Carlsbad Cavern*, and *Geology of the Delaware Basin*. She is presently working in the Grand Canyon on a cave and mines project, and recently took a two-and-one-half-week research river trip through the Grand Canyon. Carol and her physicist husband Alan are members of Heights Cumberland Presbyterian Church in Albuquerque, New Mexico, where they have taught "Science and the Bible" Sunday School classes. Elected an ASA fellow in 2005, Carol has been an ASA member since 1984 and a member of the ASA Affiliation of Geologists since its foundation. She can be reached at: 17 El Arco Dr., Albuquerque, NM 87123 or at carolannhill@aol.com.

northward of the "Five Seas" area. This pervasive situation has caused both northern and southern Mesopotamia (Iraq) to experience nearly rainless conditions in the summer months for millennia.

In addition to this general weather pattern, when low pressure centers exist both in the Mediterranean and over the Persian Gulf and Arabian Sea, Iraq (Mesopotamia) becomes susceptible to the influence of colliding maritime



**Figure 1.** Geography of Mesopotamia, showing the direction of west to east cyclonic storms across the area (curved nonsolid arrows), pre-dominant wind directions (straight solid black arrows), possible route of the ark from Shuruppak to the mountains of Ararat (largest straight nonsolid arrow), marshlands (stippled areas), and locations mentioned in the text. The black triangles show the two most favored landing places for the ark. Modern cities are underlined; river and wind names are italicized.



*If the “second month, seventeenth day of the month” of Gen. 7:11 is interpreted as denoting the season of the year when the flood started ... then the Bible is in remarkable accordance with the weather patterns that actually exist (and have existed) in the Mesopotamian area.*

## Article

### *Qualitative Hydrology of Noah’s Flood*

air masses. The eastern tropical maritime air masses originate in the Indian Ocean and can travel northwestward via the Arabian Sea and Persian Gulf as far as the Mosul area (Fig. 1).<sup>4</sup> The lower of these two maritime air masses is usually warm and moist, while the upper layers are cool—conditions that favor instability. This results in heavy rainfall in the mountainous parts of the country and also considerable rainfall in the lowlands. Continuous downpours that last for days are characteristic of this type of maritime condition, and rains are often accompanied by wind and thunder.

Long-duration downpours are caused by the stalling or blocking of a Mediterranean frontal system, and depending on how long the system stalls, a “100-year” or “1000-year” precipitation event can result.<sup>5</sup> These rare occurrences of extremely high precipitation are referred to as the “Noah effect” by meteorologists and hydrologists.<sup>6</sup> When circulation patterns persist, then high amounts of rain (and snow in the mountains) can also precede or follow a cyclonic event. An example of this happening was in 1969 over the Jordan basin, when cyclonic circulation patterns persisted for 24 days, and rain and snow fell for almost two months.<sup>7</sup> The stalling of this front, over a period of 80 hours, brought an average of 75 inches (300 mm) of rain to the basin—the highest amount in 150 years—and caused considerable flooding.

Other stalled frontal systems are recorded for the Mississippi River region, USA. In the Mississippi River flood of 1927, it rained 15 inches in 18 hours, the water rose one inch an hour, the flood waters did not start to recede for two months, and some of the tributaries of the Mississippi actually flowed backward (up into their channels) due to the rapid flooding of the Mississippi River.<sup>8</sup> In the Mississippi River flood of 1973, the duration of flooding in some parts of the watershed was up to 97 days (over three months).<sup>9</sup> This 1973 flood was caused by the duration and persistence of a large-scale, anomalous, atmospheric circulation pattern, where the trough (low) existed in roughly the same location for a prolonged period of time in March and April.

**Precipitation.** Southern Mesopotamia is one of the driest spots on Earth, with an average annual rainfall of less than four inches.<sup>10</sup> The Mediterranean cyclonic disturbances that

pass through Iraq in winter and spring provide practically the only rain of the year for this area, and even this meagerly rain can be “fickle”—with some years having no rain at all and with other years having substantial amounts. In the Baghdad area, yearly precipitation amounts to about 30 inches/year; Mosul, about 85 inches/year; Cizre, about 100 inches/year; and Diyarbakır (headwater area for both the Tigris and Euphrates Rivers), over 150 inches/year (Fig. 1).<sup>11</sup> In the extreme north and northeast, in the mountainous areas of Iraq (Kurdistan), the annual total precipitation is 175 inches/year and in some localities, can exceed 250 inches/year. In all of these areas, rainfall occurs mostly in the winter and spring and corresponds to the passing of a low-pressure disturbance.

The alluvial plain of Mesopotamia is surrounded on the east by the Zagros Mountains, on the north and northeast by the Taurus Mountains, and on the northwest by the Amanus Mountains (Fig. 1). These mountains receive rain and snow precipitation that feeds the Euphrates and Tigris River basins in the spring. The mountains of Armenia and Kurdistan in the northeastern Taurus range experience especially severe winters of up to six to eight months duration,<sup>12</sup> and snow there frequently reaches depths of six feet.<sup>13</sup> The Zagros Mountains of eastern Mesopotamia run parallel to the Tigris River, and practically every spring, melting snow feeds the Tigris to overflowing. In these areas, mountain snows come mainly in the winter months (January–February), while the greatest rainfall occurs in the spring (March–April). Spring rainfall can quickly melt the mountain snow, causing the Tigris and Euphrates Rivers to reach their highest flood level in late spring.<sup>14</sup>

**Wind.** The predominant wind in Iraq (Mesopotamia) is the northwest *shamal* (meaning northerly) (Fig. 1). The shamal wind is the more-or-less constant flow of air down the valley of Mesopotamia that follows topography and gradient from the Taurus Mountains in Turkey southward to the Persian Gulf. The shamal operates all year long, but it is especially prevalent from June to October when the wind direction is not interrupted by the passage of cyclonic storms.<sup>15</sup> These are dry, warm, persistent winds, signifying clear skies and stable weather. The very dry air brought by the shamal permits intense

heating (and evaporation) of the land surface.<sup>16</sup> Studies of dune alignment and structure in the Persian Gulf area suggest that this predominant wind pattern has not changed significantly during the last 10,000 years (Holocene).<sup>17</sup>

In winter and spring, the regularity of the shamal wind decreases and the *sharqi* (meaning easterly) becomes the predominant wind, up to a height of ~7000 feet.<sup>18</sup> These winds, coming from the Persian Gulf (Fig. 1), are relatively cool and damp and may bring clouds and rain to the entire region of Iraq as they develop in front of advancing cyclonic depressions. Sometimes in the Persian Gulf region, these southeasterly *sharqi* winds are followed, after the passage of a trough, by southwesterly *suhaili* winds. The *suhaili* is often a strong wind that can pose a danger for ships in the Gulf.<sup>19</sup> Only with the passing of a cyclonic storm are pressure gradients steep enough for violent winds to result.

Strong winds are known to have the capacity to blow boats for many miles. In the 1938 Eastern (USA) Seaboard Hurricane, winds up to 186 miles per hour drove boats and broken pieces of piers inland into the city streets of New Haven.<sup>20</sup> A boat on an almost completely flat flood plain—unfettered by trees, houses, or hills—would have the potential of being moved far inland by high winds.

### Accordance with the Biblical Account

If the “second month, seventeenth day of the month” of Gen. 7:11 is interpreted as denoting the season of the year when the flood started, rather than a month-day extension of Noah’s age,<sup>21</sup> then the Bible is in remarkable accordance with the weather patterns that actually exist (and have existed) in the Mesopotamian area. If one compares the tropical calendar of today with the sidereal calendar of the Mesopotamians for the years around 2900 BC,<sup>22</sup> then this would place the “second month, seventeenth day” in about the middle of March when meteorological conditions bring the most abundant rain to the Mesopotamian region. Genesis 7:12 says that it was a “heavy” rain which fell upon the earth (land) for forty days and forty nights,<sup>23</sup> and this is the type of rainfall (continuous downpour) that can result from the activity of maritime air masses characteristic of this season. The duration of the rain (forty days and forty nights) could have been caused by the stalling of a Mediterranean cyclonic front over the Mesopotamian area in combination with maritime air masses moving up from the Persian Gulf and Arabian Sea/Indian Ocean. This stalled storm would have been associated with southerly winds (the *sharqi* and/or *suhaili*), not with the northwesterly shamal wind, and these could have been very intense winds both in strength and duration.

The Bible (Gen. 8:1) also records that sometime before the 150 days of Gen. 7:24 (five months or about in the middle of August, assuming a middle-of-March start-date for the Flood), a wind passed over the earth causing the waters

to subside. This wind could correspond with the north-west shamal wind that blows almost continuously during the summer months. In spring, the melting of snow and steady rain in the mountains of northern Iraq produces flooding in the valleys of the south. Then in summer, the wind howls southward along the narrow fertile strip between the Euphrates and Tigris Rivers, and the drying process begins.<sup>24</sup> Thus, the Genesis account accurately records the actual meteorological situation that exists (and has existed) in Iraq (Mesopotamia).

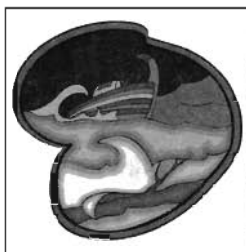
## What Water Sources Could Have Caused Prolonged Flooding?

While floods that lasted for up to six months are not unusual for southern Mesopotamia (before modern dams were built), the Noachian Flood was unique in a number of respects: (1) the Bible claims that the Flood was backed up for at least 150 days and that it lasted a total of one whole year (365 days); (2) the Bible claims that the Flood not only covered southern Mesopotamia, but also parts of northern Mesopotamia, at least as far as “the mountains of Ararat” where the ark landed; and (3) the Bible claims that the Flood, Noah’s ark, and Noah’s journey in the ark was instigated and directed by God as an act of punishment on an evil, violent, and corrupt generation. This last topic will be covered at the end of this paper under The Nature of “Nature Miracles.”

### Floods in Mesopotamia

The Mesopotamian alluvial plain is one of the flattest places on earth. The surface of the plain 240 miles (400 km) inland from the head of the Gulf is less than 60 feet (20 m) above sea level,<sup>25</sup> and at An Nasiriyah, the water level of the Euphrates is only eight feet (<3 m) above sea level, even though the river still has to cover a distance of more than 95 miles to Basra (Fig. 1). Once As Samawah and Al ‘Amārah are passed, the waters of the Euphrates and Tigris Rivers are lost in an immense marshland-lake region (Fig. 1), where water flows very slowly to the Persian Gulf. During spring this whole region—from the Euphrates east to the Tigris—can become severely inundated.<sup>26</sup> The level surface of the plain and shallow river beds of the Euphrates and Tigris, which offer the right conditions for irrigation,<sup>27</sup> can also cause immediate, widespread flooding. And, however difficult it is to get water to the land via irrigation canals, it is just as difficult to get it off the land when it floods.<sup>28</sup> Before any dams were built (before ~1920), about two-thirds of the whole area of southern Mesopotamia (Babylonia) could be underwater in the flood season from March to August.<sup>29</sup>

Of the two rivers, the Tigris is characterized by more destructive floods and larger inundations than the Euphrates. The Tigris River floods annually due to spring melting of snow in the Taurus and Zagros Mountains.



*A number of hydrologic factors could have been responsible for 150 days of flooding as recorded by Gen. 7:24: rain, heavy and continuous; snow, melted by heavy rains; springs, groundwater finally exiting; and a storm surge, high winds and tides that drive seawater inland for hundreds of miles.*

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Its waters first begin to rise in March, reach their peak in May, and normally recede in July.<sup>30</sup> At Baghdad, the river is about one-quarter mile wide, with a depth at high water of twenty-six feet and at low water of about four feet: the channel current at flood is about 3–4 miles/hour and at low water it is 1¼ miles/hour. There is hardly a season when the desert, at least for a few days, does not flood, and within a few minutes after a cloudburst, a person can be standing chest-deep in water.<sup>31</sup> Such an immediate flooding response is due to the lack of vegetation over the flat floodplain and to the very shallow water table depth of only a few feet.<sup>32</sup>

There are historical references to floods in Mesopotamia in the tenth, eighteenth, and twentieth centuries BC and seventh and eighth centuries AD.<sup>33</sup> From AD 762–1906, thirty major floods were recorded in and around Baghdad.<sup>34</sup> Of these, one of the largest floods is stated to have been in AD 1174, when the Tigris River flooded the whole of Baghdad and where the water was so high that boats entered the Bamarestan Hospital (located on high ground west of the river) through the empty doorways. One recent disaster was in 1954 when an exceptionally rainy spring combined with the melting snows of Armenia and Kurdistan so swelled the Tigris River that it submerged the low-lying plain for hundreds of miles and all of Baghdad was in imminent danger of destruction.<sup>35</sup> Noah's Flood must have been of greater magnitude than any of these floods to be preferentially preserved in the literature and history of so many ancient peoples, and the only one so large that it is still remembered as "the Great Deluge." Hydrologically speaking, it must have been a "1000-year flood"—or even a "5000-year flood."

#### Factors That Could Have Influenced Prolonged Flooding

A number of hydrologic factors could have been responsible for 150 days of flooding as recorded by Gen. 7:24.

**Rain.** Not only did it rain heavily and continuously for forty days and forty nights (Gen. 7:12), but it could have also rained intermittently after that until Day 150, when Gen. 8:2 says the rain finally stopped. The exact duration of the rain is unclear, and exactly where it rained is also unclear.

It likely rained where Noah lived and built the ark (probably Shuruppak, the traditional "hometown" of Noah), as that is where the ark was lifted above the ground and began to float (Gen. 7:17). But if the cyclonic storm was regional, it could have rained over all of Mesopotamia and the surrounding highlands.

**Snow.** While the Bible does not specifically mention the involvement of snow in the Genesis Flood, melting of mountain snows by the rains of Gen. 7:17 could also have been an important factor affecting flooding. Vast amounts of water are held in snow storage, and the greatest floods on large rivers (such as the Tigris or Mississippi) tend to occur in spring in response to snow melt.<sup>36</sup> Snow melted by heavy rains can be released as water very quickly (producing immediate flooding), but if the snow is deep and not subject to melting by rain, then water will be released over a long period of time.<sup>37</sup> If the snow had been exceptionally deep during the winter of the Flood, this snow could have added, as runoff, a great amount of water (both in the short-term and long-term) to the Mesopotamian hydrologic basin. In particular, it could have been responsible for prolonged flooding in the upper parts of the Mesopotamian hydrologic basin in the northern Mesopotamian (Urtu) region. Such a situation is recorded as having happened in the 1954 flood along the upper Tigris River.<sup>38</sup> Another important factor in melting snow are warm winds.<sup>39</sup> If the "wind" of Gen. 8:1 was a warm, northwesterly, shamal wind, it might have helped to melt snow in the surrounding highlands as well as to dry up the ground in the Mesopotamian alluvial plain.

**Springs.** The Bible mentions the "fountains of the deep" (springs) twice in its narrative—once when the springs start (Gen. 7:11) and once when they stop (Gen. 8:2). Springs are a prime factor that could have caused prolonged flooding. When it rains or when snow melts, water does not only flow over the ground as stream runoff. It can also travel underground as "groundwater," finally exiting at springs. Genesis 7:11 says that the fountains of the great deep (subterranean water or groundwater) were "broken up." "Broken up" comes from the Hebrew "bâqa," which means to "break forth," or be "ready to burst," and so the literal meaning of Gen. 7:11 is that these springs began gushing water.<sup>40</sup> The connotation of Gen. 7:11 is that

a surging mass of water burst forth from a deep subterranean water supply.

Springs exist all over Mesopotamia and surrounding highlands, and most of these are limestone (karst) springs. Ras-el-ain (*ain* means “spring”), near the border of Syria and Turkey, is one of the largest limestone karst springs in the world and is the effective head of the Khabūr River, a major tributary of the Euphrates.<sup>41</sup> Water from this spring (actually a complex of thirteen springs) comes from maximum winter infiltration (snow melt and rain in the Taurus Mountains) in January–February, but this water does not actually discharge at Ras-el-ain until the following July or August. This type of delay is typical of many karst springs, where recharge may be distant or convoluted from the spring discharge point. Some springs flow all the time, some springs flow only when it floods, and some springs have a delayed reaction between recharge and discharge. In the case of a delayed reaction, a continuous supply of water may be supplied for many months after a heavy rainstorm (or storms). The Bible seems to indicate that at least some springs began gushing water immediately as the Flood started (Gen. 7:11), but that others continued for up to five months (Gen. 8:2).

Specific springs (among many) that could have contributed water to the Mesopotamian hydrologic basin during Noah’s Flood are those located near ancient Sippar, Babylon, and Kish;<sup>42</sup> those in the vicinity of Hit;<sup>43</sup> and those in the Jezira desert region between Baghdad and Mosul.<sup>44</sup> Tributaries to the Tigris also emerge from karst springs (large caves) along the foothills of the Zagros Mountains. When severe rains occur in the Zagros, these springs respond with a strong outflow, causing the rivers to swell and overflow onto the plains.<sup>45</sup> In antiquity, one of the most important of these springs emerged from Shalmaneser’s Cave, which was thought to be the “source” of the Tigris when Shalmaneser III visited the cave in 852 BC.<sup>46</sup> It is also recorded that Sargon II had learned the secret of tapping water from subterranean strata during his campaign against Ulhu and Urartu (the land of Ararat).<sup>47</sup>

Numerous springs also exist in the deep canyons of the Cudi Dag (Jabel Judi), Cizre region of southeastern Turkey. Various karst features such as springs, sinks, and caves have developed in the Jurassic-Cretaceous Cudi Limestone of these mountains. The best known of these springs is located west of Beytişebab; other smaller ones occur further south.<sup>48</sup> Runoff from these springs can prolong flooding in the upper Tigris River Valley-Cizre Plain area—just where Noah’s ark may have landed (Fig. 1).

**Storm Surge.** There is the possibility that a storm surge (in addition to rainfall and snow melt) may have helped maintain flooding in the southern part of Mesopotamia. Storm surges are where a low-pressure meteorological system causes high winds and tides, which can drive seawater inland for hundreds of miles. This hypothesis is

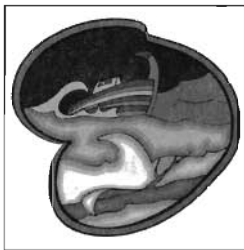
supported by written cuneiform records. The technical word for flood or deluge is “*amaru*” in Sumerian, or “*abubu*” in Akkadian. Specifically, “*abubu*” indicates moving water caused by a rainstorm or a storm that drives seawater into land.<sup>49</sup> In the Sumerian Gilgamesh Epic, it is said that a “hurricane raged” and after the flood “the sea became quiet, the storm was still, and the *abubu* ceased.”<sup>50</sup> The term *abubu* not only depicts a rainstorm and inundation, but it also includes the destructive winds and gales along with the rainstorm. In the Sumerian cuneiform tablets found at Nippur, the Noachian deluge is described as: “the mighty winds blew violently ... and the ship moved along over the face of the great waters, driven by the wind.”<sup>51</sup> In the Akkadian Atrahasis epic, the text speaks of thunder and savage winds.<sup>52</sup> Also in the Gilgamesh Epic, the flood of Ziusudra (Noah) is recorded as having been a “south storm” accompanied by wind and thunder, where the flood-winds blew over the land and the south-wind tempest swept over it.<sup>53</sup> Similarly, the Hebrew word “*mabbūl*” for “flood” used in the Genesis text is applicable to both an inundation or an “overflowing” caused by a sweeping (wind-driven) rainstorm.<sup>54</sup>

## Where is the Flood Sediment Left by Noah’s Flood?

### Universal Flood Sediments

Because of the traditional assumption that the Noachian Flood was universal, most people up to about AD 1750 accepted the church’s official view that all of the sedimentary rock on planet Earth formed at the time of Noah’s Flood (roughly the same position held today by Flood Geologists). Then, starting at the end of the eighteenth century, an agonizing battle over the history of the Earth began between scriptural chronology and the newly-founded science of geology.<sup>55</sup> During the seventy or so years between 1750 and 1820, the cumulative weight of evidence for an old Earth swayed the vast majority of field scientists (but not the majority of the church). Not only did it become evident that sediments take a long time to be deposited, it also became clear that the transformation of sediments into sedimentary rock involves an even longer span of time (in total, millions of years). In addition, it was discovered that not all sedimentary rocks are composed of flood-type sediments—in fact, most of them are not. There are marine sediments (the majority) interspersed with eolian (wind) sediments, lacustrine (lake) sediments, and evaporative sediments (such as halite and gypsum). Thus, the Earth’s sedimentary record as a whole does not document one catastrophic flood event (Noah’s Flood), but a series of many different sedimentary environments that overlap with each other in space and time.

By 1820 most geologists had abandoned the idea that all sedimentary rock had been formed at the time of Noah’s Flood, but many still believed in the former existence of an extremely violent flood (or floods) that had



*If Noah's Flood was a local flood, then ... only some of the sediment in Mesopotamia should be attributable to Noah's Flood. ... At Shuruppak, and also at Uruk, the last Jemdet Nasr remains are separated from the subsequent Early Dynastic I Period by clean, water-lain clay deposited by a flood. ... [T]hese sediments ... may be deposits left by Noah's Flood.*

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swept over the Earth—floods that had even submerged some of the highest mountain summits and had created great valleys, gorges, and ravines.<sup>56</sup> The evidence for this belief (called the “diluvialist school of thought” after Noah’s deluge) was that many parts of the Earth (especially northern Europe and the Alps) were known to be mantled by a chaotic assemblage of sediments ranging from mud to silt to sand to gravel—even huge, erratic, strangely-striated boulders of many tons weight. These deposits led some geologists to propose that older *diluvial* deposits (left by the biblical deluge) are overlain by younger *alluvial* deposits containing fossils of a recognizable modern type. Also, fossils such as great mammoths trapped in glacial ice, and “diluvial” fossil deposits in caves were attributed to changes in climate brought about by the Noachian Flood.<sup>57</sup>

This was the setting for the emergence of the glacial theory, which rudely shocked the geological community in the late 1830s and early 1840s by proposing that the action of glaciers accounted for the strangely striated “erratic” boulders and poorly-sorted rock debris (referred to as “till” by geologists) present in many parts of the world. The substantiation of this glacial, “ice-ages” theory then left *no* deposits that could be attributed to the Noachian Flood.

#### Mesopotamian Flood Sediments

So where are the flood sediments left by Noah’s Flood, if indeed such a historical flood existed? They are present in the Mesopotamian hydrologic basin because that is where the Flood took place. If Noah’s Flood was a *local flood*, then flood deposits over the entire Earth should not be expected. Rather, only some of the sediment in Mesopotamia should be attributable to Noah’s Flood.

Flood sediment layers have been found all over Mesopotamia in places such as Kish, Shuruppak, Ur, Uruk, Lagesh, and Nineveh. This is because floods are endemic to the region, occurring practically every year somewhere within the Mesopotamian hydrologic basin. Some of these flood deposits are from “normal” floods, while others are from larger-magnitude floods. The most famous of these flood deposits was found in the late 1920s by Leonard Woolley, who reported 8–11 feet of “clean water-laid mud” in the

Royal Cemetery of Ur and pronounced it the result of “Noah’s Flood.”<sup>58</sup> As it turns out, this particular flood deposit seems too early to be a record of the Noachian Flood, belonging to the end of the Ubaid Period (~3800 BC) and not to the Jemdet Nasr Period (~2900 BC). The flood deposits at Nineveh also seem to be too early (~4300 BC) to correlate with the Noachian Flood, while at Kish the opposite occurs: the flood stratum seems to be too late (from the end of the Early Dynastic Period).<sup>59</sup> At Shuruppak, and also at Uruk, the last Jemdet Nasr remains are separated from the subsequent Early Dynastic I Period by clean, water-lain clay deposited by a flood. This clay is nearly five feet thick at Uruk<sup>60</sup> and two feet thick at Shuruppak.<sup>61</sup> Since the Sumerian King List mentions that Noah (Ziusudra) lived in Shuruppak (today the archaeological mound of Fara), and since Noah is believed to have lived during the Jemdet Nasr Period,<sup>62</sup> then these sediments date from the right time and place and may be deposits left by Noah’s Flood.

#### Flood Deposition and Erosion

A popular misconception is that a great inundation such as Noah’s Flood should have left a widespread layer of sediment all over Mesopotamia. If flood deposits occur at Shuruppak (Fara), then why not at nearby Kish? Why have no flood deposits been found at Ur that correspond to Noah’s Flood, and why in the city-mound of Ur do some pits contain thick flood deposits while other pits nearby contain no flood deposits?

This presumed problematic situation is completely understandable to hydrologists—in fact, it is what they expect. Floods *erode* sediment as well as *deposit* sediment. Rivers in vegetated terrain (like in northern Mesopotamia) are capable of eroding less sediment than in unvegetated, clay-silt terrain (like in southern Mesopotamia). Rivers may scour and down cut sediment along steep gradients, whereas they may deposit sediment in shallow-gradient situations. Or, sediment left from the waters of one flood may be removed by erosion in a later flood. Most Mesopotamian cities were located close to former river channels or canals since commerce and transportation depended on these waterways. Therefore, a temple-mound (zigurat) city in the path of a raging flood might be eroded on its side facing the torrent of water, while on its lee, “backwater” side,

sediment might be deposited in low areas. Or, a city might not be covered with river silt at all, and in such cases, cities constructed after the Flood could appear to continue without an archaeological break from pre-Flood cities. In addition, during periods of high flooding, there is a tendency for in-channel sediment deposition to cause an avulsion, or change, in a river's course,<sup>63</sup> thus possibly sparing cities along the banks of that course.

All of the above illustrates that the depth of flood deposits does not automatically indicate the depth of a past flood, and the lack of flood deposits does not automatically mean the non-existence of a flood (i.e., the absence of evidence is not necessarily the evidence of absence). The only absolute way of knowing when a flood occurred is to dig a series of trenches and date the remains (pottery, etc.) both above and below a flood sediment horizon, or carbon-date organic matter within that sediment. Such a comprehensive study has never been done for the ancient cities of Mesopotamia, and certainly not using the most recent techniques. Therefore, not enough data is in yet to say which of the flood deposits in Mesopotamia may have been derived from the Noachian Flood.

It is very important to this discussion to understand the magnitude of sediment build-up that can occur in a major flooding event. As previously mentioned, the Mississippi River flood of 1973 was out of its banks for two to three months in some locations,<sup>64</sup> and the average sediment thickness left by this flood was 21 inches along the natural levee and 12 feet in the back-swamp areas. Considering that Noah's Flood lasted about four times as long (1 year), one can roughly estimate that a maximum of ~50 feet of sediment might have accumulated in an ideal backwater location during this flood. This is *nowhere* equivalent to the *miles* of sedimentary rock proposed by Flood Geologists as having formed during the Noachian Flood. But it does fit with a "1000-year" or "5000-year" local flood model.

### Noachian Flood Sediments

Besides occurring in slack places over the Mesopotamian alluvial plain and over or around some ancient city mounds in existence at ca 2900 BC, sediments from Noah's Flood should have also accumulated at or near the lowest point of the Mesopotamian hydrologic basin; i.e., in the Euphrates/Tigris delta of the Persian Gulf. The Euphrates and Tigris Rivers carry their suspended load southward and deposit it either in the marshes and shallow lakes just before reaching the Persian Gulf, or in the Gulf itself (Fig. 1).<sup>65</sup> Some recent sediments in the Persian Gulf have been dated at ca 3000–4000 BC,<sup>66</sup> and could represent material derived from Noah's Flood. However, since Gulf sediments are being constantly reworked by tidal currents,<sup>67</sup> it is probable that any sediment from Noah's Flood would be mixed with sediment from other times and sources and not be distinguishable from them.

### A Local Flood Model and Route for Noah's Ark

A possible scenario is proposed for the flooding of the Mesopotamian plain and the route taken by the ark northward to the mountains of Ararat (Fig. 1, largest straight nonsolid arrow). As in an earlier article in *Perspectives on Science and Christian Faith*, the area of Cizre and Jabel Judi are considered the most likely landing place for the ark.<sup>68</sup>

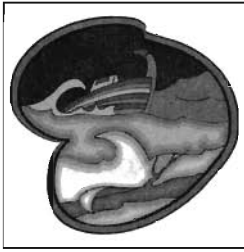
A large cyclonic storm stalled over Mesopotamia provided heavy rainfall for 40 days and 40 nights to the lowland regions and snow (or rain-melt of snow) to the highland regions. This rainstorm was accompanied by an intense south (sharqi and/or suhaili) wind, which blew the ark northward toward the mountains of Ararat (Urartu). The entire Tigris River hydrologic basin was inundated up to the area of Cizre because springs and snow melt kept the water flooded in the upper Tigris River Valley as well as in the lower Tigris River Valley.

A possible route that the ark may have followed along its journey from south to north was from southern Mesopotamia (Shuruppak) along the inundated flood plain between the Euphrates and Tigris Rivers up to the area of present-day Baghdad (112 ft elevation). Then it could have followed the very flat, flooded Tigris River Valley up to the area of Mosul (730 ft elevation), where the Tigris is still a wide stately river.<sup>69</sup> Northward from Mosul, the terrain becomes more hilly, but there is still a wide valley up to Cizre (~1640 ft elevation).<sup>70</sup> The ark could have landed somewhere in this area (just south of Jabel Judi), or it could have made it to the Cizre Plain and landed in the foothills of the Jabel Judi Mountains where the mountain tops could be seen (Gen. 8:5), but where the valleys were still flooded (Gen. 8:9). This location is in the "mountains of Ararat" (Gen. 8:4) and was known in antiquity for both its olive trees (Gen. 8:11) and vineyards (Gen. 9:20).

### The Nature of "Nature Miracles"

From the above discussion, it may seem that a completely naturalistic explanation for the Noachian Flood is being offered. Such is not the case. The Bible claims that Noah's Flood was *supernatural* in that:

1. It was God who purposely sent the Flood to judge an evil, corrupt, and violent world (Gen. 6:7; Gen. 6:11–13). But Noah "walked with God" (Gen. 6:9) and found grace in the eyes of the Lord (Gen. 6:8). Noah had a personal relationship with the true God and was thus spared.
2. It was God (*I, even I*; Gen. 6:17) who exercised absolute control over the forces of nature by causing the Flood.
3. It was God who commanded Noah to build the ark (Gen. 6:14) and to bring the animals onto the ark (Gen. 6:19), and it was the Lord God who shut up Noah and his family into the ark (Gen. 7:16).



# Article

## Qualitative Hydrology of Noah's Flood

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ultimate  
purpose)  
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with  
lower-order  
laws (God's  
physical laws).*

4. It was God who restrained the floodwaters (Gen 8:1-3) and brought the ark safely to the mountains of Ararat (Gen. 8:4).

5. It was God who established a covenant with Noah (Gen. 6:18) and who made the rainbow a sign of that covenant (Gen. 9:13).

Noah's Flood was a miracle because God *intervened* into his physical laws. One does not have to invoke the notion of the suspension or violation of natural laws in "nature miracles." Divine action can simply be understood as higher-order laws (God's ultimate purpose) working seamlessly with lower-order laws (God's physical laws).<sup>71</sup> Is it any less a miracle because it can be explained by natural processes? This is the nature of "nature miracles": to have the *timely* intervention of God into natural processes.<sup>72</sup>

One of the best examples of a "nature miracle" that comes to mind is Jesus rebuking the winds and sea (Matt. 8:23-26). In Matt. 8:26, the calming of the winds and sea could be explained by a sudden change of barometric pressure—which was probably the case. But it was God who caused this change to take place *exactly* when Christ commanded the waves and wind to be still.

Three further points should be made at this time about miracles:

1. "Nature miracles"—where miracles can be explained by natural processes—are not the only kind of miracle claimed by the Bible. Jesus' walking on water, the Red Sea parting, the Resurrection of Christ: all of these "nonnature miracles" cannot be explained by natural processes (as we know them). It is not to be implied that "nonnature miracles" cannot or have not occurred.

2. Just because God can perform "nature miracles" does not mean that all natural disasters are judgments of God as Noah's Flood was. Most natural disasters are due to natural happenings, where God allows the natural processes that he set up to operate.

3. In order to explain a "nature miracle" like Noah's Flood, miracles not recorded in the Bible should not be assumed; i.e., miracles should not be "pulled out of a hat" anytime one feels like it. Any theory, no matter how feeble, can be "proved" by recourse to the miraculous or God's omnipotence.<sup>73</sup> It is a weak interpretation that has to invent mira-

cles that the text says nothing about in order to compensate for logistical problems.<sup>74</sup> If the Bible is to be taken at face value, then the miracles that the Bible actually claims should be considered to be miracles, and those it does not claim should not be manufactured.

## Conclusion

If the actual meteorological and geographical conditions of the Iraq (Mesopotamia) area are taken into account, the Bible proves remarkably accurate in its record of the Flood account. The proposition that Noah's Flood was local rather than universal thus makes sense both historically and hydrologically from the viewpoint of the questions addressed in this paper. A companion paper on the Quantitative Hydrology of Noah's Flood follows that will attempt to answer the hardest question of all: How could the ark have gone "uphill" against the current (hydrologic gradient) to land in the "mountains of Ararat"? ☼

## Acknowledgment

I thank Alan Hill for his contributions to this paper.

## Notes

<sup>1</sup>US Weather Bureau, *Climate of Southwestern Asia*, Report no. 40 (Washington, DC: US Army Air Forces Weather Division, 1944), 1.

<sup>2</sup>Anti-cyclones are storms in the Northern Hemisphere that move in a clockwise direction, while cyclones are storms that move in a counter-clockwise direction.

<sup>3</sup>US Weather Bureau, *Climate of Southwestern Asia*, 10.

<sup>4</sup>A. H. Shalash, *The Climate of Iraq* (master's thesis, University of Maryland, 1957), 22-3.

<sup>5</sup>The term "100-year flood" (or "1000-year flood") is a statistical designation meaning that there is a 1 in 100 (or 1 in 1000) chance that a flood this size will happen during any one year.

<sup>6</sup>K. K. Hirschboeck, "Flood Hydroclimatology," in *Flood Geomorphology*, ed. V. R. Baker, K. C. Kochel, and P. C. Patton (New York: John Wiley, 1988), 41.

<sup>7</sup>M. Inbar, "Effects of a High Magnitude Flood in a Mediterranean Climate: A Case Study in the Jordan River," in *Catastrophic Floods*, ed. L. Mayer and D. Nash (Boston: Allen and Unwin, 1987), 337.

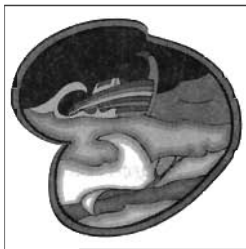
<sup>8</sup>PBS show, "Fatal Flood," *American Experience*, aired March 2002.

<sup>9</sup>K. K. Hirschboeck, "Catastrophic Flooding and Atmospheric Circulation Anomalies," in *Catastrophic Floods*, 46.

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## Article

### Quantitative Hydrology of Noah's Flood

# Quantitative Hydrology of Noah's Flood

Alan E. Hill



Alan E. Hill

*[I will] explore  
the plausibility  
of Noah's Flood  
being local,  
i.e., localized  
within the  
Mesopotamian  
hydrologic  
basin ...*

*The possibility that Noah's Flood could have been local rather than universal has been rejected by many people who argue that a local flood would have floated the ark into the Persian Gulf. This paper will explore the possibility that the wind could have blown the ark upstream, against the gradient, landing it some 650 to 700 miles inland from the Persian Gulf. First, the model determines the rate of water influx needed to flood the entire populated area of Mesopotamia. Then flood depths, range of flow velocities, etc. are generated based on a literal reading of Genesis 6–8. Finally, one plausible set of wind conditions (out of many possible) able to transport the ark to the mountains of Ararat is presented. Depending on the weight of the ark, wind velocities average as low as 50 mph, but peaks near 70 mph are adequate to accomplish the task. For all cases studied, the required wind velocities fall well within reason for a large stalled cyclonic storm over the Mesopotamian region.*

**T**he object of this paper is to explore the plausibility of Noah's Flood being local, i.e., localized within the Mesopotamian hydrologic basin rather than being universal over the entire planet Earth. A discussion of how this position meets with God's purposes and conforms to a rational interpretation of his Word has been addressed elsewhere, and will not be repeated here.<sup>1</sup> Rather, this paper specifically answers the physical objections raised by Young Earth Creationists, who ask: (1) How could the flood waters, if constrained to a local region, have stayed backed up for 150 days, and (2) How could the ark have traveled against the current, landing in the mountains of Ararat, instead of floating with the current down to the Persian Gulf?

It seems inconsistent to question God's ability to perform simple miracles, such as those required to manage a local flood, yet allow for God to manage a giant-scale miracle related to a universal, worldwide flood.

Consistent or not, the argument prevails, which is why I became motivated to write this paper. I wish to clarify my personal position that God can perform both "nature miracles," in which he manipulates natural forces, as well as "full blown" miracles in which he momentarily modifies his original laws of nature.

Since there is no rational evidence backed by mainstream scientific investigations for there ever having been a worldwide universal flood, I have turned my attention to providing mathematically quantifiable evidence that a local flood is plausible in terms of God's having performed a "nature miracle." More specifically, I have constructed a mathematical model into which the most critical topological features of the Mesopotamian region have been incorporated. Then, the literal biblical description of the period of rainfall and period of spring-water flow ("fountains of the deep") was entered into the calculation. The Bible does not give quantitative information on the magnitude of rainfall or spring flow rates, but it does give conditions as to the initial water depth at the point of the ark's departure ("15 cubits upward," Gen. 7:20), the total duration of rainfall and spring flow (150 days, Gen. 8:2), the presence of water at the ark's landing position (mountains of Ararat, Gen. 8:4), and the point in time when Noah disembarked

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from the ark, i.e., when the mud hardened (exactly one year or 365 days after the Flood started, Gen. 8:14).

The details of rainfall and spring flow distribution functions in the model were manipulated in order to discover if any (or multiple) input scenarios could be fabricated which produced end results that matched a full ensemble of predictions stipulated by Scripture. Also, differing outcomes were explored to cover cases where biblical mandates were less clear. Finally, having developed input conditions that conform with Scripture, it is most interesting that the required rainfall and spring flow rate values are entirely consistent with the actual meteorological and hydrological conditions that can prevail in the Mesopotamian region.<sup>2</sup>

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The ark was specified according to the physical dimensions described in Gen. 6:15, and it was presumed to have been endowed with other sound engineering practices to minimize drag and maximize stability. Shipbuilding expertise existed in the time of Noah.<sup>3</sup> Furthermore, God gave Noah specific instructions on how to construct the ark suitable to meet his purposes (Gen. 6:14-16). Noah could have used sails (as was typical for boats of that time), but since Genesis does not mention sails, no use of sails is assumed.

The ark was modeled to be situated upon the water in a manner wherein drag forces, due to water flow, pull the ark downstream, but intense winds blowing inland apply a driving force to that portion of the ark situated above the water line, which tends to drive the ark upstream, against the gradient. Most of the "wind work" is needed simply to hold the ark in place against the current. Then only a slight increase in wind velocity is needed to actually

move the ark upstream. So, the computer model is programmed to derive the wind velocity versus time needed to move the ark from its (assumed) initial position to its final one within a period of 40 days (or less).

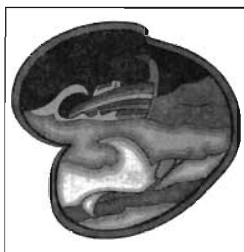
## Overview of the Mathematical Model

An outline of the mathematical approach used in this paper is included in the Appendix. However, since most of this mathematical detail will not be comprehensible to a general readership, some general comments need to be made with regard to its methodology, extent of applicability, and most specifically, its intended purpose. First, this model, and the nature of the assumptions it embraces, are crude at best. A full-blown hydrodynamics approach would be to prepare a "finite element" code wherein a network of cells are distributed across the entire flooded area, and each cell is mathematically tied to each of the cells adjacent to it. The physically defining equations for a full-blown approach include the Navier-Stoke's equation, or at least a composite of equations that invoke the conservation of energy, conservation of momentum, flow-stream continuity, and viscous losses.<sup>4</sup>

In contrast, my model relies fundamentally on a differential equation defining the continuity of flow and the "Manning formula," which hydrologists normally use to derive the velocity of flow versus the water depth and the hydrological gradient. This formula normally provides a method of dealing with flow losses caused by boundary drag effects. However, the Manning formula, as it is used in the formulation presented in this paper, can also include pressure head loss caused by turbulence and eddy currents.

I have assumed that the rainfall and spring flow are time variable, but that these two sources of water are distributed uniformly, but differently, over each of the three regions constituting the entire flooded space. Boundaries that control the flow pattern are also assumed, as shown in Fig. 1. The hydrological gradient is assigned one of two values that characterize the Mesopotamian alluvial plain and the ascent into the foothills of the mountains of Ararat, respectively. These gradients correspond to the current-day topology, which is believed to be relatively unchanged since Noah's time.

So, what has been lost by replacing a full-blown sophisticated model with a more simplistic one? Answer: nothing is lost, really, because we do not have the pertinent, detailed data from Scripture that is necessary to give meaning to a full-blown model. In either case, we are unable to realistically determine what actually happened to any level of detail during Noah's Flood. However, even my simplistic approach can be used to determine what *might* have happened, in terms of possible scenarios consistent with the Genesis record. And, we are enabled



## Article

### Quantitative Hydrology of Noah's Flood

to generate a plausible set of conditions, and subject to these, show that the ark could have readily been blown against the gradient to land 440 miles upstream, over an elevation change of 2100 feet within 40 days.

### Assumptions Concerning the Topology

The model overlays the Mesopotamian region considered to be flooded, shown as an area bounded A, B, C, and D in Fig. 1. This area covers the land region shown in figure 1 of the previous paper "Qualitative Hydrology of Noah's Flood" (p. 121) and it is assumed that the ark follows the route shown in that figure, i.e., from Shuruppak past present-day Baghdad, past present-day Mosul, up to Cizre in the foothills of the mountains of Ararat.

It is fortuitous that the geometry of this region could be developed using cylindrical coordinates, referenced to a point of origin at the top, wherein both the flooded region and a smaller central channel serve as the major flow conduit spread at constant angles,  $2\theta_1$  and  $2\theta_2$ , respectively. This choice of conditions allows for the entire region to be flooded, causing total destruction. In addition, for each of the three regions shown in Fig. 1, it provides a primary channel flow of constant depth and flow velocity at any given moment in time.

Here I am taking the liberty to define conditions that make the calculations easy, and this should be acceptable since the actual conditions are unknown and my choices have been made in conformance with the parameters specified in Genesis.

*It is fortuitous that the geometry of this region could be developed using cylindrical coordinates, referenced to a point of origin at the top, wherein both the flooded region and a smaller central channel serve as the major flow conduit spread at constant angles,  $2\theta_1$  and  $2\theta_2$ , respectively.*

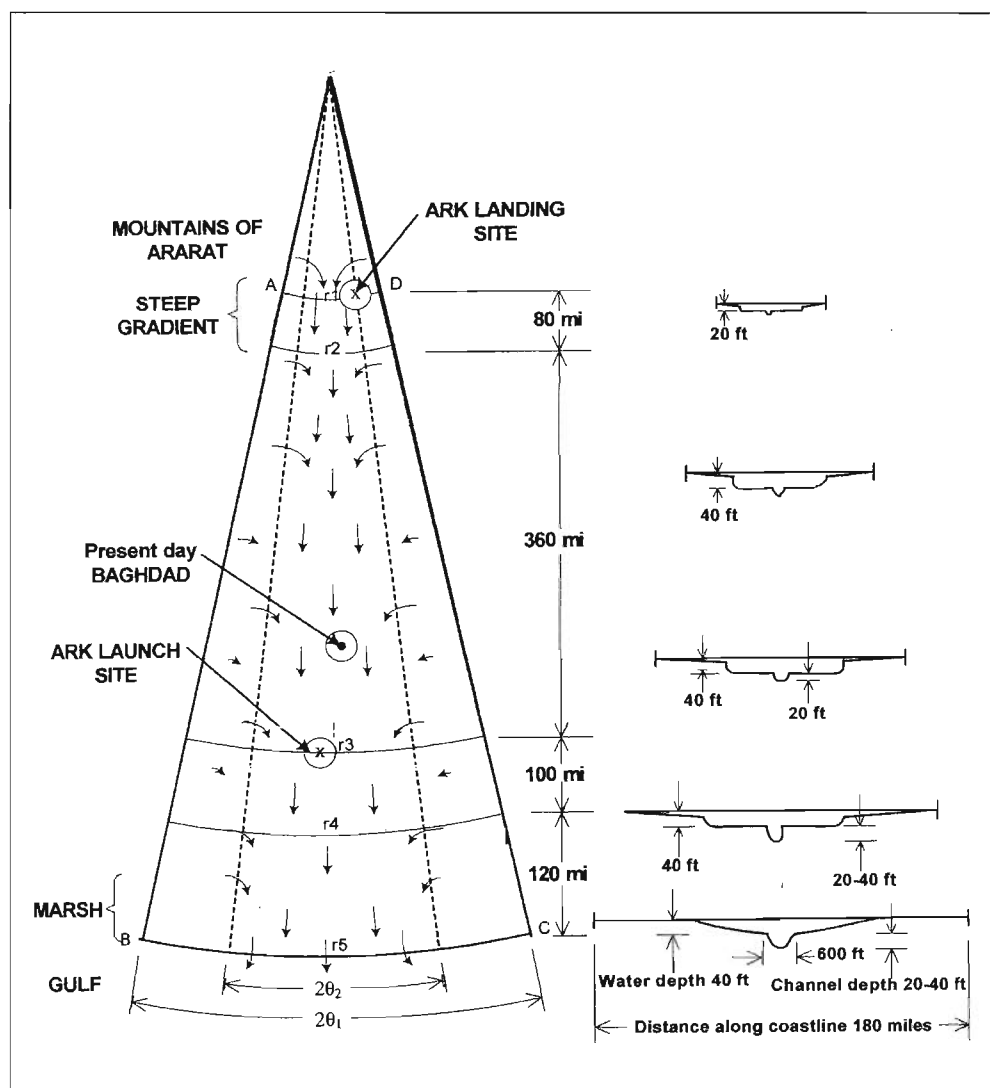


Figure 1. Geometric Model of the Topology of the Mesopotamian Hydrologic Basin.

Any scenario that can be found to work is acceptable toward meeting the purpose of this paper.

The three regions dealt with separately include: (1) the alluvial plain, which is one of the flattest places on Earth, its gradient is only 0.00072, over which the ark is being assumed to have traveled some 360 miles; (2) the foothills of Mount Ararat, where the gradient increases to 0.0017, over which the ark is being assumed to have ascended some 80 miles; and (3) a marshland delta region of some 120 miles, where the floodwaters could have escaped through marshlands to the Persian Gulf (figure 1 of the previous paper, p. 121).

The dynamics of flow (and reservoir backup) are determined by a competition between waters being supplied to the three regions and waters being lost through the marshland channel. Viewed end on (see cross-sectional views of Fig. 1), the coastline is assumed to vary gradually and slope down toward the Tigris River channel, and that within the marshland this constriction chokes the primary flow conduit channel to perhaps 40 miles wide. That is, the main radially directed channel is bounded by the angle  $2\theta_1$  of Fig. 1, and the full width of the flooded region is bounded by the angle  $2\theta_2$ . All of the land (at least inland of the marshes) is assumed to be flooded—deep enough to destroy life, but relatively shallow compared to the main channel flow so that the drainage can be assumed to flow laterally toward the drainage channel rather than radially downward. The marsh area can be adjusted by weighting the Manning friction factor to account for additional drag caused by the marshland vegetation.

The most populated areas at that time were those along the Euphrates and Tigris Rivers, or along canals connecting to these rivers. In any case, all of the ziggurat towers, onto which people could climb to escape the floodwaters, lie within the main channel regions defined by  $2\theta_1$ . For this reason, and because of scriptural definitions, the floodwaters were modeled to peak at least at a 40-ft depth over the entire region bounded by  $2\theta_1$  and the Gulf to the south, and the start of the ascent into the foothills of

the mountains of Ararat. In addition, a formerly present river channel of some 600 ft wide and 20–40 ft deep is assumed to have extended the maximum water depth to some 60–80 ft. However, its inclusion into the calculation makes an imperceptible difference in the outcome.

The third region, the ascent into the foothills, was modeled to reach only a 20 to 30-ft depth in the region bounded by main channel flow, but with the possibility that there also existed an additional narrow central channel, perhaps extending the total depth to ~70 ft. Naturally, the water flow velocities in this steeper region were higher, mandating that somewhat stronger winds were needed to push the ark up the final ascent to the foothills region of Cizre.

## Noah's Ark

A literal translation of Gen. 6:15, and using the conversion factor 1 cubit = 18 inches,<sup>5</sup> places the dimensions of the ark at approximately 450 ft (300 cubits) long by 75 ft (50 cubits) wide by 45 ft (30 cubits) high. The ark is assumed to have been situated upon the water as shown in Fig. 2. Most likely the ark was configured as a barge, having an upturned prow to reduce drag, but otherwise box-like in shape. It may have had rudders and/or structural members to provide lateral stability according to the standard shipbuilding practices of that time.

According to Hoerner,<sup>6</sup> the prow as shown in Fig. 2 reduces the drag coefficient from 1.0 to 0.4. Further drag reductions down to 0.3 are possible by means of additional contouring, but the value 0.4 will be used. Note (from the formulas in the Appendix) that the total fluid dynamic drag scales as the square of the ark's velocity relative to the water flow. It is interesting to note that the Genesis-specified, length-to-width ratio of 6/1 for the ark affords the maximum stability, which is confirmed by the modern dynamics approach of Hoerner. Other factors needed to establish the validity of drag forces have been considered (including the Reynold's number, Froude number, etc.), but are deemed too detailed to warrant being included here in the text.

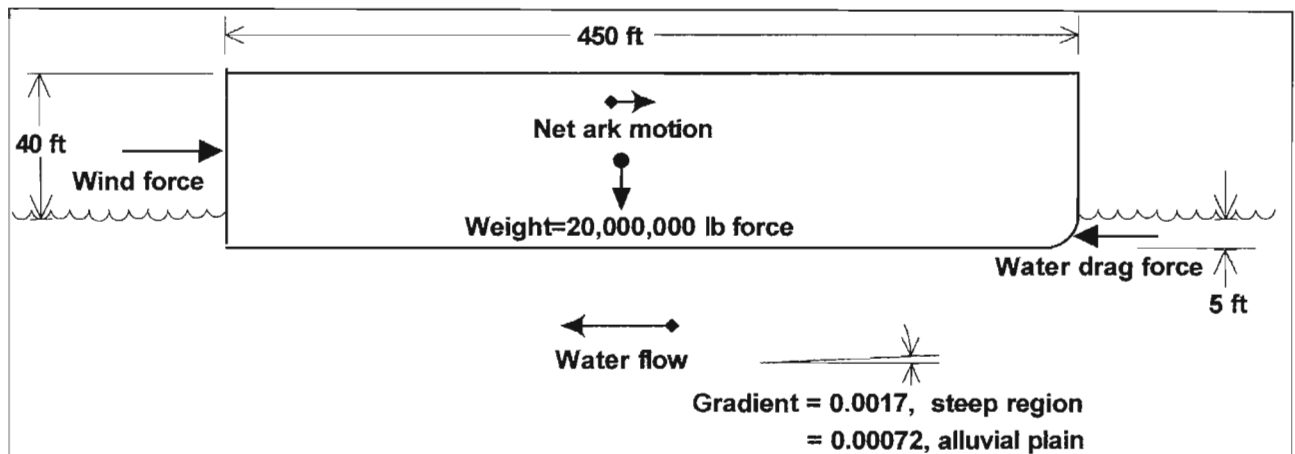
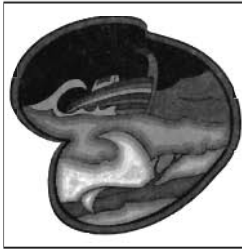


Figure 2. Configuration of Noah's Ark and Its Draft upon the Water.



## Article

### *Quantitative Hydrology of Noah's Flood*

*A draft of 5 ft,  
where 40 ft  
remains above  
the water line,  
will be shown  
to readily allow  
the ark  
[weighing  
less than  
10.5 million  
pounds]  
to be blown  
upstream.*

A discussion relating to the mass of the ark, and correspondingly its buoyancy, must be included since this determines the ark's draft (the depth to which a vessel is immersed when bearing a given load, Fig. 2). In turn, the effects of wind blowing the ark upstream versus water drag tending to push it downstream, depends markedly on the buoyancy factor and correspondingly the draft.

A draft of 5 ft, where 40 ft remains above the water line, will be shown to readily allow the ark to be blown upstream. This condition may seem unrealistic at first glance; however, a brief consideration of the ark and the ark's cargo proves otherwise. The ark, if forced to become totally submerged, would displace a volume of water of about 1,520,000 ft<sup>3</sup>, weighing 94.8 million pounds, wherein an assumed 5-ft draft would displace a water volume weighing 10.5 million pounds. That is, the fully loaded ark would have to weigh more than 10.5 million pounds to cause the draft to exceed 5 feet.

So, let us now "ballpark" a lower probable weight for the ark, according to the estimates shown in Table 1 below. One could argue that some of these estimates are low. For example, more drinking water could be required if no fresh water were collected from the rain, more food could be needed, and the total weight of animals may have been underestimated. But let us use this beginning scenario as a baseline upon which curves to be generated remain self-consistent. At the end of this discussion, the outcomes for heavier "arks" will be tabulated.

## Computational Results for Floodwater Dynamics

The mathematical treatise for this paper is entirely relegated to the Appendix, in sympathy for a general readership. The results and the assumptions on which they are based will follow in these final two sections.

I have evaluated many rainfall distribution scenarios, but for simplicity sake, only a single "benchmark" one (with several variations) will be presented. For this scenario, a rainfall and spring water distribution has been adjusted to develop the characteristics specifically described in Genesis 6-8. Essentially, the water depth immediately rises to 40 ft (not including the central 600-ft-wide assumed river channel of an additional depth of 20-30 ft) and floods the entire Mesopotamian plain, including the ziggurats there. The foothills of the mountains of Ararat are also flooded by rain, snow melt, and spring waters pouring off the surrounding mountain highs.

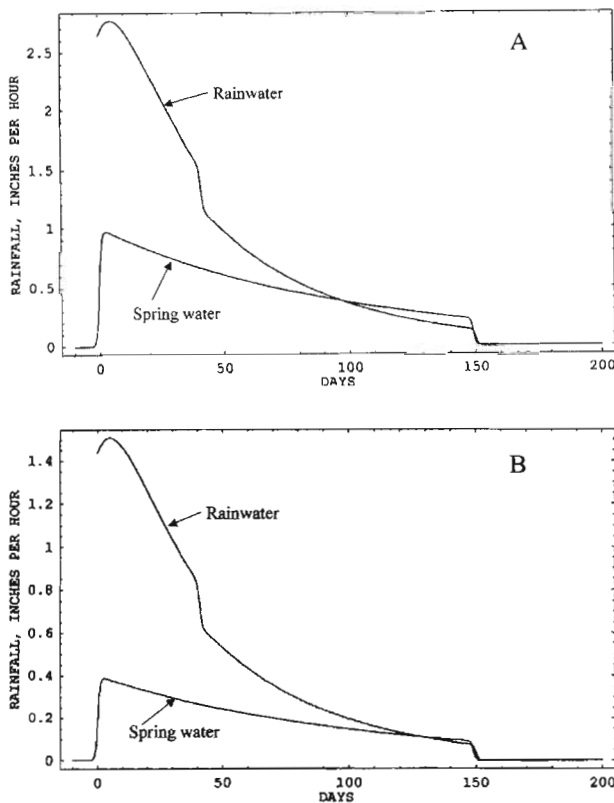
The rainfall distribution over time for the benchmark scenario is shown in Fig. 3A. As Gen. 7:12 states, the hard rainfall is limited to a 40-day period, whereas weaker rain fell thereafter until day 150, and then both the rain and spring flow stopped completely after 150 days (Gen. 8:2). Interestingly, a peak rainfall of only 2.75 inches per hour, tapering off to just one inch per hour in 40 days produces the requisite conditions. Such rainfall rates are not unreasonable for large hurricanes. Here, the conduit flow has been stretched to cover a 40-mile width (defined

**Table 1. Estimated Minimum Weight of Loaded Ark**

Super structure: 6" thick cedar wood, all 6 sides 65,000 ft <sup>3</sup> ; density of cedar = 0.5g/cm <sup>3</sup> ....	2.00 million pounds
Braces .....	2.00 million pounds
Cages, food bins, etc. ....	1.00 million pounds
Collected animals: 2 ea x 2500 species x 250 lbs average weight .....	1.25 million pounds
Food for animals .....	2.50 million pounds
Fresh water for animals and people (assuming the ark was kept shut up until Day 263).....	1.00 million pounds
Humans + 50 slaughtered ("clean") animals (250 lbs average weight) .....	0.15 million pounds
Human accommodation .....	0.10 million pounds
<b>Total:</b>	<b>10.00 million pounds</b>

by  $2\theta_1$  in Fig. 1) at the confluence with the Persian Gulf. If the main channel width were to be further constricted to ~25 miles, the requisite peak rainfall value gets reduced to only 0.7 inches per hour (graph not shown).

Conditions somewhat modified from those of Fig. 3A develop a peak depth of 30 ft located at the assumed ark landing site. Again, the pre-existing river channel may have added another 20 ft at the point of maximum depth. These conditions will be shown to require a peak wind flow velocity of 72 mph (maintained for six days) in order to push the ark up the 80-mile long ascent into the foothills of the mountains of Ararat. Therefore, a second variation of the condition for the water supply rate onto the foothills region has alternatively been investigated. For this second scenario, the maximum depth at the landing site of the ark is reduced to 20 ft (plus the river channel depth) in order to reduce the peak wind-flow requirement. Hence, the required peak wind velocity gets reduced down to 62 mph. This alternative rainfall and spring water distribution falling onto the foothills of the mountains of Ararat is shown in Fig. 3B.

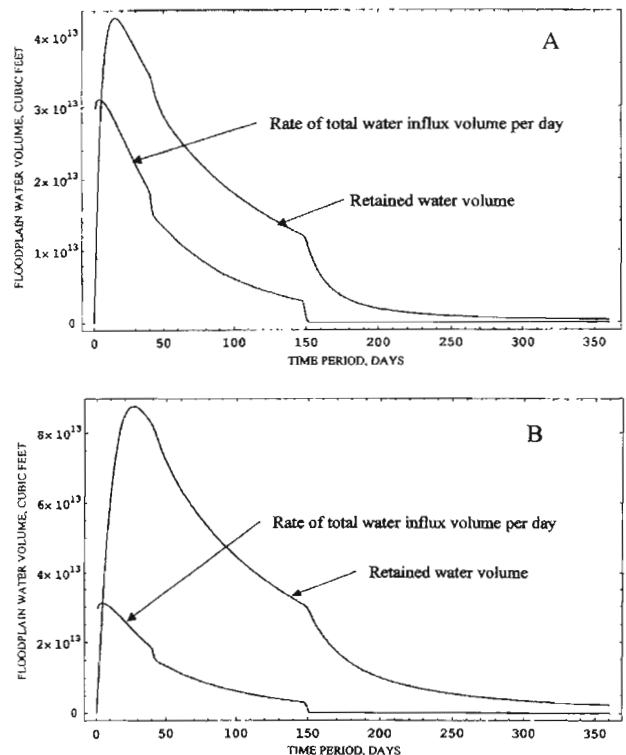


**Figure 3. Water Influx Versus Time:** (A) onto the Mesopotamian alluvial plain. Benchmark case: produces a 40-ft mean water depth, whereas an adjusted input data set (not shown) produces a 30-ft peak depth at the ark landing site; (B) onto the slope of the mountains of Ararat for the further reduced flow case as displayed (as B) which produces a 20-ft peak depth at the landing site.

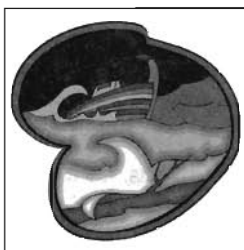
Having specified a set of input conditions, let us now explore the outcome. The *rate* of water falling onto the total area (i.e., the “reservoir”) is shown in Fig. 4 in terms of cubic feet per day over time. The total *accumulated* water retained in the reservoir is also plotted over time. By comparing these two functions, we can get a feeling for how rapidly the floodwaters accumulated versus how rapidly the waters flowed into the Persian Gulf. Fig. 4A applies this comparison for our benchmark case.

Fig. 4B shows what would happen if the flood channels were taken to be only 10 miles wide instead of 40 miles wide, thereby further constricting the water escape route into the Persian Gulf. As expected, relatively more water backs up. Hence, the waters reach their maximum depth at different points in time than in the benchmark case; that is, they reach an 85-ft depth in 25 days, wherein for the 40-mile-wide channel, a 40-ft depth is reached in five days. Also, the peak channel flow velocity rises from 6 mph up to 8 mph.

Despite the fact that both depth and velocity increase, the reservoir retention still doubles over the value achieved in the benchmark case. Also, the retained water curve loses its similarity to the flow-rate curve as the channel narrows, which is to be expected. Nevertheless, it is interesting to note that the water still drains away on a time scale of ~360 days in either case.



**Figure 4. Water Influx Rate and Reservoir Retention:** (A) for the benchmark study case, channel width = 40 miles; (B) like A, except channel width is narrowed to 10 miles.



# Article

## Quantitative Hydrology of Noah's Flood

*The choice  
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arbitrary.*

This fact indicates that slight adjustments could be made to accommodate a wide selection of values for channel width and yet we could find reasonable, self-consistent solutions. This is encouraging in that the choice of channel width, while reasonable, remains arbitrary.

Figure 5 displays the water depth for the benchmark scenario at two locations: the assumed ark launch and landing sites, respectively. Once again, the inclusion of an additional 20 to 40-ft depth over a potentially pre-existing riverbed is assumed, which does not cause a perceptible change to the hydrological dynamics.

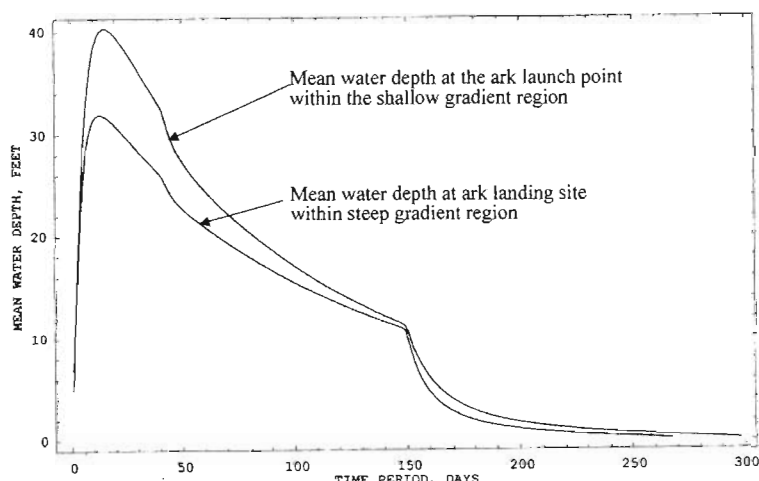
The third region being analyzed is the marshland where the floodwaters flow into

the Persian Gulf. This curve is omitted from Fig. 5 since it closely resembles the two curves shown. The maximum mean depth at this point, however, is increased to reach 45 ft owing to the extra drag of the water flow caused by the marsh vegetation in this region.

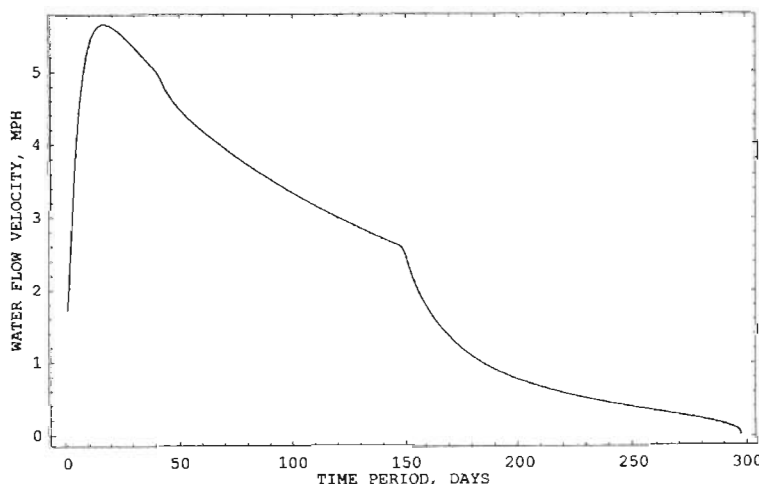
Next, Fig. 6 displays the mean water flow velocity within the 40-mile wide channel at its confluence with the Persian Gulf, which peaks on day 15 and which has fully receded by day 300. These depth and flow velocity parameters at the confluence are particularly important since they control the time-changing rate of water drainage, and this quantity taken in balance with the time-dependent water influx determines the water retention dynamics, i.e., how long it takes for the flood waters to recede.

Figures 5 and 6 both indicate that the floodwaters receded by approximately day 300, a time conformable with Gen. 8:12-13. In fact, note the sudden downturn to zero of the velocity in Fig. 6 at day 300. This zero effect is caused by the inclusion of an evaporation term in the model. Evaporation rates on the order of 0.3 to 1.0 cm/day are known to be characteristic of desert regions like Iraq,<sup>7</sup> whereas I have determined empirically that the incorporation of the rate 0.15 cm/day (or 0.0022 inches per hour) causes the downturn specifically at about day 300, or perhaps at day 310, which is consistent with Gen. 8:13 where the ground was drying, but not yet completely dry.<sup>8</sup> It took an additional 50 days after day 314 to dry up the earth completely, bringing the day of disembarkment from the ark at day 364, or day 365 (one solar year) if both the first and last days are included (Gen. 8:14). A slightly cloudier sky condition could have produced the exact number I empirically derived. These evaporation rates may appear to be too small to matter. However, evaporation provides an absolutely critical mechanism for getting rid of the last of the water, since at shallow depths, viscous drag forces impede the ability for water to flow. Also, evaporation was needed to dry up the mud sediments, which would have extended to many feet in depth.

As inferred earlier, I am taking a somewhat empirical approach that uses certain controlling formulas to produce realistic



**Figure 5. Water Depth at the Ark Launch Point.** Benchmark case: 40 mile-wide channel at confluence with Persian Gulf.



**Figure 6. Mean Flow Velocity at the Confluence of the Flood Channel with the Persian Gulf.** Benchmark case: 40-mile wide main conduit channel.

answers. In doing so, certain physical constants must be derived from physical data. Then the calculations may be judged as to how well they predict (or conform to) natural occurrences. Normally the Manning formula is used to relate water flow velocity to the hydrological gradient, and the drag due to boundary effects along the “wetted perimeter” (the surface along which the flow stream touches). In addition to considering effects caused by boundary conditions, the “wetted perimeter” is assigned to a “constant” called the Manning roughness factor,  $n_r$ . In textbooks,  $N_r$  is “called out” (for the case of very wide channels) according to the nature of the channel surface. In turn, this calibrates the effect that drag forces create at the flow boundaries. For example, the numerical value corresponding to the desert sand for our case is  $n_r = 0.035$ .<sup>9</sup> The existence of marshes can be accounted for by increasing the value for  $n_r$ ; in fact, the need to increase  $n_r$  by a factor of 2 or 3 is not uncommon and the highest values used to fit a known physical situation reach the value of 0.4.<sup>10</sup>

As it turns out, the value of  $n_r$  can be adjusted to more generally include all of the “head-loss” factors, including eddy losses due to turbulence as well as surface drag.<sup>11</sup> This method is now sometimes used by geomorphologists in lieu of incorporating a loss term in an energy equation, such as Bernoulli’s equation. This technique is well suited to a situation where detailed data is lacking along the flow path. Based on known situations (such as flood data for particular positions), a new value for  $n_r$  may be established for that region of space. Sometimes  $n_r$  is continuously varied along the flow channel, or it may be assigned specific values characteristic of known regions. This latter scheme serves the purpose of this presentation quite well. For example, recent flood data taken in the Baghdad, Iraq region fixed the high water mark depth for the Tigris River at 23 feet when the corresponding flow velocity reached ~3.5 to 4 mph.<sup>12</sup> This measured data can be used to back out a value of  $n_r = 0.059$  for flood conditions. Interestingly, I had empirically backed out the number  $n_r = 0.06$  for the marshland region, which ideally conformed to the purpose of reconciling all of the conditions specified in Genesis. Actually, I used the number  $n_r = 0.05$  at Baghdad and  $n_r = 0.06$  in the marshland area, having increased it to account for the additional friction of the marshland vegetation. My choice of lowering  $n_r$  slightly for both regions falls within reason, given that the floodwaters were much deeper in the case of Noah’s Flood.

In any case, I find it quite remarkable that the  $n_r$  value generated from actual flood data for the Tigris River matches my value generated empirically, on the basis that it leads to physical conditions for the Flood as specified by Scripture.

## Noah’s Uphill Journey

Having developed a hydrological framework, we are now positioned to explore plausible, but not unique nor specifically correct, wind conditions that could have moved Noah’s ark from launch to final resting point, in conformance with the literal Genesis account. In review: (1) the waters quickly (within a few days) reach depths on the order of 40 ft at the launch point; (2) it rained heavily for 40 days and 40 nights, then tapered off, but continued to rain for 150 days, at which point the rain and springs ceased; (3) the waters had fully receded by day 314, and it required another 50 days for the mud to harden enough for Noah and his family to disembark.

Genesis does not indicate at what point the ark reached the region of its final destination, only that it came “to rest” in the mountains of Ararat on day 150. In any case, the dynamics allow for the ark to have reached its assumed landing area near Cizre within 40 days from launch. While the trek could have taken much longer, it is much more energy efficient to move the ark rapidly. This is because most of the “wind work” is needed simply to hold the ark in place; that is, stationary against a 6 to 8 mph water current. So in order to move the ark 380 miles in 40 days, we need add only a net 0.86 mph forward velocity to the ark, i.e., we must increase the velocity of the ark relative to the current by only ~10% as opposed to simply holding the ark stationary against the current, and in doing so the ark arrives (as computationally shown) in 36–40 days. The flow dynamics of this situation is shown in Fig. 2, which illustrates the ark, its draft upon the water, and the forces which act on it and which are needed to move it from launch to landing.

The solid line of Fig. 7 traces the water flow conditions along the actual path taken by the ark. The lower portion covers the 300 miles traveled along the alluvial plain against a hydrologic gradient of 0.00072. The curve jumps from its lower position to its upper position at the point where the ark begins its final 80-mile ascent against a gradient of 0.0017. The water flows faster along the steeper

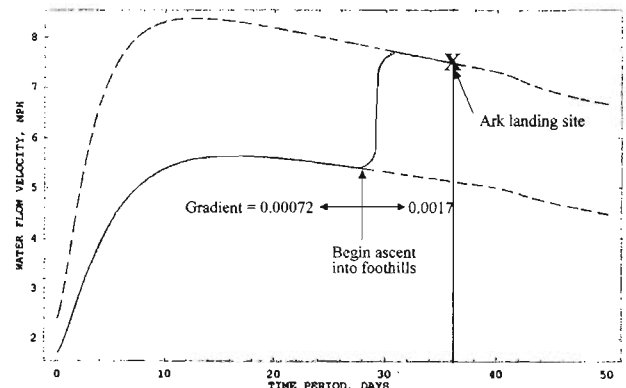


Figure 7. Water Velocity as Observed from the Ark



## Article

### *Quantitative Hydrology of Noah's Flood*

*The ark  
could have  
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given a  
least-favorable  
set of  
assumptions.*

slope, reaching almost 8.5 mph as shown. This calculation applies to our benchmark assumption where the maximum water depth is 40 ft in the alluvial plain and 30 ft deep along the steeper ascent to the foothills of the mountains of Ararat.

Figure 8 tracks the minimum wind velocity needed to move the ark upstream at a constant velocity of 0.86 mph, wherein it arrives in the mountains of Ararat in 36 days. In essence, the required wind rises to ~52 mph and must be maintained near this level for 28 days. Then the ark arrives at the point of ascent, which requires that wind conditions near 70 mph be sustained for another six days in order to negotiate the steeper slope. Possibly the tail end of the cyclonic storm moved by in order to provide the needed additional push.

The lower, final hump of the wind velocity curve presents a trade-off scenario, whereas only a 62-mph wind lasting six days is needed instead of a 70-mph wind; how-

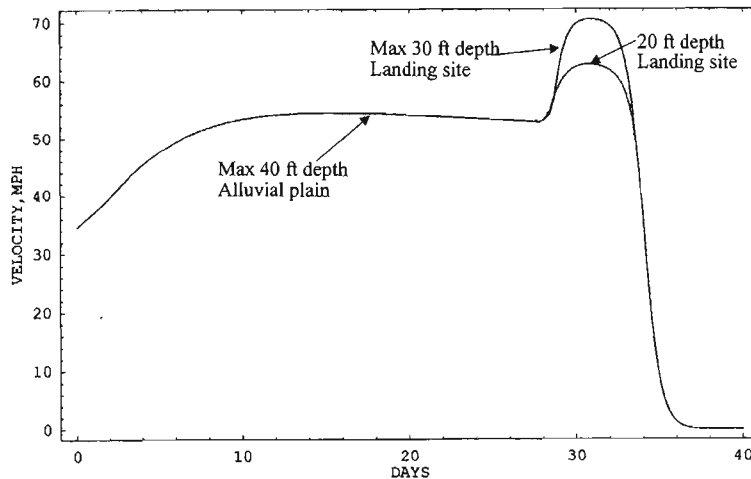
ever, these conditions reduce the maximum depth from 30 ft to 20 ft within the landing site region. The ultimate water influx distribution in the steep slope region is needed to produce this relatively shallow trade-off condition, as shown in Fig. 5, lower graph.

Winds really blow in gusts so the needed velocity over time displayed in Fig. 8 actually corresponds to the "root mean square" of the gust velocities. Figure 8 is intended to prove feasibility for my hypothesis—that is, that the ark could have been blown upstream, given a least-favorable set of assumptions.

Finally, let us compare the ease of moving an ark upstream given differing assumptions for its weight, and the choice of definition for the length of a cubit. Although more formidable winds are required to move a 20-million-pound ark (with a correspondingly smaller draft) upstream, even these winds fall well within the range of a great hurricane.

It is interesting to note that, if a Mesopotamian cubit of about a half a meter is used (1 cubit = 21.6 inches), then the winds required to move even a 20-million-pound ark become markedly reduced (Table 2). And, it is probably likely that the Mesopotamian cubit was referred to in Gen. 6:15 because that was the value used in the time frame of Noah (~2500 BC).<sup>13</sup>

A question remains: If the ark did reach the region of its final destination in only 36–40 days, what then held it from slipping back downstream during the remaining 110 days until Gen. 8:4 tells us that "the ark rested on the seventh month, seventeenth day on the mountains of Ararat" (day 150)? Perhaps the ark floated around the backwaters of the Cizre basin outside the steep-



**Figure 8. Minimum Wind Velocity over Time Needed to Move the Ark from Launch to Landing Point in 36 Days for the Case of a 5 ft Draft**

**Table 2.**

Scenario	Weight, Draft	Maximum wind Shallow gradient	Maximum wind Steep gradient
<b>Case A</b> (18" cubit)	Weight = 10 million lbs Draft = 5 feet	54 mph	70 mph
<b>Case B</b> (18" cubit)	Weight = 15 million lbs Draft = 7.5 feet	68 mph	90 mph
<b>Case C</b> (18" cubit)	Weight = 20 million lbs Draft = 10 feet	86 mph	118 mph
<b>Case D</b> (21.6" cubit)	Weight = 20 million lbs Draft = 6.6 feet	59 mph	85 mph

gradient current flow, similar to when water has stayed backed up for months in the Mississippi hydrologic basin.<sup>14</sup>

## Conclusions

In conclusion, I have presented one of any number of possible formulations of conditions, backed up by plausible calculations that verify that a local flood could have occurred within the framework of known physical parameters in the Mesopotamian region. That is, these events can potentially be viewed as "nature miracles" in light of a literal reading of Genesis.

I have also modeled one of any number of possible scenarios that can feasibly account for how Noah's ark could have been blown upstream into the foothills of the mountains of Ararat against the floodwater current. This possibility refutes the standard Young Earth Creationist

argument that a universal flood is inevitable because the ark would have been floated down to the Persian Gulf by the flood current. Had a more complete model, which included wave action and wind shear effects, been included in the analysis, the rainfall and wind velocity requirements could have been shown to be even less stringent than the values shown here. ☼

## Acknowledgments

I thank Larry Hill of Los Alamos National Labs for insightful technical discussions, Carol Hill for reviewing the manuscript and for developing an enormous base of information on which this paper stands; also Robert Cushman and Phil Metzger for helpful corrections to this article.

## Appendix

An abbreviated outline of the mathematical model used to generate the data contained in this paper will be given here. Formula derivations are omitted because such a level of detail is inappropriate for this journal. It is hoped, however, that a certain level of credibility is established for the more technically minded reader.<sup>15</sup>

First, several general functions have been composed that input the time varying rates of rainfall and spring output uniformly over each of three differing regions on the flood plain. These regions pertain to: (1) the marshland region at the confluence of the Tigris River with the Persian Gulf, (2) the alluvial plain, and (3) the steeper gradient region leading into the foothills of the mountains of Ararat. See Fig. 1 for a geometrical diagram of all three areas.

The equations controlling the rates of rainwater and spring water, respectively, are:

$$f_1(t) = n_{rain} \left( \left( \left( 1 - e^{-\frac{t}{\tau_1}} \right) e^{-\frac{t}{\tau_2}} (0.25)(1 - \tanh[t - 41]) + 1.20 \right) \times (1 - \tanh[t - 150]) \right) e^{-\frac{t}{\tau_3}} \quad [1]$$

$$f_2(t) = 0.5 (1 + \tanh[t]) \left( n_{spring} e^{-\frac{1}{\tau_4}} (1 - \tanh[t - 149]) \right) \quad [2]$$

Figure 3 (p. 135) plots particular solutions to equations [1] and [2]. Equations [1] and [2] may be adjusted to develop any desired distribution by modifying the time constants  $\tau_1$ ,  $\tau_2$ ,  $\tau_3$ , and  $\tau_4$  and by selecting appropriate peak value levels. The hyperbolic tangent function is liberally used throughout the various derivations to round off instantaneous changes of slope, which otherwise cause singularities that plague convergence of the differential equations involved.

Next, the rate of total water volume falling upon the reservoir (or a specific region therein) is simply:

$$Vol_{tot}(t) / day = [(f_1[t] + f_2[t]) \times 0.5 \times (r_5^2 - r_1^2) \times 5280^2] \quad [3]$$

In preparation for solving the master continuity equation, a hydrodynamic slope function must be specified:

$$slope(r) = slope1 - (slope1 - slope2) \tanh[r - r_2] \quad [4]$$

which automatically switches the gradient where the boundary separating the alluvial plain from the foothills is crossed.

Next, equations [5] through [7] further specify boundary conditions that geometrically constrain the solutions. The initial conditions volume  $Vol = 0$  at time  $\tau = 0$ , and depth  $z = 0$  at  $\tau = 0$ , are also imposed.

$$w_{(r_5)} = 2 \times r_5 \times \tan[\theta_2] \times 5280 \quad [5]$$

$$SurfAreaChan = \frac{1}{2} \times \tan[\theta_1] \times (r_5^2 - r_1^2) \times 5280^2 \quad [6]$$

$$volCh = z_{ch} \times SurfAreaChan \quad [7]$$

Constraints and input conditions expressed in equations [1] through [7] are incorporated into the master continuity equation [8]:

$$\frac{\partial Vol(\tau)}{\partial \tau} = \frac{1}{2} \times (f_1(t) + f_2(t)) \times 2\theta_1 \times (r_5^2 - r_1^2) \times 5280^2 - w(r) \times \eta \times (24 \times 3600) \times$$

$$\left( \text{if } Vol(t) \geq volCh, \text{ then } z(t) = z_{ch} + \frac{Vol(t) - volCh}{SurfAreaRegion}, \text{ else } z(t) = \frac{Vol(t)}{SurfAreaChan} \right)^{\frac{5}{3}} \quad [8]$$

Then, the continuity equation [8] is solved simultaneously with the depth equation [9], the Manning equations [10] and [11] and the rate of volume change versus volume, equation [12], which are:

$$z(t) = \left( \frac{(2 \times f_1(t) + f_2(t) - evap) \times \frac{1}{2} \times \theta_1 \times (r_5^2 - r_1^2) \times 5280^2 - \frac{\partial Vol(t)}{\partial t}}{w(t) \times \eta \times (24 \times 3600)} \right)^{\frac{3}{5}} \quad [9]$$

$$vel(t) = \eta \times (z(t))^{\frac{2}{3}} \quad [10]$$

$$\eta = \frac{1.49}{\eta_r} \times \sqrt{slope(r)} \quad [11]$$

$$\frac{\partial V_{(t)}}{\partial t} = -2\eta \left(\frac{4}{3}\right) \frac{\sqrt{V_{water(t)}}}{3 \times 32} \quad [12]$$

The continuity equation [8] is a highly nonlinear first-order differential equation that contains both independent and dependent variables as its driving functions. Fortunately, the powerful Mathematica Code yields a numerical time-dependent solutions to these equations. Note also in [8] that Mathematica can process logical operations built right into equations as they are being solved.

The equations [10] and [11] are the primary drivers that contain the total "head losses," due both to turbulence and surface drag phenomenon. Careful adjustment of the Manning Roughness Factor, inserted into equation [11], is incorporated to simulate the head-loss effect, and has been extracted from (wherever possible) physical data known for the Mesopotamian region. Note the functional dependence and that the water velocity  $v$  scales as the depth  $z^{(2/3)}$  from equation [10].

The travel time from the launch point to the foothills and then from the foothills to the arrival point is given by equations [13] and [14], respectively, and typically amounts to 26 days plus 8 days, respectively, if the ark is specified to move at a constant velocity  $v_{ship} = 0.86$  mph.

$$Travel \text{ to Foothills} = \frac{r_5 - r_3}{v_{ship} \times 0.678 \times 24} \quad [13]$$

$$Travel \text{ Foothills to End} = \frac{r_2 - r_1}{v_{ship} \times 0.678 \times 24} \quad [14]$$

Finally, the four equations [15], [16], [17], and [18] controlling the motion of the ark are:

$$\text{windwork } 2(t) = \frac{1}{2} \times \rho_{\text{air}} \times f_w \times [wv(t) - v_{\text{ship}}]^2 \times S_1 \quad [15]$$

$$\text{viscuswork } 2(t) = \frac{1}{2} \times c_d \times \rho_{\text{water}} \times (v_{\text{ship}} - (-vel[t]))^2 \times v_{\text{ship}} \times S_2 \quad [16]$$

$$\text{liftwork } 2(t) = mg \times v_{\text{ship}} \text{ slope} \quad [17]$$

$$\text{windwork } 2(t) = \text{viscuswork } 2(t) + \text{liftwork } 2(t) \quad [18]$$

Equation [18] simply balances all of the horizontal forces on the ark, where  $wv(t)$  is the wind velocity,  $v_{\text{ship}}$  is the ship velocity,  $c_d$  is the drag coefficient (0.04),  $\rho_{\text{air}}$  = the air density,  $\rho_{\text{water}}$  = the water density,  $S_1$  and  $S_2$  are the frontal ark submerged area and rear areas above the water line, respectively.

Finally, a factor  $f$  is designated to adjust the value of air density for its water content. It can be shown that:

$$f = \frac{\rho_{\text{net}}}{\rho_{\text{air}}} = 1 + 0.222 \times \frac{n_{\text{in}}}{v_{\text{waterVert}}} \quad [19]$$

where  $n_{\text{in}}$  is the rainfall in inches/hour, and  $v_{\text{waterVert}}$  is the rainfall vertical velocity component in inches/second.

The rainfall velocity depends on droplet size, and the bottom line is that this calculation depends on unknown factors. It does appear that  $f$  must be very near unity, as will be assumed in the data presented here. Its presence remains as a flag for future work.

Finally, the computer is asked to solve equations [15], [16], [17], and [18] simultaneously for the time dependant value of wind velocity. Its solution is plotted in Fig. 8 for two cases of interest.

The output of this solution for the final result was generated by Mathematica software. Since the complex formulation would be of no use to the reader, it is omitted here. Note also that the formulas presented in this Appendix have been stripped of computer syntax for simplicity of understanding, and cannot be directly inputted into Mathematica as shown.

## Notes

<sup>1</sup>C. A. Hill, "The Noahian Flood: Universal or Local?" *Perspectives on Science and Christian Faith* 54, no. 3 (2002): 170–83.

<sup>2</sup>C. A. Hill, "Quantitative Hydrology of Noah's Flood," *Perspectives on Science and Christian Faith* 58, no. 2 (2006): 120–9.

<sup>3</sup>P. Johnstone, *The Sea Craft of Prehistory* (Cambridge: Harvard University Press, 1980); M. C. DeGraeve, *The Ships of the Ancient Near East* (c. 2000–500 BC) (Lewen: Department Orientalistich, 1981); L. Casson, *Ships and Seafaring in Ancient Times* (Austin: University of Texas Press, 1994); G. F. Bass, "Sea and River Craft in the Ancient Near East," in *Civilization of the Ancient Near East* 3, ed. J. M. Sasson (New York: Charles Scribner's, 1995), 1421–31.

<sup>4</sup>L. D. Landau and E. M. Lifshitz, *Fluid Mechanics, Course of Theoretical Physics* 6 (Oxford: Pergamon Press, 1959); C. E. Fröberg, *Introduction to Numerical Analysis* (Reading MS: Addison-Wesley, 1969); S. Humphries, *Field Solutions on Computers* (New York: CRC Press, 1998).

<sup>5</sup>The Mesopotamian cubit was somewhat larger than the 18 inch cubit mentioned in the King James Version of the Bible. Circa 2500 BC, the Babylonian cubit was about 20 inches and the Egyptian cubit was about 25 inches; J. C. Warren, *The Early Weights and Measures of Mankind* (London: Committee of the Palestine Exploration Fund, 1913), 10–11.

<sup>6</sup>S. F. Hoerner, *Fluid-Dynamic Drag* (Midland Park, NJ: published by the author, 1965) inseq. pages.

<sup>7</sup>A. P. Schick, "Hydrologic Aspects of Floods in Extreme Arid Environments," in *Flood Geomorphology*, eds. V. R. Baker, R. C. Kochel, and P. C. Patton (New York: John Wiley, 1988), 193.

<sup>8</sup>C. A. Hill, "The Noahian Flood," 171, table 1.

<sup>9</sup>V. L. Streeter, *Fluid Mechanics* (New York: McGraw-Hill, 1958), 176.

<sup>10</sup>G. P. Williams, "Paleofluvial Estimates from Dimensions of Former Channels and Meanders," in *Flood Geomorphology*, 326–7.

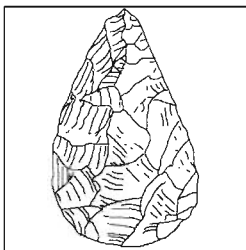
<sup>11</sup>V. T. Chow, *Open-Channel Hydraulics* (New York: McGraw-Hill, 1959), 217; J. E. O'Connor and R. H. Webb, "Hydraulic Modeling for Paleoflow Analysis," in *Flood Geomorphology*, 394.

<sup>12</sup>H. F. Vos, *Beginnings in Bible Geography* (Chicago: Moody Press, 1973), 13.

<sup>13</sup>J. Friberg, "Numbers and Measures in the Earliest Written Records," *Scientific American* 250, no. 2 (1984): 110–8.

<sup>14</sup>K. K. Hirschboeck, "Catastrophic Flooding and Atmospheric Circulation Anomalies," ed. R. Mayer and D. Nash, *Catastrophic Floods* (Boston: Allen and Unwin, 1987), 46.

<sup>15</sup>Basic references used for the hydrodynamic equations in the Appendix are: P. D. Patel and T. G. Theofanous, "Hydrodynamic Fragmentation of Drops," *Journal of Fluid Mechanics* 103 (1981): 207–23; A. A. Ranger and J. A. Nicholls, "Aerodynamic Shattering of Liquid Drops," *AIChE Journal* 7 (1969): 285–90; E. Y. Harper, G. W. Grube and I. D. Chang, "On the Breakup of Accelerating Liquid Drops," *Journal of Fluid Mechanics* 52 (1972): 565–91; Advisory Council on Scientific Research and Technical Development, "The Shape and Acceleration of a Drop in a High-Speed Air Stream," *Publication of ACSRTD*, no. 50 (1949): 457–64.



## Communication

*The Dilemma Posed by The Wee People*

# The Dilemma Posed by the Wee People

Glenn R. Morton



Glenn R. Morton

*A new anthropological discovery casts serious doubt on [an] old, but still widespread, apologetical view that hangs humanity from the framework of a H. sapiens skeleton or a human cranial capacity.*

One of the most widely held apologetical positions within conservative old-earth-believing Christian circles is that advanced by Ross,<sup>1</sup> Wilcox,<sup>2</sup> Maatman,<sup>3</sup> Wiester,<sup>4</sup> and Davis and Kenyon.<sup>5</sup> Broadly speaking, these views hold that Adam was *Homo sapiens*, was created late in hominid history, and most hold that *H. sapiens* was not genetically connected with the ancient hominids.<sup>6</sup> Davis and Kenyon state this position well when they say:

Design adherents, however, regard *Homo erectus*, as well as the other hominids discussed in this section, as little more than apes, and point instead to the abrupt appearance of the culture and patterns of behavior which distinguish man from the apes.<sup>7</sup>

Wiester echoes this sentiment when he says:

I believe we can dismiss *Homo habilis* and *Homo erectus* as likely candidates for Adam and Eve. For one thing science is not certain whether they led to *Homo sapiens* at all. They may have become extinct. Furthermore, the present fossil evidence does not indicate they possessed those traits that we consider uniquely human.<sup>8</sup>

A new anthropological discovery casts serious doubt on this old, but still widespread, apologetical view that hangs humanity from the framework of a *H. sapiens* skeleton or a human cranial capacity. The discovery was announced in two articles in

the Oct. 28, 2004 issue of *Nature*.<sup>9</sup> These articles describe the morphology and cultural artifacts of a small descendant of *H. erectus*, which was found on the island of Flores, Indonesia, in the Liang Bua cave. The species has been termed *H. floresiensis*. It is extremely unusual. These people stood three feet tall and would have weighed (as an adult) a mere 35–55 lb. (16–25 kg). By comparison, Lucy, the famous *Australopithecus*, stood 3'6" and weighed 62 lb. (28 kg). *H. floresiensis*' brain size was 380 cc compared with *Australopithecus*' brain size of 430–530 cc. Living on an island which lacked predators, these descendants of *H. erectus* shrank in size. Amazingly, they lived merely 20,000 years ago, and some legends about these people have them still living in caves on Flores, when the Dutch arrived in Indonesia, in the 1520s, raising the intriguing possibility that we might someday find some of these people alive (a comparison photo can be found on the Internet<sup>10</sup>).

There is little doubt that this fossil is a new species. Some have argued that the creature is a microcephalic human but this theory has been stretched to the limit because as of October 2005, nine diminutive hominids had been found in the cave spanning a time of 3,000 years.<sup>11</sup> As one researcher said: "You can't have a colony of microcephalics going through time ... That's crazy."<sup>12</sup>

Secondly, it is unlikely that this creature is human. It shares many morphological features with *H. erectus* which we *H. sapiens* lack. It has no chin. There is a deep fissure separating the mastoid process from the petrous crest of the tympanic, a double mental foramina, and an erectine parietal contour, a recess between the tympanic plate and the entoglenoid pyramid. All are traits that humans lack (or are very rare) and are common traits belonging to *H. erectus*. After a scan of the brain, Falk, et al. concluded that

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they were either descended from *H. erectus* or an earlier hominid. But the morphological connection seems clear, these are descendants of *H. erectus* or of an earlier hominid and that seems to have theological implications.

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*It is unlikely that this creature is human. It shares many morphological features with H. erectus which we H. sapiens lack.*

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The theological problem presented by this tiny hominid lies in the archaeology and its small brain. *H. floresiensis* has a brain which is only 400 gm (approximately 380 cc). This is the size of a chimpanzee brain and smaller than many Australopithecine brains. One would be tempted to say this was theologically an ape save for the fact that, while controversial, this creature appears to have made stone tools, hafted them onto sticks, hunted pygmy elephants, and indeed controlled fire, as is evidenced by the charred bones of the prey. The tools are very well crafted and quite small, as would be expected from creatures of this size.

These small-brained hominids clearly pass a test for moral accountability which was outlined in an earlier paper.<sup>13</sup> Basically this test merely says that any creature which is capable of engaging in complex cultural activities which require planning for future consequences are also quite capable of understanding moral imperatives, like "Thou shalt not steal." Their use of fire clearly shows an intelligence and concept of the future far beyond that of the chimpanzee. In order to maintain a fire, one must know how to start a fire, know how to tell when the present store of wood will be burned up, know when it is time to go get more wood, remember where there is good dry wood (green wood burns poorly), and know how to properly space the logs for correct burning. And while cooking food, the fire-maker must understand other mental steps: to know how far from the flames the food must be for proper cooking without burning and to know how to use a tool (like a spit) to maintain that distance. Such intelligence is capable of understanding moral imperatives. This view that the image of God lies in our ability to make moral choices is consistent with the views of Jonathan Edwards, some Wesleyan traditions, and some in Judaism.<sup>14</sup>

What is more interesting is the evidence, both physical and legendary, for language among these people. The cranial base is flexed. This is an important indicator of language according to anthropologists. Schepartz notes:

Steinheim, Kabwe, and several Upper Paleolithic crania are more similar to modern adult humans in their degree of basicranial flexion, implying greater speech capabilities than Neanderthals.<sup>15</sup>

As an aside, I would note that the La Ferrassie Neanderthal had a greater basicranial flexion than modern humans.

Those who excavated the site also believe that this hominid possessed a language. This is due to the complex activities uncovered by the excavation. Connor and Keys write:

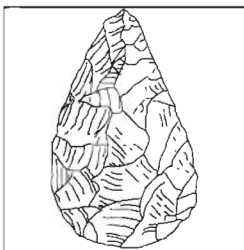
They were the height of a three-year-old child, weighed around 25 kilos [4 stone] and had a brain that was smaller than that of most chimpanzees. Even so, they used fire, made stone tools and hunted stegadon—a primitive type of elephant—and giant rats. "We believe their ancestors may have reached the island in bamboo rafts. The clear implication is, despite tiny brains, these little humans were intelligent and almost certainly had language," Professor Morwood said.<sup>16</sup>

And legends abound in the Malay Archipelago of sightings of the *ebu gogo*, a dwarf who would eat everything and anything as late as the time the Dutch arrived. The legends say that this creature spoke and lived in caves.

Theologically, this discovery is problematic for the most widespread apologetical view. Here we have a creature who is not descended from *H. sapiens* but from *H. erectus*, who appears to have engaged in the same complex cultural activities humans engage in, and who appears to have had a language, often thought to be the mark of humanity. While we, *H. sapiens*, are also a direct descendant of *H. erectus*, we are descended from an African lineage, and they from a Javan lineage, making us sister species with our earliest common ancestor living somewhere around two million years ago. Yet, it appears that both species engage in the same kind of behavior—making fire, making stone tools, and even speech. The implication of this discovery for apologetics, in particular for the way Christians treat the hominids, are huge.

Wiester suggests that brain size may be used to qualify a being as *H. sapiens*.<sup>17</sup> But this limitation ignores intelligent people, leading normal lives in our society, who have very small brains. John Lorber, years ago, documented that some people with very tiny brains were both socially and intellectually normal. He cited the case of one socially normal, honors math student at Sheffield University in England, who had only a millimeter of brain encrusting the inside of his skull. The rest of his skull was full of water. By my calculations, this man had the same brain size as that of a rhesus monkey, 108 cc. Lewin writes:

"There's a young student at this university," says Lorber, "who has an IQ of 126, has gained a first-class honors degree in mathematics, and is socially



*Unfortunately,  
now a  
widespread  
anthropological  
apologetic  
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observational  
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There is also  
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that many  
will not change  
their views  
even in the  
light of this  
discovery.*

## Communication

### *The Dilemma Posed by The Wee People*

completely normal. And yet the boy has virtually no brain ...

"I cannot say whether the mathematics student has a brain weighing 50 grams or 150 grams, but it's clear that it is nowhere near the normal 1.5 kilograms, and much of the brain he does have is in the more primitive deep structures that are relatively spared in hydrocephalus."<sup>18</sup>

From these data alone, Christians should have divorced our definition of humanity from brain size; then we would have been prepared for the Liang Bua discovery. Unfortunately, now a widespread anthropological apologetic is being falsified by observational data. The result is that Christians again will lose more credibility. There is also every expectation that many will not change their views even in the light of this discovery.

Are they human? Yes. Alan Turing presented his Turing test to determine whether an artificially intelligent computer had been created. The test is this: If normal humans interacting with the computer cannot tell the difference between the responses of a computer and the responses of another human, then the computer must be considered to be intelligent. This is a behavioral definition of AI. But this type of test also applies to the Liang Bua people. The only way we have of determining who is spiritually aware and who is not is based upon their behavior. While we cannot definitely claim that the Liang Bua people had a religion (some modern humans, like the Ona of Tierra del Fuego, have no religion<sup>19</sup>), in all other respects they seem to have behaved like us. And therein lies the problem.

What do we do if we actually find one of these creatures? As Desmond Morris asked in a recent article:

If an explorer brought back one of their infants to study, would you put him down for Eton or the Zoo?

If he died, would he be buried in consecrated ground or a pet cemetery?

His very existence among us would make us question all over again what it is to be human.<sup>20</sup>

## Theological Hobson's Choices

The views of many old-earth and young-earth apologists have always rejected any humanity for the Australopithecines. But if a creature as different from us as *H. floresiensis* engages in human activities, how can we reject them from the status of human? And, looking back to the early hominids, the question arises about the status of other human-acting creatures whose stature, weight, and brain-size is *smaller* than *Australopithecus*. Given this, how can we automatically claim that the brain size of *Australopithecus* excludes him from humanity?

We have four choices as I see it:

1. Acknowledge, as I have argued,<sup>21</sup> that humanity is much older than we have heretofore been comfortable accepting. In other words, include *H. erectus* within the human family. Since humans and the Liang Bua people do the same things, acknowledge the fact that our common ancestor (*H. erectus*) was also spiritually aware and thus move Adam way back in time. In this case, we should send them all to Eton, as Morris suggests. But many apologists and Christians have been loathe to accept that small-brained Australopithecines or erectines could share the image of God with us. *H. floresiensis* pulls the rug out from under that argument. This seems to be the best approach to match observation with an apologetic that has a modicum of concordism.

2. Claim that the Liang Bua people are just fancy animals, meaning that we ignore their tool making, their means of hunting, the hafting of stone points on wooden spears, their use of fire, and the likelihood of language and put them in the zoo. Besides the questionable ethics, this claim requires that we restrict the image of God solely to something that has no physical impact on our lives or leaves no physical trace of its presence. This seems to move God's *image* into the realm of the imaginary.

3. Accept a modification of Dick Fischer's views<sup>22</sup> in which Adam is late and is a representative for all humans, even the Liang Bua people. This would require some modifications of Fischer's views as he seems not to be favorably predisposed to having the other

hominids allowed into the human family<sup>23</sup> or having us descended from them.

4. Claim that Scripture simply is not historically accurate and says nothing about what it means to be human.

Each of these positions has its strengths and weaknesses. But it seems likely that if we exclude from humanity a person or group who does all the things we do, from making stone tools, to fire, to speaking, then we are no different from the nineteenth-century polygenists, like Jean Bory St. Vincent, who, in 1825, claimed as many as fifteen species of modern humans, only one of which was descended from the biblical Adam. There should be no reason to repeat the mistakes of the past, although the most widespread of the intelligent design views of anthropology has already committed that error, even before the advent of *H. floresiensis* by ignoring the abundant evidence of human-like activity among hominids, like *Australopithecus*, *habilis*, *erectus*, and Neanderthal, all of whom made and/or recognized art, and controlled fire. ☼

## Notes

<sup>1</sup>Hugh Ross, *The Genesis Question* (Colorado Springs, CO: NavPress, 2001), 56; see also Fazale Rana and Hugh Ross, *Who was Adam?* (Colorado Springs, CO: NavPress, 2005), 178, 196 where they reject *H. erectus* on the basis of their stone tools and liken Neanderthals to monkeys.

<sup>2</sup>David L. Wilcox, "Adam Where Are You? Changing Paradigms in Paleoanthropology," *PSCF* 48, no. 2 (1996): 88–96; David L. Wilcox, "Establishing Adam," *PSCF* 56, no. 1 (2004): 49–54, esp. p. 52.

<sup>3</sup>Russell Maatman, *The Impact of Evolutionary Thought: A Christian View* (Sioux Center, IA: Dordt College Press, 1993), 119.

<sup>4</sup>John Wiester, *The Genesis Connection* (Nashville, TN: Thomas Nelson Publishers, 1983), 165.

<sup>5</sup>Percival Davis and Dean Kenyon, *Of Pandas and People* (Dallas, TX: Houghton Publishing Co., 1993), 110–3.

<sup>6</sup>Among those listed, only Wilcox appears to believe that humans are genetically related to *H. erectus*.

<sup>7</sup>*Ibid.*, 112.

<sup>8</sup>Wiester, *The Genesis Connection*, 188.

<sup>9</sup>P. Brown, et al., "A New Small-Bodied Hominin from the Late Pleistocene of Flores, Indonesia," *Nature* 431 (2004): 1055–61; M. J. Morwood, et al., "Archaeology and Age of a New Hominin from Flores in Eastern Indonesia," *Nature* 431 (2004): 1087–91.

<sup>10</sup>A comparison photo between *H. floresiensis* and *H. sapiens* can be seen at [www.talkorigins.org/faqs/homs/floressapiens.jpg](http://www.talkorigins.org/faqs/homs/floressapiens.jpg)

<sup>11</sup>M. J. Morwood, et al., "Further Evidence for Small-Bodied Hominins from the Late Pleistocene of Flores, Indonesia," *Nature* 437 (2005): 1012–8.

<sup>12</sup>Rex Dalton, "More Evidence for Hobbit Unearthed As Diggers Are Refused Access to Cave," *Nature* 437 (2005): 934–5.

<sup>13</sup>G. R. Morton, "Planning Ahead: Requirement for Moral Accountability," *PSCF* 51, no. 3 (1999): 176–9.

<sup>14</sup>See the Articles of the Wesleyan Methodist Church of Australia. Article 110 says: "We believe that humanity's creation in the image of God included ability to choose between right and wrong" [www.australian.wesleyan.org.au/article8.htm](http://www.australian.wesleyan.org.au/article8.htm); Jonathan Edwards apparently held a similar view of the image of God: [www.jonathanedwards.com/text/FoW/Part%20I%20Definition%20of%20Terms/1.5.htm](http://www.jonathanedwards.com/text/FoW/Part%20I%20Definition%20of%20Terms/1.5.htm). See also [http://judaism.about.com/library/3\\_askrabbi\\_o/bl\\_simmons\\_murder.htm](http://judaism.about.com/library/3_askrabbi_o/bl_simmons_murder.htm) which says: "The image of God means that we have the ability to choose."

<sup>15</sup>L. A. Schepartz, "Language and Modern Human Origins," *Yearbook of Physical Anthropology* 36 (1993): 91–126, 105.

<sup>16</sup>Steve Connor and David Keys, "The 3-ft-tall 'Hobbit' That Rewrites the History of Mankind," *The Independent* (UK), 28 October 2004 [http://news.independent.co.uk/world/science\\_technology/story.jsp?story=576797](http://news.independent.co.uk/world/science_technology/story.jsp?story=576797) Accessed October 28, 2004.

<sup>17</sup>Wiester, *The Genesis Connection*, 178.

<sup>18</sup>Roger Lewin, "Is your Brain Really Necessary?" *Science* 210 (1980): 1232, 1233; see also John Lorber, "Hydranencephaly with Normal Development," *Developmental Medicine and Child Neurology* 7 (1965): 628–33.

<sup>19</sup>E. Lucas Bridges, *The Uttermost Part of the Earth* (New York: Dutton, 1949), 429.

<sup>20</sup>Desmond Morris, "Eton or the Zoo?" BBC News, Friday, 29 October 2004, <http://news.bbc.co.uk/1/hi/magazine/3964579.stm> Accessed November 5, 2004.

<sup>21</sup>G. R. Morton, "The Mediterranean Flood," *PSCF* 49, no. 4 (1997): 238–51; G. R. Morton, "Dating Adam," *PSCF* 51, no. 2 (1999): 87–97; G. R. Morton, "Neanderthal/Human Hybrid," *PSCF* 51, no. 3 (1999): 145; G. R. Morton, "Planning Ahead: Requirement for Moral Accountability," *PSCF* 51, no. 3 (1999): 176–9; G. R. Morton, *Adam, Apes and Anthropology* (Spring, TX: DMD Publishing Co., 1997).

<sup>22</sup>Dick Fischer, *The Origins* (Lima, OH: Fairway Press, 1996).

<sup>23</sup>*Ibid.*, 27.

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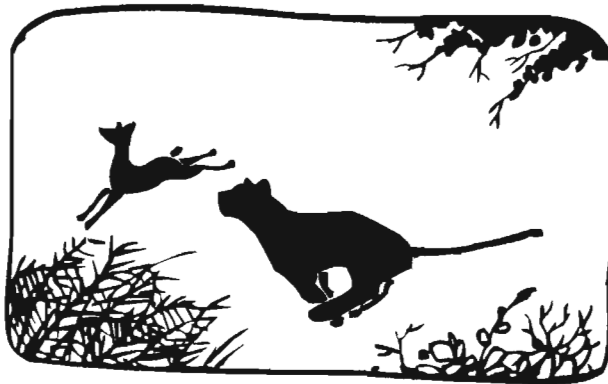
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## Did Animals Die before the Fall?

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**O**ne profound difference between old- and young-earth creationists<sup>1</sup> is the question of animal death before the creation of Adam and Eve. Old-earth creationists believe that the vast majority of the geologic record depicts earth history prior to the appearance of humans, and that this record is replete with evidence of animal death before humans existed.

Young-earth creationists, on the other hand, attribute signs of death in the fossil record to Noah's Flood (for the most part), which is post-Adamic. They reason that animal death is part of the curse, so animals could not have died before Adam sinned.<sup>2</sup> James Stambaugh writes: "Those who accept the Bible believe that death is a punishment for sin; death must have come into existence *after* Adam fell."<sup>3</sup> Likewise Mark Van Bebber and Paul Taylor argue: "Because animals did not die until after Adam's sin, the fossils are evidence of death *after* Adam's sin, not before."<sup>4</sup>

For John D. Morris, nothing less than the Christian faith hinges upon the question of death before the Fall.

If death existed before Adam, then death is not the penalty for sin. How, then, did Christ's death pay the penalty for our sin? If death is not tied to Adam's sin, then life is not tied to Christ's death and resurrection, and the Christian faith is nothing.<sup>5</sup>

The idea that animals died before the Fall is abhorrent to young-earth creationists. Van Bebber and Taylor state:

Thus, the Progressive Creation [old-earth] scenario involves a process of elimination, death by fang and claw—cold and unmerciful to the weak. Could even a sadist think of a more cruel and ugly way to pro-

duce the animals over which Adam was to rule? What a horrible thing to accuse Jesus Christ of doing!<sup>6</sup>

These arguments sound plausible, but they break down upon closer scrutiny.

To wit, suppose just for the sake of argument we agree that Adam's sin is the direct cause of animal death. Even this premise does not establish a logical necessity that death chronologically followed his act of sinning. Death could have been imputed to animals prior to Adam's disobedience. Here is why. In essence, those who affirm that death in the animal kingdom flowed chronologically from Adam's sin reason as follows:

First premise: Adam's sin (the cause) resulted in death in the animal kingdom (the effect);

Second premise: An effect must follow chronologically from its cause;

Therefore: Death came after Adam sinned, not before.

Conclusion: Animals that existed before Adam sinned did not die.

A syllogism of the above form is necessarily correct if both premises are correct. That is, if one accepts the premises as true, then one must also accept the conclusion as true.

Now, consider a parallel argument:

First premise: Jesus's sacrifice (the cause) resulted in salvation for humanity (the effect);

Second premise: An effect must follow chronologically from its cause;

Therefore: Salvation came after Jesus's death, not before.

Conclusion: Humans that existed before Jesus's death were not saved.

But the second argument must be rejected, based upon ample biblical data that saved individuals lived before Jesus's death.<sup>7</sup> So where is the error in the syllogisms? The second premise—God's imputation of sin (or of righteousness) can precede the cause!<sup>8</sup>

These arguments stand or fall together. If one accepts the fact that God can impute Jesus's righteousness retroactively, then one must accept that God can impute Adam's sin retroactively. Conversely, if one denies that Adam's sin can be imputed retroactively, then one must deny that Jesus's righteousness can be imputed retroactively. This latter deduction, however, implies that no one existing before Jesus's death was saved; but this is a deduction both young- and old-earth creationists should reject!

Animal death before Adam's sin, therefore, presents no theological difficulty, for there is no logical prerequisite forbidding animal death before Adam's time. Concomitantly, this also means that there is no theological or moral

mandate to search for a post-Adamic event, like Noah's Flood, to explain animal death prevalent in fossils.

*If one accepts the fact that God can impute Jesus's righteousness retroactively, then one must accept that God can impute Adam's sin retroactively. Conversely, if one denies that Adam's sin can be imputed retroactively, then one must deny that Jesus's righteousness can be imputed retroactively.*

As a final point,<sup>9</sup> the original premise—that animal death is the result of Adam's sin—is unwarranted. Scripture is silent on the extent to which Adam's punishment was imputed to the rest of creation, including the death of animals. In Rom. 5:12–21, the Apostle Paul makes it clear that the sin of Adam, which resulted in death, was imputed to the rest of humanity; nothing in his discourse implies that Adam's sin affected animals. Adam is the federal head of *humanity*, not of the entire creation.<sup>10</sup>

Moreover, in Rom. 8:18–25, Paul spends ample time discussing the futility, bondage, and decay of creation as a whole, but he does not attribute this condition to Adam's sin.<sup>11</sup> Rather, it is a direct result of God's sovereign will, so creation in its entirety might be “brought into the glorious freedom of the children of God” (verse 21). Futility, bondage, and decay appear to be part of the created order. It is gratuitous, therefore, to imply that Adam's sin, in and of itself, brought these debilitating effects to the entire cosmos.<sup>12</sup>

We conclude that the claim that animals died only after the Fall lacks support. I encourage my young-earth brethren, therefore, to abandon this argument as a theological prerequisite that fossils reveal evidence of death after Adam sinned, not before.<sup>13</sup> ☪

### Notes

<sup>1</sup>I use the term “old-earth creationist” for one who believes that the earth is on the order of 4.6 billion years old. The term “young-earth creationist” represents one who believes that the earth is around 10–20 thousand years old.

<sup>2</sup>The death of plants and the death of bazillions of algae, bacteria, and protozoa before the Fall is not a problem for young-earth creationists. These entities were necessary for proper ecology of the earth. Nevertheless, although plants and animals operate on the same molecular chemistry, some young-earth creationists propose that plants do not constitute “Biblical life.” Unlike animals and humans, plants (and other living entities) do not depend upon blood, whereas for humans and for higher animal forms, the “life is in the blood” (Lev. 17:11, 14; Deut. 12:13; cp. Gen. 9:4 and Deut. 19:6). Hence, it is argued, because of the “blood solidarity” between humans and higher animal forms, Adam's sin resulted in the death of animals as well as the death of humans. See James S. Stambaugh, *Death before Sin?* Impact article # 191 (El Cajon, CA: Institute for Creation Research, 1989) Available online at [www.icr.org/index.php?module=articles&action=view&ID=295](http://www.icr.org/index.php?module=articles&action=view&ID=295).

<sup>3</sup>Stambaugh, *Death before Sin?* Stambaugh continues the same line of thinking at [www.icr.org/index.php?module=articles&action=view&ID=344](http://www.icr.org/index.php?module=articles&action=view&ID=344).

<sup>4</sup>Mark Van Bebber and Paul S. Taylor, *Creation and Time: A Report on the Progressive Creationist Book by Hugh Ross* (Gilbert, AZ: Eden Communications, 1996), 21 (emphasis theirs).

<sup>5</sup>John D. Morris, “Death before Sin” (#20011023) in *Days of Praise* (El Cajon, CA: Institute for Creation Research, 2001). Available online at [www.icr.org/index.php?module=articles&action=view&ID=18303](http://www.icr.org/index.php?module=articles&action=view&ID=18303).

<sup>6</sup>Van Bebber and Taylor, *Creation and Time*, 21, 22.

<sup>7</sup>E.g., Abraham, David, Daniel, Job, and many more (check Hebrews 11). This should also be seen in the light of Paul's discussion in Galatians 3 that the mode of salvation has remained constant throughout history. That is, God did not use one manner of salvation for Old Testament saints and another for New Testament saints. All are saved by Christ's atoning death.

<sup>8</sup>I am indebted to Robert J. Dunzweiler, late professor of systematic theology at Biblical Theological Seminary, for this insight.

<sup>9</sup>Whether one agrees or disagrees with my analysis in this and in the next paragraph, the conclusion that animals could die before the Fall still obtains.

<sup>10</sup>John Murray correctly sums up the extent of Adam's headship: “When he [Paul] says ‘entered into the world’ he refers to the beginning of sin in the human race and ‘the world’ means the sphere of human existence,” John Murray, “The Epistle to the Romans” in *The New International Commentary on the New Testament*, ed. F. F. Bruce. (Grand Rapids, MI: Eerdmans, 1965), 181.

<sup>11</sup>Some have suggested Satan's fall as the cause of the rest of creation's futility. This idea is prominent in, but not limited to, the so-called “Gap Theory.” I do not subscribe to this theory. See Douglas F. Kelly, *Creation and Change: Genesis 1.1–2.4 in the Light of Changing Scientific Paradigms* (Great Britain: Christian Focus Publications, 1997), 94–8.

<sup>12</sup>This is implied, for example, by Van Bebber and Taylor, *Creation and Time*, 46; and by Henry Morris, *The Genesis Record: A Scientific and Devotional Commentary on the Book of Beginnings* (Grand Rapids, MI: Baker Book House, 1976), 47. Here, by “world,” Morris means the entire earth. To me, Romans 8 implies that nonhuman death was part of the original created order, but it is well beyond the scope of this article to delve further into this subject.

<sup>13</sup>I thank a couple of anonymous reviewers for helpful comments.

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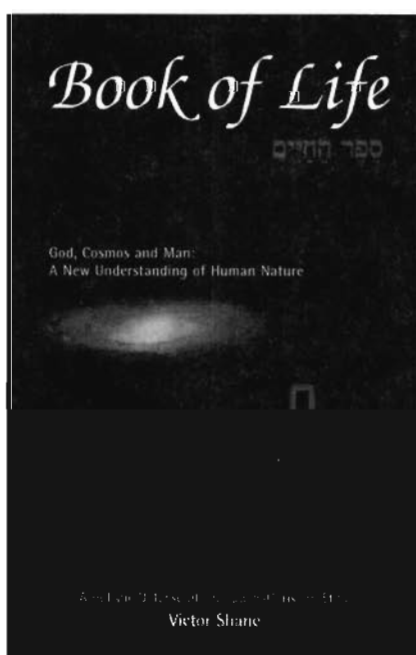
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# *Book of Life*

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

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

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

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## Book Reviews



### ETHICS

**DESIGNERS OF THE FUTURE: Who Should Make the Decisions?** by D. Gareth Jones. Oxford: Monarch Books, 2005. 256 pages. Paperback; £ 8.99. ISBN: 1854247085.

Jones is professor of anatomy at Otago University and an ethicist. In this book, he writes about a relatively recent scientific issue. The wealth of new details in this book concerns the ethics of embryonic stem cell (ESC) research, the embryo, the fetus, and designer babies. The book has a comprehensive glossary, bibliography, index, and list of scriptural references.

This book will interest readers seeking information about these topics from a Christian perspective. The author focuses on the use of new technologies at the beginning of human life and offers valuable insight into many related ethical and theological matters.

Jones thinks Christian understanding in some scientific matters is inadequate. He directs the reader away from the well-known issues involving the womb to the laboratory with its *in vitro* technology that is of very recent origin.

Jones outlines how the problem of subfertility has often been resolved through IVF (*in vitro* fertilization) technology. The author explains the procedures involved in pre-implantation genetic diagnosis (PGD). To illustrate this approach, take the example where both parents carry the gene for fibrocystic disease where the individual embryos are screened and, in the case of those carrying the mutation, eliminated. The embryo without the defective gene is implanted and the parents then have a normal child. Jones asks "In these situations are we playing God?" No! the author responds, setting out his arguments in this carefully argued treatise. Jones thinks other matters will arise in the future where society must make decisions that some might see as playing God. Foundational to Jones' thesis is that humans should exercise dominion over nature in a responsible way, seeking to enhance people's well-being.

The author explains matters involving the zygote and how the attitude of significant sections of a community may influence legislation, impeding or even preventing ESC research. Yet such research is important, Jones writes, because at Day 6 from conception there is a collection of cells, the undifferentiated Inner Cell Mass, that is capable of creating all cell lines of tissues of our bodies. In the author's view, this research may help in some clinical situations.

The theological and ethical issues associated with ESC research are staggering. Jones states that some people think the embryo is a human individual and therefore they are opposed to research on it. Other ethicists are equally adamant that the embryo is not an individual until about three weeks of age. This would allow research under some

conditions. Jones suggests that a very early embryo without any neural elements could be used in research to achieve a greater good for others.

Jones makes a significant contribution to the current assessment and the recent findings of the neurosciences regarding the brain. He says that our mental activity is embodied in brain function that can be partially elucidated by newer imaging techniques.

This is an important book. Jones advocates a role for Christians in dialogue with those whose aim is to improve the quality of life. The book includes a very useful series of questions, based on the text, which could be used in group discussions. I highly recommended this book.

*Reviewed by Ken Mickleson, Auckland, New Zealand.*

**VIEWING NEW CREATIONS WITH ANABAPTIST EYES: Ethics of Biotechnology** by Roman J. Miller, Beryl H. Brubaker, and James C. Peterson, eds. Telford, PA: Cascadia Publishing House, 2005. 295 pages, index. Paperback; \$23.95. ISBN: 1931038325.

Evangelical Christianity is frequently viewed and applied monolithically, even by Christian scholars, when relating to scientific and/or technological developments. Yet careful attention to the differing theologies and emphases within the global Christian movement reveal subtle and not so subtle differences among Christians in the sciences, engineering, and related disciplines when it comes to making sense of the world and our place within it.

This collection of carefully edited contributions from Anabaptist scholars illustrates how useful an exposition and view of a particular set of issues can be when applied consistently. The book is based on a conference held in November 2003 at Eastern Mennonite University dealing with biotechnology, and explores genetic modifications and some Anabaptist perspectives on them. It includes both a critique and a synthesis of Anabaptist views that are faithful to overarching principles within the Anabaptist tradition such as being "concerned with both effectiveness and faithfulness" and being "willing and vulnerable to step outside of societal and cultural influences by obediently following Jesus Christ."

The thirty chapters feature twenty-four contributors in genetics, molecular biology, gynecology, obstetrics, theology, ethics, biochemistry, philosophy, nursing, history of science and technology, sociology, agriculture, and law. Illustrations and photographs aid comprehension of key issues. Responses to questions from the conference audience are included. The essays, readable and accurate, provide much food for thought. Christian leaders will find useful materials to distribute and discuss with Christians in diverse settings including college classrooms, church-based discussion groups, and Christian professionals.

One of the strengths of the book is the diversity of its contributors with commitments to a distinct Christian tradition. One can hope to see more of this type of volume from Christian publishers.

*Reviewed by Dennis W. Cheek, Vice President of Education, Ewing Marion Kauffman Foundation, Kansas City, MO 64110.*



## FAITH & SCIENCE

**SCIENCE AND PROVIDENCE: God's Interaction with the World** by John C. Polkinghorne. W. Conshohocken, PA: Templeton Foundation Press, 2005. 144 pages. Paperback; \$14.95. ISBN: 1932031928.

*Science and Providence* is a classic work by Polkinghorne, one of the most influential contributors to the field of science and religion. After making several significant contributions to quantum theory while a professor at Cambridge University, Polkinghorne made a mid-career transition into the Anglican priesthood and promptly began addressing some of the most difficult questions at the interface of science and religion.

In the mid-1980s, Polkinghorne published a seminal trilogy *One World, Science and Creation*, and *Science and Providence* that established his insight into a God-ordained world. His contributions to science and religion are widely recognized, for which he has garnered many awards including the Templeton Prize in 2002.

Templeton Foundation Press has selected several influential books for re-release including *Science and Providence*. This book provides a seminal approach to one of the thorniest issues of science and religion, divine intervention in an orderly creation. A preface describes general developments within science and religion since the release of the first edition in 1988, and supplements the unchanged text with references to Polkinghorne's subsequent publications. In each of the topics, providence, miracle, evil, prayer, time, and Incarnation, Polkinghorne deftly describes a living God who strives to commune with his creation through the inherent nature of creation. Given humanity's limited knowledge of God, the description is necessarily incomplete but rings true.

Re-reading *Science and Providence* is like strolling down a memory lane with an old friend, remembering gems of the past and rediscovering themes as important now as they were in the past. Templeton Foundation Press has re-issued a classic resource and performed a valuable service for the science and religion community.

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

**TAKING FAITH SERIOUSLY** by Mary Jo Bane, Brent Coffin, and Richard Higgins, eds. Cambridge, MA: Harvard University Press, 2005. 382 pages, endnotes, bibliography, index. Hardcover; \$29.95. ISBN: 0674017102.

Bane is professor of public policy and management at Harvard University's Kennedy School of Government. Coffin is director of the Hauser Center for Nonprofit Organizations' Program on Religion and Public Life at Harvard University. Each authored a chapter in the book in addition to their work as editors. Higgins is a writer and editor who helped frame the book and put it together. This book was inspired by "The Intellectual Foundations Seminar on the Social Role of Faith-Based Organizations" sponsored by the Hauser Center at Harvard University. This seminar

was a part of a larger Hauser program to develop a deeper understanding of the social roles of the nation's "voluntary" sector.

The book consists of nine chapters that describe the multiple and subtle roles that religion plays on many levels in our nation's civic life. The opening chapter, which stands by itself in part one, provides a historical perspective by tracing the rise and influence of the Protestant civic engagement tradition in America during the eighteenth and nineteenth centuries. The eight case studies which follow are divided into two groups. Four studies, which make up part two of the book, examine religious practices and social interactions in several different settings. The first of these studies attempts to determine why Catholics are less involved than Protestants in both religious and civic activities. The next study looks at the different ways in which a cluster of black congregations in a poor Boston neighborhood try to meet the needs of their unchurched neighbors. The third case study focuses on the ways that three different Protestant churches in an affluent Boston suburb engage in moral discourse over the inclusion of gays and lesbians within their respective congregations. The final study in part two summarizes the results of a survey that was used to evaluate styles of civic engagement among Catholic parishes, liberal Protestant congregations, conservative Protestant congregations, and African American churches.

Part three presents four case studies that examine religion in larger and more diffuse settings, such as institutions and faith-based programs and movements. These studies include a look into the history of two Lutheran child-serving agencies, an examination of the roles of religion in the care for the elderly, an evaluation of four programs in Boston directed at teenage girls, and an analysis of the controversial political phenomenon known as the pro-life movement. The concluding chapter then offers two hypotheses for taking religion seriously. The first hypothesis is that "many of religion's social contributions are functionally good for our democracy" (p. 305). The second is that "the instrumental contributions that religion makes to our pluralist democracy are anchored in the intrinsic commitments of religious faith" (p. 308). These hypotheses are followed by a proposal which states that "creative initiatives to strengthen the intrinsic religious practices of faith communities will also serve the instrumental aims of helping to strengthen pluralistic civil society and participatory democracy" (p. 311).

The main argument of the book is that faith needs to be taken seriously by scholars and policy makers because of the valuable social contributions that religious organizations can offer. In making this argument, the authors take a middle-of-the-road approach between the two paradigms of "faith-based boosterism" and "dogmatic secularism." They believe that the Bush administration's political focus on faith-based social services is both dangerous and inadequate. It is dangerous, they argue, because it misrepresents the capacities of religious organizations to carry the burden of social welfare for the nation's disadvantaged citizens. It is inadequate because this narrow focus prevents secular leaders from recognizing the moral and spiritual contributions that religious organizations can provide. On the other hand, the authors believe that the dogmatic secularist approach devalues the positive effects of reli-

religious practice on democratic life. This approach, which argues for the complete separation of church and state, fails to appreciate the fact that nearly half of all social capital in America is religiously related.

This book provides a fair and thought-provoking analysis of the contributions that religious organizations can make in a pluralistic, democratic society. It is a book that deserves wide readership among church leaders, sociologists, social workers, and government officials at the local and national level. It could easily be used as a supplementary textbook in an introductory sociology or social work course at a Christian college. With forty pages of endnotes and an extensive bibliography, the book provides a wealth of information for further study. Hopefully, this book will help many secularists to acknowledge that religious faith from a Christian tradition has much to contribute to the overall health and well-being of our democratic society.

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

**READING GOD'S WORLD: The Scientific Vocation** by Angus J. L. Menuge, ed. St. Louis, MO: Concordia, 2004. 336 pages. Paperback; \$14.99. ISBN: 0758605803.

Shortly before reading this book, I had the privilege of reading *God at Work* by Gene Edward Veith, Jr., an excellent defense of the concept of vocation as a divine calling. Veith is a colleague of Menuge at the Cranach Institute at Concordia University Wisconsin.

*Reading God's World* takes the vocation of science and explains, in many wonderful ways, how it is a divine calling, both biblically and from the experience of dozens of distinguished scientists throughout history. Contributors include Peter Barker, Paul Boehlke, Edward B. Davis, Peter Harrison, Nathan Jastram, Kurt Marquart, Nancy Pearcey, William Powers, Henry Schaefer III, and Menuge, the editor, professor of philosophy at Concordia University Wisconsin. Five of the contributors work in Lutheran settings or research Lutheranism, so there is a distinctive Lutheran flavor to the book. I studied biology at Luther College (IA); I wish a book like this had been available to me when I was a student.

This book asks two questions: (1) Is science a legitimate vocation for a Christian? and (2) Is it possible to consider a calling in science as a divine calling? The authors answer both questions in the affirmative. They argue, as others have done, that Christian thinking was necessary for the development of science. This made me wonder about future prospects for science in our deeply secular and postmodern world, especially Europe.

The names of many famous scientists, faithful Christians, are mentioned, including Kepler, Boyle, and Popper. An index would help in referencing these. Also, a significant number of articles from this journal are referred to.

The chapters in this book are not balanced as to complexity and style. There is significant duplication of concepts, for example, recurring reference to Luther's ideas on vocation. However, this is common in edited books and does not distract from the high quality of the individual contributions.

The strongest theological content is in the final three chapters. I recommend reading these chapters first as a foundation for the historical and personal content of the first seven chapters.

I am reviewing this book from China, where I work in health development. I was recently able to use many of its illustrations in a recent lecture I gave on "Science and Faith." A constant challenge for me is to balance the extremist teaching of some Chinese Christians deeply suspicious of knowledge, science, and the world.

This book left me with two thoughts which I hope the authors will entertain in the future. First, this book provided lots of history, but little insight about what is happening today in science, or where science may be headed in the future. For example, while belief in the truth was a significant force to launch modern science, is it able to sustain science in the face of postmodernism? Second, science achieved significant development in non-Christian contexts, such as Arab and Chinese, but they did not prove able to sustain a scientific program. What does this teach us about the role of Christianity in the formation of Western science, and the future of science in our deeply secular world?

I highly recommend this book as an important contribution to our vocation as scientists. ASA members would be familiar with most of the concepts presented here, but this book does put together much important material in one place. Selected chapters should be required reading for undergraduate science majors to encourage them to press on in their calling. It would also be good for pastors to read sections of this book so they might better encourage their young church members to accept science as a calling from God, to balance the bias toward pastoral ministry as the only legitimate option for a young Christian with a passion for God.

*Reviewed by Mark A. Strand, Shanxi Evergreen Service, Yuci, Shanxi, China 030600.*

**WHY PSYCHOLOGY NEEDS THEOLOGY: A Radical-Reformation Perspective** by Alvin Dueck and Cameron Lee, eds. Grand Rapids, MI: Eerdmans Publishing Company, 206 pages. Paperback; \$24.00. ISBN: 0802829074.

Editors Dueck and Lee both teach in the School of Psychology at Fuller Theological Seminary. Dueck is professor of Integration of Psychology and Theology, and Lee is professor of Family Studies. This volume includes the school's 2003 Integration lectures delivered by Nancy Murphy, Fuller's Professor of Christian Philosophy. The lectures were entitled "A Radical Proposal for Integration: Psychology in Dialogue with the Ana-Baptist Tradition." This lecture series was begun in 1971 and has resulted in at least eight other volumes including one authored by Dueck himself. He delivered the lectures in 1986.

The editors have coupled Murphy's three presentations with six response chapters written by scholars who teach at Azusa Pacific, Brigham Young, the University of Texas (Austin), the University of New Mexico, Wheaton College and Fuller in the fields of clinical, counseling, and philosophical psychology as well as family life education. While all the responses include cross references to

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Murphy's lectures, the volume lacks an index—an omission that decreases the value of the volume for ongoing scholarly discussion.

Murphy's thesis is focused on three assertions: (1) the applicability of philosopher Imre Lakatos' proposal regarding research programs in science to the theology/psychology dialogue; (2) the need for psychology to study what leads to human "flourishing" rather than "instrumental adaptation"; and (3) the possibility that such psychological research could center on the value of *self-renunciation*—an Ana-Baptist Christian essential.

Lakatos's contention is that the hard core of any mature scientific research program is a construct that is basically *metaphysical*. Asserting that theology can be similarly conceived, Murphy contends that God is theology's hard core idea. Further, Murphy uses Arthur Peacocke's "hierarchy of the sciences," to contend that theology is preeminent and that each of the sciences in Peacocke's model addresses "boundary" (i.e., unanswerable) questions that arise from the discipline just below it.

This "top-down reasoning" provides a basis for Murphy to assert that psychology is essentially *ethical and value based*—it always *prescribes* and never simply *describes*. Thus, an appropriate research program for psychology would be to study how humans behave when they aspire to live by certain ethical ideals. At this point, Murphy suggests that the ideal from a Christian perspective would be grounded in the self-renunciation exemplified of Jesus. She had adopted the word "kenotic" to characterize this practice of *self-renunciation* and contends that life grounded in this approach can be studied reliably and validly. Such lives will be found to be "flourishing." The title of one of her lectures typifies this as a "Radical Reformation" approach—indicating its Ana-Baptist roots.

The most negative among the critiques of Murphy's position was written by Frank C. Richardson, professor in the Department of Educational Psychology at the University of Texas, Austin, and past president of the Division of Theoretical and Philosophical Psychology of the American Psychological Association. While he agrees with Murphy's observation that psychology is never value free, he disagrees with her objectifying of theology as if it were a natural science whose effects can be studied empirically in controlled experiments.

Richardson insists that Murphy's approach inadvertently supports claims to final truth that remain riddled with personal unacknowledged assumptions that depersonalize human life and promote liberal individualism. He advocates instead a hermeneutic that goes beyond scientism and constructionism. This approach allows for interpreting humans as "self-interpreting beings" who work out the meaning of their lives in the course of personal life-stories. They are not organisms whose behaviors are determined by genetics or social environments. Humans are, indeed, moral beings whose lives can be studied in terms of the goals they set for themselves. These go far beyond selfish instrumentalism and liberal individualism—both of which lie at the core of much methodology in contemporary social and behavioral science.

As an example of serious dialogue about integration theories that attempt to relate theology and psychology,

this volume is superlative, even if the quality of the responses is a bit spotty. Richardson's reflections are representative, however, of several essays that both affirmed the uniqueness of Murphy's thesis as well as creatively critiqued it.

The volume requires attentive reading that will stimulate all those who have investment in the religion/social-behavioral science dialogue. Physical scientists would do well to consider much of this dialogue.

*Reviewed by H. Newton Malony, Senior Professor, Graduate School of Psychology, Fuller Theological Seminary, Pasadena, CA 91101.*

**TWO GREAT TRUTHS: A New Synthesis of Scientific Naturalism and Christian Faith** by David Ray Griffin. Louisville, KY: Westminster John Knox Press, 2004. 115 pages, notes, references, index. Paperback; \$19.95. ISBN: 0664227732.

Epicurus is credited with the paradox: "Is God willing to prevent evil, but not able? Then he is impotent. Is he able, but not willing? Then he is malevolent. Is he both able and willing? Whence then is evil?" From this, the argument that God does not exist is formulated as follows: (1) If God exists, then he is omniscient, omnipotent, and perfectly good; (2) If God were omniscient, omnipotent, and perfectly good, then the world would not contain evil; (3) The world contains evil. Therefore, (4) It is not the case that God exists.

Since Newton's time, the conventional world view is that the material world consists simply of "particles hitting particles." This view makes the freewill concept difficult, for there is no known mechanism by which a nonphysical mental state can act upon physical matter. The conclusion of many thinkers, Sagan, Dawkins, and others, has naturally (sic) been to accept what David Ray Griffin, the author of this book, calls "maximal naturalism," or in Sagan's words, "The universe is all there is." Griffin resolves the paradox and refutes the argument. A foreword by Howard Van Till, ASA friend, endorses him highly, and on that basis alone ASA members should study this book.

I reviewed Griffin's longer book on this subject, *Religion and Scientific Naturalism*, in PSCF 54, no. 3 (Sept 2002). This review may be accessed on the ASA web site ([www.asa3.org](http://www.asa3.org)) under "book reviews," or at [www.burgv.50megs.com/griffin.htm](http://www.burgv.50megs.com/griffin.htm). This volume is a summary of that book, based on lectures given in October 2002 at Christ Community Church, Spring Lake, Michigan. It is very readable.

In chapter 1, "Scientific Naturalism: A Great Truth That Got Distorted," Griffin argues that "Scientific Naturalism" is understood to rule out religion, but this is a distortion because naturalism may be theistic. He rules out super-naturalism, holding that it is not possible for there to be a divine being who can interrupt fundamental causal processes.

In chapter 2, "Christian Faith: A Great Truth That Got Distorted," Griffin summarizes his primary Christian doctrines: (1) A good God created us; (2) A loving God desires that we treat each other with justice and compas-

sion; (3) Our world, though full of evil, is essentially good; (4) God acts in the world, mostly through human beings; (5) God's attributes are shown to us through Jesus; (6) God's purpose is to overcome evil; (7) Salvation can be experienced now, albeit only partially; (8) Our lives have ultimate meaning; (9) Life beyond bodily death is a reality.

Griffin distinguishes these primary doctrines from secondary doctrines, such as the virgin birth, original sin, the Immaculate Conception, the Fall, Satan, the 6,000 year-old Earth, and others. Primary doctrines must surely be true; secondary ones may or may not be. Teaching secondary doctrines as if they are primary doctrines causes many of Christianity's problems. The main secondary doctrine distortion is *creatio ex nihilo*, which, for Griffin, makes the paradox of Epicurus, and the resulting argument against God's existence, terribly persuasive (further discussed in chapter 3).

In chapter 3, "Scientific Naturalism and Christian Faith: A New Synthesis," Griffin, while rejecting modern liberal theology, reflects on the views on Bergson, Einstein, William James, Charles Peirce, and Whitehead, arguing "panexperientialism," the idea that all actual things have "experience." (Conscious experience is enjoyed only by humans and animals.) This solves, for Griffin, the mind-body problem. As absurd as panexperientialism appears, it has been endorsed by several leading thinkers: Hartshorne, Bohm, Hiley, Waddington, and others. Panexperientialism holds that the mind and body are distinct interacting entities and that therefore humans can exercise self determination. Griffin holds, of course, a panentheistic view, a form of process theology. The divine power is persuasive, not coercive. Humans directly experience God at all times.

In chapter 4, "Christian Faith: From Arrogance to Timidity to Respectful Confidence," Griffin sums up his thesis. The great truth of the Good News of Christianity has been distorted by the idea of God's omnipotence. Consequently, the Christian message developed an arrogant doctrine of exclusivity, which ultimately led to the Crusades, the Holocaust, and the peculiarly American theology of "manifest destiny." The Enlightenment challenged this arrogance; the church retreated into timidity; theologians were systematically excluded from intellectual discussions. Griffin asserts that only by embracing process theology can Christianity again become "robust" and regain a place at the table.

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



## GENERAL SCIENCES

**GALILEO'S CHILDREN: Tales of Science Vs. Superstition** by Gardner Dozois, ed. Amherst, NY: Prometheus Books, 2005. 350 pages. Hardcover; \$25.00. ISBN: 1591023157.

These stories by eminent authors are collected by a former editor of *Asimov's Science Fiction*. The theme is the interaction of science with religion across space and time. Prometheus is a "skeptics" press, so antireligious views are consistent with their readership. The approach implies a negative slant toward religion, but the encounters are sophisticated and provocative.

These stories are not only triumphal tales of "Science Militant" but also offer insights into the meaning of religion in people's lives. They provide an overview of secular perspectives on religion and are useful for entertainment, self-examination, social relevance, or apologetics.

The Preface views an ongoing battle between science and religion, with the controversies concerning creationism, evolution, and "Intelligent Design" seen as paradigmatic. Sci-Fi is presented as a critical literary battlefield for winning hearts and minds (emphasis on minds). Galileo's apocryphal phrase "Nonetheless, [Earth] still moves!" is symbolic of the struggle of rationality against religious oppression.

This collection itself indicates that oppression is not what it used to be, acknowledging historical Church support of Galileo and science. Protestant reformers were just as anti-Copernican and no more charitable than Catholics who condemned Giordano Bruno to the stake in 1600. Today, Islamic extremists are a more immediate threat to rational pursuits.

This book defines superstition as the enforcement of willful ignorance through terror. "Ignorance" may be mischaracterized, since there is a world view behind every opinion and more than just religious concepts can be misused. Resistance to scientific "truth" includes opposition to global warming and neo-conservative marginalization of scientists for political ends.

The stories are all imaginative *tours de force*, as summarized below:

- LeGuin's "The Stars Below" constructs a religious culture that drives an astronomer literally underground. His thoughts take an "inward" turn, leading to discoveries that reflect a form of mythological thinking.
- In "The Will of God," Roberts presents an alternate history depicting scientific martyrdom when electricity and telephony are considered blasphemous.
- Martin offers a thoughtful and whimsical "The Way of Cross and Dragon," in which the extraterrestrial clergy of a future Christianity fights a heresy called Liars.
- Silverberg's "The Pope of the Chimps" shows a starkly realistic perspective on the danger of religious belief under limited understanding. It proposes that chimpanzees develop a worship of human beings yet misunderstand the implications of our behaviors.
- Pangborn's "The World Is a Sphere" is a strange depiction of a future history of southern United States.
- "Written in Blood" by Lawson examines unforeseen interactions between bioscience and a literal interpretation of Islamic religious language.
- In DuBois' "Falling Star," technology's fragility leads to apocalypse when a "Final Computer Virus" causes the collapse of civilization. Ironically, the story reinforces a biblical concept of human sin, ignorance, and pride.
- "Three Hearings on the Existence of Snakes in the Human Bloodstream" by Gardner is an ambitious alternate history concerning the evolution of religion under imaginative conditions. In a civilization where sacred texts describe "snakes" in human blood, the physiologist Anton Leeuwenhoek goes on trial for announcing

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that they are not visible under the microscope. His claims are accepted, but his explanation gets out of hand.

- Clarke's "The Star" is a classic depicting the future discovery of the actual Star of Bethlehem.
- "The Last Homosexual" (Park) illustrates the misuse of science under conditions of fear.
- In Tiptree's "The Man Who Walked Home," a scientific experiment causes a global apocalypse. Its temporal effects become the basis of religious speculation.
- Resnick's "When Old Gods Die" depicts a utopia founded on a traditional African culture. Its animistic world view comes under challenge when people learn that modern medicine provides satisfying health results without the society's foundational mythology.
- Editor Dozois saves his best for last. Egan's "Oracle" provides an alternate history in which a physicist is rescued from persecution in a 1950s fascist Britain and ends up debating C. S. Lewis on the question of machine intelligence.

These tales are examples of top-quality storytelling. Most impressive are Martin's "The Way of Cross and Dragon," Gardner's "Three Hearings on the Existence of Snakes in the Human Bloodstream," and Egan's "Oracle" in which the fictionalized characterizations of C. S. Lewis, Alan Turing, and other historical figures are especially striking.

Reviewed by Scott R. Scribner, 7119 Mezzanine Way, Long Beach, CA 90808.



## HEALTH AND MEDICINE

**FAITH AND MENTAL HEALTH: Religious Resources for Healing** by Harold G. Koenig. West Conshohocken, PA: Templeton Foundation Press, 2005. 332 pages, index. Paperback; \$29.95. ISBN: 193203191X.

Koenig is a psychiatrist who has carefully examined the relationship between religion and mental health. He is professor of psychiatry at Duke University Medical Center, where he founded the Center for the Study of Religion/Spirituality and Health. He edits the *International Journal of Psychiatry in Medicine* and Templeton Foundation's *Science and Theology News*.

Koenig wrote this book for two audiences: mental-health professionals seeking to understand the roles of religion in their field, and religious professionals who counsel persons with emotional illness. Although I belong to neither category, the book was of great interest to me because of my strong conviction that obedience to God's commandments is beneficial to our health and well-being.

Part I surveys the history of responses to mental illness. Primitive societies regarded mentally-ill persons (shamans) as gifted and desirable. Greek and Roman cultures viewed them as physiologically ill, and isolated them either for their own protection or for society's. Christianity's response has been mixed. Emotional disturbance has been variously seen as a sin to be punished, an illness to be treated, or a demon to be exorcized.

Several religious persons or groups are noteworthy for their responses to the mentally ill. John Cuidad began a compassionate ministry to the poor and sick in sixteenth-century Spain. After his death, his followers formed *The Hospitaller Order of St. John of God*. Anton Boisen became the first chaplain at Worcester (MA) State Hospital in 1924. By 1930 Boisen helped organize what became the Association for Clinical Pastoral Education.

Part II summarizes research on religion and mental health. Koenig distinguishes *religion* (an organized system of beliefs and practices) from *spirituality* (a personal quest for meaning). Most research focuses on religion, which is more readily quantified. In general, religion correlates positively with mental health. Religious people tend to have more positive emotions, less anxiety, fewer self-destructive behaviors, and fewer mental disorders. However, some religious teachings are interpreted to condone hatred, aggression, prejudice, physical abuse, and domination. Prayer is a common response to disaster or illness, and it usually helps people cope, but religiousness sometimes correlates with negative emotions (e.g., the sufferer was abandoned by God, or is being punished). Belief helps people cope with hardship by providing positive world views, purpose and meaning, social support, other-directedness, forgiveness, thankfulness, and hope. Mental-health practitioners should recognize and respect patients' religious beliefs. Where possible, they should incorporate those beliefs into treatments.

In Part III, Koenig gives what he says is the first comprehensive list of faith-based organizations that provide mental-health care. He organizes this list into five categories: (1) Clergy in the United States (roughly one-third million) who spend on average 15% of their work week doing counseling; (2) Networks and advocacy organizations, such as National Alliance for the Mentally Ill, whose state or local affiliates often work with churches; (3) Mission-driven services, such as Catholic Charities or the Salvation Army; (4) Clergy (including chaplains) with professional training in counseling; and (5) Counselors (usually without professional religious training) who emphasize faith-based therapies, including faith-based organizations (such as Teen Challenge) that provide mental health services and also professional organizations (such as the American Association of Christian Counselors).

Although this reviewer has concentrated on Christian organizations, Koenig also discusses mental-health perspectives related to Native American, Muslim, Jewish, Buddhist, and Hindu religious beliefs, and he describes faith-based mental health services offered within those communities.

Part IV discusses obstacles faced by researchers like Koenig, and by faith-based organizations that seek support to provide mental-health services. Few NIH grants are awarded for studies of religious mental-health interventions; one reason is that few peer reviewers have expertise in this area. According to Koenig, many leading scientists still hold the view that religion and science are incompatible (it seems to me that ASA is well-equipped to address this situation). In his final chapter, Koenig suggests possible solutions. His final recommendation is that "Only by working together as colleagues, respecting and valuing each other's contributions, can the secular health

community and the faith community meet the challenges that lie before them." That sounds to me like good advice for all who seek to improve the interface between science and religion.

*Reviewed by Joseph H. Lechner, Professor of Chemistry, Mount Vernon Nazarene University, Mount Vernon, OH 43050.*



## HISTORY OF SCIENCE

**SCIENCE AND BELIEF: From Natural Philosophy to Natural Science: 1700–1900** by David M. Knight and Matthew D. Eddy, eds. Burlington, VT: Ashgate Publishing Company, 2005. 272 pages, index. Hardcover; \$84.95. ISBN: 0754639967.

The development of modern science has been a subject of intense historical work over the past fifty years. This collection of essays brings some important new contributions that add further nuance to our understanding of this formative period. These two hundred years witnessed a marked transition for nature study which was seen as a branch of philosophy in the early 1700s. It was transformed into highly specialized pursuits that increasingly were the domain of specialists rather than philosophers with wide-ranging interests.

Many of these sixteen chapters were originally given as papers at a conference held at the University of Durham, England, in 2002 with the funding support of the Durham Department of Philosophy, the Ian Ramsey Study Centre at Oxford University, The Center for Theology and the Natural Sciences at Berkeley, CA, and the Wellcome Trust. The contributors are noted historians and philosophers of science along with some younger scholars drawn principally from institutions in the UK and US and three authors from Canada, France, and Germany.

The essays focus specifically on the role of beliefs, especially religious beliefs, in the scientific enterprise principally in England. The reader is exposed to careful scholarship that covers a wide range of the sciences including botany, chemistry, medicine, earth sciences, physics, and evolutionary biology. Also discussed are topics such as metaphysics, professionalization in the sciences, historiography, science and religion, altruism, publishing, and popularization of science. An opening chapter by David Knight of Durham University discusses science and beliefs in general. A concluding chapter by John Hedley Brooke of Oxford University offers insightful reflections. An index enables the reader to locate topics and people of interest.

A close reading of these essays will promote an understanding that the relationships between science and beliefs, particularly religious ones, during this period were variable, contextual, evolving, and expressed implicitly or explicitly. For example, the relationship between Paley's natural theology and Darwin's "reformed natural theology" turns out to be much closer than many have alleged or imagined. The role of professionalization as a social movement and the British navy as a core employer of full-time scientists can no longer be so easily overlooked.

Copious footnotes enable interested readers to explore ideas tantalizingly suggested in the narrative. Persons with eclectic interests will particularly enjoy this sumptuous intellectual feast. This is historical work and analysis at its finest from the minds of skilled practitioners.

*Reviewed by Dennis Cheek, Vice President of Education, Ewing Marion Kauffman Foundation, 4801 Rockhill Road, Kansas City, MO 64110.*

**THE SCIENTIFIC REVOLUTION AND THE FOUNDATIONS OF MODERN SCIENCE** by Wilbur Applebaum. Westport, CT: Greenwood Press, 2005. 243 pages, index, bibliography, biographies and primary documents. Hardcover; \$32.95. ISBN: 0313323143.

There is little doubt that the history of science is taught badly or not at all in high schools. Of particular concern to ASA members is the continuing persistence of myths about a historical conflict between science and religion. An insidious and serious misunderstanding about science arises from the traditional story of great men writing great books to combat ignorance and superstition. We all agree that the Sun does not orbit the Earth, but we have little understanding of why people used to believe that it did – still less, why it seemed perfectly rational to them. Even the term "scientific revolution" is a twentieth-century coining of dubious utility. It suggests a once only event when modern science overthrew traditional (and wrong) Aristotelian philosophy. The truth is that science is the product of near continuous development from the twelfth century to the present day.

Greenwood Press has published a series of textbooks on historical events for use in high schools. They have approached a distinguished group of academics to write the books for them. Applebaum is Emeritus Professor at the Illinois Institute of Technology with many years experience of teaching the history of science to undergraduates. His book follows the pattern of others in the series. The editors have split the text into short sections with numerous subheadings. The print is large and there are no footnotes. After the main body of text, there is a lengthy section of biographies of the major figures mentioned, a collection of extracts from primary sources and an annotated bibliography. These later sections make up nearly half of the book.

It is hard to rate this textbook. While undergraduates enjoy plenty of choice in history of science texts, schools have fewer options. On the positive side, Applebaum has compressed a huge amount of information into a small space and has arranged his material in a coherent way. He briefly introduces all of the major figures to the stage before chasing them off again so that the next character can enjoy his couple of paragraphs. The biographical section helps because students can find out a bit more about each of the individuals they have met.

The chapter "Religion and Natural Philosophy" will be particularly welcome to ASA members because Applebaum decisively rejects the idea of conflict between science and religion. The choice of illustrations is judicious and the occasional diagram clear and informative. The best section of the book from a pedagogical point of view is the collection of primary source extracts. Applebaum has selected

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some of the most important documents and included a short introduction to each of them. Sadly, there are no cross references between the main text and the relevant primary documents. The editors should correct this omission for the next edition because it would enormously increase the usefulness of the book.

Unfortunately, reading the book from cover to cover was a painful experience for me. Applebaum loads his writing with the passive tense and subsidiary clauses. This can make his meaning completely obscure. While the rebuttal of the conflict hypothesis is welcome, Applebaum is otherwise very traditional in his historiography; his story describes a succession of "great men."

This is not a book for someone looking for a good summary of early-modern science. For that, I would recommend Peter Dear's *Revolutionising the Sciences* or Alan Debus's *Man and Nature in the Renaissance*. Although Applebaum's text may be an appropriate high school textbook, I doubt that it will arouse much excitement in students for its subject matter. This is a pity because history of science is a very exciting and challenging subject. Still, this book is certainly better than allowing some of the common myths about science to proliferate further.

*Reviewed by James Hannam, University of Cambridge, England.*

**THE VICTORY OF REASON: How Christianity Led to Freedom, Capitalism, and Western Success** by Rodney Stark. New York: Random House, 2005. 270 pages, index. Hardcover; \$25.95. ISBN: 1400062284.

Stark, an outstanding evangelical sociologist of religion at Baylor University, has produced a series of books in recent years highlighting the distinct contributions of Christianity to world history including *The Rise of Christianity, For the Glory of God*, and *One True God*. This latest book expands further his general thesis that Christianity has been blamed for many of the world's current and past ills but seldom credited for any of the world's more positive aspects.

Stark's central focus in this book is on the power of reason and its corollary, the belief (or faith) in human progress. He traces its origins within Christian theology and then shows how it led to various technical and organizational improvements (mostly in Christian monastic communities), rippled out into political philosophy and spawned modern states, capitalism, and ultimately contributed substantially to the concept and reality of personal freedom. He argues that all of these changes had their start in the middle to late Middle Ages rather than during the Protestant Reformation or the Enlightenment. The latter view is the preferred period for many secularists and modern pundits; the former view is the one of the famous Weber-Tawney thesis, which has been largely discredited by more recent and more thorough scholarship.

In many respects, this book clearly and compellingly presents work that has been proceeding almost unheralded by medievalists for the past fifty years. The revolution in our understanding of the Middle Ages—no longer the "Dark Ages" which was more a reflection of our ignorance than of reality—allows us to see that Catholicism during

this period was actively shaping Western institutions and ideals and that scholasticism, the monastic movement, and various mendicant orders fed this growth.

While experts for the periods in question will undoubtedly find much to quibble with in a book of such grand scope, the general thesis of Stark is worthy of serious consideration and has been given considerable positive attention in the secular media. He is to be commended for his balanced approach that not only highlights positive contributions of Christianity but also shows awareness of the dark underside of excesses and barbaric acts that were committed in the name of Christ. *PSCF* readers will be especially interested in his comments in various sections regarding both the growth of western science and various innovations in technology, the vitamins which he finds in Christian beliefs and efforts go back to the Middle Ages. This is consistent with the more detailed work by Jaki, Lindberg, Gingerich, and many other historians of science.

*Reviewed by Dennis W. Cheek, Vice President of Education, Ewing Marion Kauffman Foundation, Kansas City, MO 64110.*



## NATURAL SCIENCES

**THEOLOGY AND MODERN PHYSICS** by Peter E. Hodgson. Burlington, VT: Ashgate Publishing, 2005. 264 pages. Paperback; \$29.95. ISBN: 0754636232.

Hodgson is a devout Catholic and distinguished nuclear physicist at Oxford University. He has been active for many years in the global dialogue in science and religion with a particular emphasis on theology and its interactions with modern physics. This extremely insightful, balanced, and humble exposition of his current understandings of the many twists and turns in this dialogue is a wonderful contribution to this burgeoning literature and should be of particular interest to *PSCF* readers.

Contrary to some writers in this domain, Hodgson is very careful in his exposition of contemporary physics and suitably cautious in the potential application of these ideas to Christian theology. He does not shy away from including appropriate mathematical equations to make his points and yet at the same time, delivers up a text suitable for educated readers regardless of their particular subject matter background. He expounds views different from his own but at the same time, explains why he finds particular views compelling.

This book is rich in the history of physics as it considers classical physics, space, time, relativity, quantum theory, quantum mechanics, determinism, cosmology, chaos, and symmetry. Hodgson devotes several chapters to discussions of theology, philosophy and physics, Judeo-Christian contributions to modern science, the Muslim centuries, the Renaissance and science, and non-Christian religions. He includes an extensive bibliography for each chapter and both a name and subject index for readers.

Hodgson's overall conclusion is worth quoting in full: Modern science can certainly bring home to us more forcefully the incredibly intricate structure of God's creation. It may also suggest ideas and analogies that

have some use in theology. But to suppose that it can supplant traditional theology or provide new theological understanding is a chimera. Modern science has certainly enlarged our vision of the world. Instead of a cosy, man-centered world of Aristotle, we now have a vast number of huge galaxies flying away from a primeval explosion several billion years ago. In the spiral arm of one of these galaxies is the rather undistinguished star which we call the sun. This change of perspective inevitably changes the way we think of ourselves and may cause us to speak in a different way about our Christian beliefs, but it does not change in any way our fundamental convictions concerning the creation of everything by God, and the birth, death and resurrection of Christ (p. 226).

Interested readers will also want to check out the other excellent titles in this Ashgate Science and Religion Series.

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## ORIGINS & COSMOLOGY

**CHAOS AND HARMONY: Perspectives on Scientific Revolutions of the Twentieth Century** by Trinh Xuan Thuan. West Conshohocken, PA: Templeton Foundation Press, 2006. Paperback; \$22.95. ISBN: 1932031979.

*Chaos and Harmony* is an outstanding survey of modern cosmology and particle physics. The beauty of the book lies in succinctly describing complex science in accessible and engaging prose. Thuan, a professor of astronomy at the University of Virginia, specializes in young dwarf galaxies and in writing books on science for the general public, including *Discoveries: Birth of the Universe* and *The Quantum and the Lotus: A Journey to the Frontiers Where Science and Buddhism Meet*. *Chaos and Harmony* was originally published in France and, after becoming a bestseller, was translated into English and published by Oxford University Press in 2001. The current edition is the second publication in English but the first in paperback.

*Chaos and Harmony* joins a growing list of popular science books describing modern advances in physics and cosmology. The seven chapters are partitioned into two main sections covering modern cosmology and particle physics, concluding in a final intriguing chapter on "the unreasonable effectiveness of thought." Thuan has a gift for eloquently presenting complex topics in clear prose which he uses to describe engaging areas of modern science having religious overtones. He uses analogy extensively but also has a knack for connecting complex scientific ideas with familiar sights.

The golden light of the sun reflects off the woman's slender body and penetrates the man's eyes. Traveling at a speed of 300,000 kilometers per second, 10,000 billion particles of light, called photons rush through his pupils ... (p. 1).

Woven throughout the text is an emphasis on the amazing complexity and perfect timing of physical pro-

cesses in the universe. In the last chapter, Thuan collects these themes to address matters of intelligence, complexity, consciousness, and the use of mathematics to describe reality. Thuan's conclusion is: "We will have to rely on other modes of knowledge, such as mystical or religious intuition, informed and enlightened by the discoveries of modern science" (p. 334).

*Chaos and Harmony* describes the strange yet beautiful theories of the very small and the very large. Thuan delights in raising philosophical and religious questions stemming from discoveries in science and addresses issues of design and purpose as a secondary theme of the book. Consequently this could be a useful text for introductory science courses or for nonbelievers interested in contemplating the marvels of modern science as evidence for God's delicate fingerprints in creation. Thuan's writing will appeal to Christians in the sciences and humanities alike, as a resource for presenting topics of modern physics and cosmology, and as a source of inspiration in contemplating creation's complexity and design.

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

**PERIL IN PARADISE: Theology, Science, and the Age of the Earth** by Mark S. Whorton. Waynesboro, GA: Authentic Media, 2005. 233 pages. Paperback; \$16.99. ISBN: 1932805230.

This book grew out of a theological debate over the authority of Scripture versus the age of the Earth, which arose at the author's conservative Southern Baptist church. In a "Science and the Bible" class held at the church, Whorton was accused of teaching heresy for claiming that the Earth was far older than the traditional biblical age of 6,000 years. The leaders of his church believed that the Earth was young, not for scientific reasons, but because of the creation account in Genesis where God pronounced his creation as being "very good." If the Earth were as old as modern geologists claim, then there would have been animal pain, suffering, and death for untold ages before God created Adam and Eve and placed them in the Garden of Eden. How can this creation, red in tooth and claw, be called "very good" by God? And, if death existed before Adam and Eve's sin, how can death be the consequence of sin? Does this not also negate the Gospel message of Christ's dying as the penalty for our sin?

Whorton refers to the above position as the "Perfect Paradise Paradigm"—a view that believes before the fall of Adam the world was a perfect place without any form of death or suffering. Death and suffering came into the world when God cursed Adam and Eve for disobeying him in the Garden of Eden. This is the view expounded by most of the young-Earth creationist authors and organizations (for example, the late Henry Morris of the *Institute for Creation Research*).

Whorton proposes replacing this paradigm with one he refers to as the "Perfect Purpose Paradigm," the idea that God believed his creation to be "very good" because it suited his eternal purpose—the ultimate redemption of all creation for the glory of God. In the words of the author: "A majestic truth of Scripture is that God's purpose for

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creation is much greater than a garden paradise for man's enjoyment."

This book is both a critique of the young-Earth "Perfect Paradise Paradigm" and a defense of Whorton's old-Earth "Perfect Purpose Paradigm." There is little discussion of the scientific evidence for an old Earth as the purpose of the book is to present an orthodox, biblically-based theology which allows for an ancient Earth as well as animal death and suffering before the Fall. While this is certainly not a new idea in Christendom, Whorton's approach is geared toward the many Americans who attend conservative churches and are sympathetic to the young-Earth creationist view of Earth history because they see this viewpoint as being more compatible with Scripture than the modern scientific explanation of Earth history.

Whorton, who earned a Ph.D. in aerospace engineering from the Georgia Institute of Technology and works for NASA's Marshall Space Flight Center, is neither a theologian nor a scientist but is involved in these issues as a lay Christian. Whorton is a preacher's son involved in his local church and associated with Hugh Ross' *Reasons to Believe* ministry. He also developed and currently teaches a course in biblical apologetics at the Whitesburg Heritage Bible College in Huntsville, Alabama. While accepting of an old Earth, Whorton is also a skeptic of biological evolution and refers to himself in the book as a progressive creationist.

While I personally disagree with Whorton's progressive creationist position, I believe that this book accomplishes his goal—presenting a reasoned defense of his "Perfect Purpose Paradigm" while effectively critiquing the young-Earth creationist "Perfect Paradise Paradigm." Judicious editing could have eliminated some repetition in this book, strongly recommended as a defense of an old Earth theology.

*Reviewed by Steven Schimmrich, Assistant Professor of Earth Sciences, SUNY Ulster County Community College, Stone Ridge, NY 12419.*



## PHILOSOPHY & THEOLOGY

**TIME & ETERNITY: The Question of Time in Church, Science, and Theology** by Antje Jackelén. West Conshohocken, PA: Templeton Foundation Press, 2005. 345 pages. Paperback; \$29.95. ISBN: 1932031898.

Jackelén is the director of the Zygon Center for Religion and Science at the Lutheran School of Theology in Chicago and associate professor of systematic theology/religion and science at the same institution. She has published on feminist theology and on the challenges of the dialogue between religion and science. She writes and lectures in Swedish, German, and English. This book was first published in German in 2002.

After an introduction and comments on the hermeneutical approach used, the book is divided into four parts: (1) Narrated time in hymns; (2) Biblical and theological conceptions of time; (3) Time in the formulation of scientific theory; and (4) Aspects of the theology of time.

Jackelén's purpose is to "bring concrete theological symbol systems—and not theology per se—together with science, and then to see what happens" (p. 1).

The examination of the texts of hymns tries to see what they say about the relationship between God and time, about eternity, the future, and the relationship of human beings to time. Her thesis that time is accessible to human beings only when articulated in narrative is heavily influenced by the theory of Paul Ricoeur. "Ricoeur compares this narrative understanding to a picnic to which the author contributes the words, while the reader contributes the meaning" (p. 11). Her approach encourages theological reflection on the thoughts and feelings of the hymn writers.

Jackelén analyzed 3,682 passages containing indications of time in a total of 3,146 hymns in order to compare the frequencies of time and eternity terminology given in the hymns. Her observations are that "Hymns that deal with suffering are not content to wait for eternity" (p. 40); "Jerusalem is the city that stands high above space and time" (p. 42); time repeatedly occurs in the metaphor of the dance (p. 56); and the relationship between time and eternity has become unclear and problematic.

The second chapter examines the complex meanings inherent in "time" such as the theological concepts of God, time, eternity, and death. There is a relational dynamics between time and eternity. One significant outcome is an interpretation that cyclical and linear conceptions of time coexisted and interfered with each other (p. 68), exemplified by the Jubilee Year, which, while regular, was a cyclical phenomenon. In the New Testament, two profoundly contrasting meanings occur for the same word: eternity of God and the time of the world. But "Time is more than a deficient eternity and eternity is something other than multiplied time" (p. 116).

Chapter three, which examines time in scientific theory, contains 339 footnotes (there are 1,397 in the book), with mathematical and philosophical discussions on the concept of absolute time and variations of relative time, thermodynamics and chaos research. This is a difficult chapter and I would have to answer "yes" to her rhetorical question: "What have we learned from this chapter? Was it much ado about nothing?" (p. 176) What she has shown convincingly is that "scientific theories and theological models do not exist in isolation from each other" (p. 180).

The final chapter concentrates on the doctrine of the Trinity and eschatology. What Jackelén means by trinity is not simply that three persons enter into relationships with one another but that "the persons mutually constitute one another within the relationships. A distinction between being and relating is possible only in theoretical thinking" (p. 192). We need chronological time in order to divide time and organize it, but we need the experience of forgetting time and of having times when the measurement of it is of no importance. In this respect, the hymns that Jackelén outlines and analyzes are "guardians of rich treasures" because their narrations offer the diversity of experiences that promote theological reflection.

*Time & Eternity* is not an easy book to read: it demands some historical-theological background knowledge, an awareness of the way time is used in scientific constructs,

as well as a willingness to put up with nonprecise definitions of how the Bible uses the terms.

The bibliography alone contains 434 entries, many in German and Swedish but always with English translations. Anyone who wants to be familiar with the vast history of contributions to the subject, primarily from philosophical and theological sources, will want to examine this book carefully.

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**MORTAL MINDS: A Biology of the Soul and the Dying Experience** by Gerald Woerlee. Amherst, NY: Prometheus Books, 2005. 237 pages, includes bibliographic references. Hardcover; \$25.00. ISBN: 1591022835.

Woerlee is clear about his goal for *Mortal Minds*: to look for credible evidence for the human soul and life after death. It is also clear that he approaches the question from a purely materialistic position. Near-death experiences (NDEs), occasionally cited as evidence of an afterlife by both Christians and non-Christians, are evidence "only if they could not be explained by anything else except a life after death" (p. 16). Woerlee uses the same rationale as the average "God-of-the-gaps" proponent; once the "gap" is filled with a scientific explanation, there is no room for the supernatural. The possibility that the human soul could exist yet not be subject to scientific investigation is barely considered.

A physician and anesthesiologist, Woerlee is well-qualified to comment on neurological matters. Unfortunately, he spends chapters 7 through 14 searching for souls in what most scientists and Christians would consider unlikely places: paranormal phenomena. When he is able to offer a physiological explanation, such as the ability of the optical imperfections of the human eye to account for the perception of auras, Woerlee does so clearly and convincingly. Other arguments suffer from over-simplification. According to Woerlee, the soul cannot be necessary for life, since transplanted organs can live outside the body. Extrasensory perception must not exist; otherwise the blind and deaf would develop it. In the end, Woerlee dismisses the field of parapsychology without a serious critique.

It takes Woerlee until chapter 15 to do what he does best: provide a neurological explanation for the common features of NDEs. Bright lights are the result of sudden oxygen loss causing pupil dilation and/or visual cortex activation. The perceived tunnel is the peripheral retina succumbing to oxygen starvation before the center, while disconnection from the body results from paralytic and analgesic drugs administered during general anesthesia. Woerlee's model was previously published in a peer-reviewed journal.<sup>1</sup> *Mortal Minds* expands on it and makes it more understandable to a lay audience. Neuroscientists, however, might prefer to get the basics of his hypothesis from the journal article, where they will not have to plow first through chapters about psychic premonitions, demonic attacks and alien abductions.

There is a second difference between *Mortal Minds* and Woerlee's scholarly paper. In the journal, he sticks to

methodological naturalism and does not deny the possibility of a soul existing after death, but states merely that such existence is not necessary to explain the NDE. The book is not so restrained; in the final chapter, Woerlee confidently proclaims his final conclusion.

I had learned I have no soul. My mind is the product of the functioning of my body, so my mind will die with my body and I will not live for eternity in a life after death (p. 227).

Although Woerlee delights in his newfound freedom "from uncertainty as to my place in this universe" (p. 237) and celebrates that "No gods determine my destiny. I am the master of my own destiny" (p. 237), Christians are unlikely to rejoice at his good news.

Skeptics of NDEs will find Woerlee's physiological explanations intriguing, while proponents of paranormal research will likely complain that their views were not given a fair hearing. For Christians, this book challenges only those whose belief in life everlasting depends, at least in part, on NDE testimonials from fellow believers.

*Mortal Minds* is perhaps most valuable as an illustration of possible consequences when the tools of science are used to investigate the supernatural. Some well-meaning Christian apologists continue to cite supposedly unexplained phenomena, from NDEs to the Shroud of Turin to allegedly designed biological constructs, as evidence for certain essentials of faith like immortal souls, Jesus' resurrection, and the existence of a Creator. *Mortal Minds* demonstrates that careful examination of such mysteries can lead to reasonable naturalistic explanations. In that event, strict materialists will find their viewpoints reinforced, while God-of-the-gaps Christians dependent on such examples as bedrock of their faith may find their house built on very shaky sand.

Methodological naturalism insists that science's usefulness as an investigatory tool is limited to earthly or "natural" realm. Christians should look to Woerlee's concluding chapter as an object lesson of what can happen if those boundaries are overstepped.

<sup>1</sup>G. M. Woerlee, "Cardiac Arrest and Near-death Experiences," *Journal of Near-Death Studies* 22, no. 4 (2004): 235-49.

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



## RELIGION & BIBLICAL STUDIES

**GOD TALK: Cautions for Those Who Hear God's Voice** by Ruth A. Tucker. Downers Grove, IL: InterVarsity Press, 2005. 192 pages. Paperback; \$15.00. ISBN: 0830833315.

Tucker doubts that Joseph Smith, Jr., founder of the Mormon Church, received an "audible response" when he asked God what the true church was (p. 34). Perhaps Smith's "visionary testimony was created after the church was formed ... when it was facing criticism from the outside" (p. 35).

In this book, Tucker celebrates God's silence, not his voice, "if for no other reason than the fact that silence is far less open to misinterpretation and disagreement" (p. 13).

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Her three main points are: (1) the person who has an apparent supernatural communication with God should not be interpreted as being more spiritual; (2) negative side effects are possible for those who claim to hear God's voice including self-absorption, spiritual abuse, and elitism; and (3) God is neither garrulous nor distant (pp. 14–5). "I will argue that the talkative God of today is a second-rate version of the trinitarian God" (p. 14).

Tucker discusses many people who have claimed that God told them what to do. They include Pope Urban II (launched the first crusade); Joan of Arc (political and military leader subsequently burned at the stake); Jonathan Edwards (it was God's will that the British defeated the French at Cape Breton); and Carry Nation (God told her to smash a saloon).

Tucker quotes Jim Wallis who says that true spokespersons for God are likely speaking for the powerless whereas others who claim to hear God's voice are speaking to benefit themselves. According to Wallis, the average person associates a lot of "anti-s" (such as, antiabortion, antiliberal, antifeminist, antiwelfare, antienvironmentalist) with evangelical Christians but a lot of virtues with Jesus. Wallis observes that perhaps "Pat Robertson's Christian Coalition has the wrong political agenda" (p. 27).

Read why Tucker thinks Wallis' test is not always a good guide, with her examples of John Brown and Paul Hill (pp. 26–9). Tucker offers her test as to when we may conclude that we have heard the voice of God: "If our silent expression of that voice comes forth in a way that radiates the love of Christ in word and deed, we can conclude that God has truly spoken" (p. 47).

Tucker is skeptical about apologists speaking for God. She thinks their answers to these knotty questions are deficient and unnecessary: How can a good and omnipotent God permit evil? How can a good God elect only some to salvation? and How can God's existence be proved? (pp. 53–6). Tucker says of C. S. Lewis, the only "pope of apologetics" for Protestants, that he was "compelled to leave some of his rational arguments behind and come to the foot of the cross" (p. 57). We need, writes Tucker, "a humble silence rather than a calculated defense of what cannot be rationally defended" (p. 59). Tucker thinks God is perhaps more accepting of Job's anger at God's silence than of apologists who seek to explain it away.

Tucker thinks many of those who write about listening to God offer superficial and unbiblical advice. For example, of one writer she observes: "I cannot identify one biblical illustration that would parallel his" (p. 103). And further: "Despite all the books and articles and retreats devoted to listening to God ... we ought to be dubious about claims that this is an exercise or skill that can be learned" (p. 111).

Tucker can be brutally frank as when she writes that the popularity of *The Prayer of Jabez* by Bruce Wilkinson was based partially "on our near universal tendency towards self-absorption" (p. 126).

Christians should find solace in God's silence rather than merely accepting or enduring it. God's silence should be celebrated and cultivated because "Today, we are safe in the silence of God" (p. 173). While Tucker believes God has spoken to us in the Bible and through his Son,

she questions the validity of the claims of those who say that they speak for God or that they have heard God speak directly to them. Tucker concludes that all the books, articles, and tapes in the world on listening to God's voice will not make it so (p. 173).

I liked this book. Tucker writes in an engaging fashion with clear prose further illuminated by catchy examples. She deals with some important contemporary issues, but her main topic is an analysis of the cacophony of voices claiming to be God's. Her emphasis upon the voice of God coming from the Scriptures is a salutary one.

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

**THE GREAT GIVEAWAY** by David E. Fitch. Grand Rapids, MI: Baker Books, 2005. 264 pages. Paperback; \$14.99. ISBN: 080106483X.

Fitch thinks the evangelical church has outsourced ("farmed out") many of its ministries to big business, parachurch organizations, psychotherapy, and consumer capitalism. And he does not like it. He tells why and then offers advice on how to "reclaim the mission of the church," the subtitle of his book.

What brought the church to the present unpleasant state of affairs? "(T)he main culprit in this 'giveaway' is evangelicalism's complicity with modernity" (p. 13). And what exactly is "modernity"? "(T)he veneration of modern science, the obsession with controlled factual truth, and the unabashed confidence in objective reason as located in the mind of each individual ..." (p. 14). Further, Fitch dislikes evangelicalism's scientific attempts to defend the Bible, the push to make Christianity attractive to society, the emphasis on decisions for Christ, rationalizations to justify individual objectivity (p. 15), the CEO structure of the church (p. 73); and the defaulting of psychotherapy to secularists (p. 181).

Fitch thinks modernity's confidence in science, with its control of nature and its espousal of Enlightenment individualism, is misguided. The church's acceptance of modernity has led to a lost focus for the church, and its reason for "meaningful existence." The eight chapters of the book each deal with a function of the church and how it can be improved.

Fitch faults evangelism because of its failure to lead people to a life of sanctification. He faults science because it is "a purveyor of webs of belief," it "masquerades as an objective discourse," it is a way of observing the world with its "pluses and minuses," unable to explain much of human behavior, and it is stumped concerning moral and religious issues (p. 51).

What does Fitch recommend? Immersive worship which focuses on God through art, symbol, beauty as expressed through liturgy; evangelism which counts commitments, not just conversions; leadership which is grown in the church and shared; and narrative-based preaching, rather than expository preaching.

Fitch has the following recommendations: (1) churches need to be smaller, not bigger. Of megachurches, Fitch writes: "Going from ten to 1,000 members in five years is

the sign of a sick church" (p. 27); (2) churches need to become alternatives to Starbucks as providers of warm hospitality; (3) evangelical homes need to be incubators of evangelism; (4) churches should abandon the CEO form of leadership; (5) congregations should become more economically and racially diverse; (6) churches need small groups to renew monastic practices like confession and repentance; and (7) churches need to catechize children. Fitch concludes by saying he hopes his plan to reclaim the church's mission is not a pipe dream.

Fitch is a pastor and seminary adjunct professor, so he has experience and knowledge to underpin his observations. He has obviously done a lot of reading on this subject: thirty-four of the book's pages are filled with small print endnotes (no index, unfortunately). He also wants to see the church's mission reclaimed and he is doing something about it: Fitch is co-founder of a collaborative group of Chicago area leaders who seek to reverse the trend of postmodernism.

For those who would like to see some changes made in the evangelical church, this book is a valuable resource. Fitch is not a curmudgeon merely complaining about the shortcomings of the contemporary church; he is more a reformer or revolutionist who loves the church and offers suggestions as to how it can be more Christian and thus more effective.

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



## SCIENCE EDUCATION

**DOES GOD BELONG IN PUBLIC SCHOOLS?** by Kent Greenawalt. Princeton, NJ: Princeton University Press, 2005. 261 pages, index. Hardcover; \$29.95. ISBN: 0691121117.

The status and role of religion in public schools in the United States has a long and convoluted history. This is a splendid guide to an exceedingly wide range of contemporary issues from a former Deputy Solicitor General of the United States and professor of law at Columbia University. The author assumes an educated reader but no specialized knowledge of law or the various topics he explores. Detailed endnotes provide legal cases, law review articles, and other literature for each topic considered.

The first two chapters look at the history of American public schools and religion and the purposes of public school education. The next portion considers devotions, clubs, prayer, moments of silence, Bible reading, teaching religious propositions, and equal access matters.

It is the following seven chapters that highlight issues of special interest to readers of *PSCF*. Greenawalt presents a detailed exposition of topics related to teaching about religion. Three chapters hone in on teaching natural science and its relationship to evolution, creationism, intelligent design (ID), and the teaching of religion. He concludes for legal reasons that the teaching of both creationism and ID is prohibited in science classrooms and provides extensive rationales why this should be so. He carefully dissects a variety of Supreme Court and federal court decisions related to this subject and demonstrates extensive awareness of semi-popular literature and

technical literature from both ID proponents and their opponents. Greenawalt finds the legal arguments of the ID movement wanting, although I am quite sure Phillip Johnson among other legal scholars would disagree. Nevertheless, the reader can, I think, rely upon Greenawalt's account as the probable path judges would go down in such cases and indeed, some of the same rationales he supplies were part of the judge's decision in the recent Dover school district case.

The remaining three chapters consider how religion can and should be taught in history, economics, literature, civics, ethics, and comparative religion courses and the various constitutional constraints and legal limits on such teaching.

A final section consists of two chapters that deal with student rights to religious freedom and free speech, and one chapter that considers when students may be properly excused from public school activities when they or their parents object to specific content.

As a former school superintendent and state education department official, I found this book exceedingly helpful. Anyone who wants to understand not only pertinent law related to religion in public schools but also its application in a variety of situations should read it.

*Reviewed by Dennis Cheek, Vice President of Education, Ewing Marion Kauffman Foundation, Kansas City, MO 64110.*

**SCIENCE AND RELIGIOUS HABITS OF MIND: Irreconcilable Tensions in the Curriculum** by Ron Good. New York: Peter Lang Publishing, Inc., 2005. 104 pages. Paperback; \$22.95. ISBN: 0820471089.

Good, professor emeritus at Louisiana State University (LSU), served as a professor of science education there and at Florida State University. He has long been involved in debates about evolution and creationism and other critical issues.

The theme of the book is the difficulty of achieving scientific literacy in US schools. It contains four chapters, a bibliography, and three papers related to its theme.

Chapter one outlines Good's commentary on three main scientific discoveries: (1) Displacing earth from its exalted position (Copernicus, Kepler, Galileo and Newton); (2) Evolution of species by natural selection (Darwin); and (3) Relativity and quantum theory (Einstein in particular).

Chapter two summarizes the contributions of Darwin and Einstein and adds Bertrand Russell. Darwin needed no assistance from the supernatural "to maintain the evolution and extinction of species" because natural selection could account for everything. Darwin was willing to question the authority of the Bible. With the Galapagos Islands data, he interpreted population growth as restrained by famine, disease, and war, so "supernatural explanations were no longer necessary to explain changes in organisms over time ..." (p. 11). Darwin, once freed from religious dogma, framed his theory of natural selection that now "serve[s] as the main unifying force of all biology."

Einstein "disliked the mindless discipline practiced at the Catholic elementary school he attended as a child"

## Book Reviews

(p. 17) and preferred mathematical rigor and logic. Although Einstein rejected the label of "atheist," when he said he wanted "to know God's thoughts" (p. 20), he used religious terms in a metaphorical way. Good claims that creationists and other mystics have embraced the uncertainty they saw in Einstein's work to promote their own agendas.

Bertrand Russell, although not a scientist, "logically disposed of God and traditional religious dogma" (p. 22) because he saw it as harmful to humankind.

Chapter three is called "Scientific and Religious Habits of the Mind" and is the crux of Good's argument. Any reference or hypothesis concerning God is not necessary and intrudes upon a truly scientific approach. A scientific habit of the mind is informed skepticism and is very different from religious thinking that resorts to common sense and folk knowledge. Religious belief does not need evidence but relies on early indoctrination and the acceptance of a holy book or religious leaders. Good relies on Steven Pinker to explain how the mind works, which is by our genetic program, shaped by evolutionary history. The mind is a "biochemical processor of symbols" (p. 31) but, unfortunately "seems to be biased toward religious belief and away from scientific thought" (p. 34).

Chapter four is about democracy and science education. John Dewey, who placed scientific thought at the center of his school curriculum, is highlighted. Good contrasts natural selection and supernatural creation and claims that only the former provides an explanatory theory and that trusting in God allows religion to invade government and to cloud scientific thinking. Good does not favor any "politically correct" position that allows some compatibility between religion and science. The last part of the chapter includes a digression into post-modernism, concluding that we must unlearn old habits of the mind and question common ideas about human nature. Good questions six common assumptions, e.g., that the mind and the brain are very different things.

Good is surprised that after a century of modern science, supernatural causes and similar pre-scientific thoughts are still widespread, so he outlines some closing action plans. He proposes that teachers of science are to avoid religious beliefs because they act as obstacles. His three papers that conclude the book demonstrate Good's activism, illustrated by an LSU resolution calling for the teaching of evolution and commitment to it.

Good believes that religion obscures science teaching. He attempts to show why the struggle against religion which Darwin, as the high priest of evolution, started, must go on, because, as his subtitle implies, science and religion are incompatible and irreconcilable.

The weakness of the book is its casual and caustic nature. Good treats religion and anyone associated with it as incapable of thinking like a scientist. He dismisses Christian ethics and moral standards for the classroom, believing that scientific logic and reasoning alone are sufficient. We might ask if this sole emphasis on scientific thinking, to the exclusion of moral constraints, will ultimately prepare students to be better citizens or teachers.

*Reviewed by Karl J. Franklin, SIL International, 7500 W. Camp Wisdom Road, Dallas, TX 75236.*



## SOCIAL SCIENCE

**THE HEART OF RACIAL JUSTICE: How Soul Change Leads to Social Change** by Brenda Salter McNeil and Rick Richardson. Downers Grove, IL: InterVarsity Press, 2004. 188 pages. Paperback; \$12.00. ISBN: 0830832696.

This book's title summarizes accurately its contents. The book is supplemented by three appendices, end notes, a bibliography, and a list of recommended resources. John Perkins, who wrote the foreword, praises the book as "a blueprint for the Christian church" and a "biblically grounded book" to make racial reconciliation practical (p. 11).

The book's main points, one from each of its ten chapters, include: (1) racism exists in the USA; (2) reconciliation is seemingly impossible; (3) racism violates the gospel; (4) only changed hearts can end racism; (5) transformation can occur through worship; (6) renounce false identities and embrace true selves; (7) receive and extend forgiveness; (8) renounce evil powers; (9) work with other people; and (10) pursue the ministry of reconciliation.

Christians can become more familiar with the issue of racial justice by referring to some of the forty-eight books in the bibliography, the eighteen in the resource list, plus the thirteen suggested videos. A list of biblical texts to explore also provides a starting point for becoming more informed about biblical approaches to racism.

McNeil is an ordained Christian minister, teacher, and evangelist. Founder and president of Overflow Ministries, she served on the staff of InterVarsity Christian Fellowship. Richardson is associate director of evangelism for Intervarsity. Previously he served as pastor of evangelism for the Church of the Resurrection in Wheaton, Illinois.

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

**HANDBOOK OF SPIRITUALITY AND WORLDVIEW IN CLINICAL PRACTICE** by Allan M. Josephson and John R. Peteet, eds. Washington, DC: American Psychiatric Publishing, Inc., 2004. 180 pages. Paperback; \$37.50. ISBN: 1585621048.

While religion can be a risk factor for psycho pathology, it can also be a prophylactic in some cases. Some clinicians see the value of incorporating spiritual approaches to problems that vex people throughout life (p. ix). Thus, the purpose of this book is to show how that might happen. An important point stressed in the book is the necessity for therapists to be conversant with and respectful of the client's world view.

The crux of this book is consideration of clinical practice as it relates to the world views of Protestant Christians, Catholic Christians, Jews, Muslims, Hindus and Buddhists, and atheists and agnostics. Here is Sigmund Freud's definition of world view: "An intellectual construction which solves all the problems of our existence uniformly on the basis of one overriding hypothesis" (p. 4). Freud's world view, materialistic and atheistic

(Freud called himself "a godless Jew"), strongly influenced his clinical observations. Anna Freud, Freud's daughter, considered Albert Einstein "very childlike" for his theistic view (p. 5). For the most part, modern science views faith as a psychological crutch. Freud thought that "many who profess faith have as the sole basis of that faith an unresolved, unconscious, or 'neurotic' conflict" (p. 9).

The chapters dealing with various religions do a splendid job of summarizing the essence of each world view and how it may be an asset or liability. For instance, Protestant patients sometimes interpret psychiatric conditions, such as obsessive-compulsive behavior, as sin resulting in guilt; sometimes perceive God as overly punitive which leads to anger and anxiety; sometimes feel powerlessness which leads to sorrow and guilt (p. 66). Some Christians are Gnostic in their view that the body, with its many sinful impulses, is therefore of itself evil. This may lead to an excessive taboo on healthy sexual expression and enjoyment of sensory pleasures. On the other hand, a lot of research shows that Protestant faith is a great contributor to coping and mental health, and a successful therapist will be conversant with this.

Some beliefs and practices of ultra-Orthodox Jews may create barriers to mental health. For instance, some Jews are prone to shun outside help because of their strong belief that God is supposed to be the healer of the broken-hearted (Ps. 147:3). Further, the Jewish attachment to and respect for the community may run counter to receiving psychiatric help. One rabbi forbade Jewish psychiatric patients from seeing a therapist outside the faith. Also, the talking cure, more than the pharmacological, may be seen as a threat to faith. Jewish clients often struggle with the conflict between their sexual behavior and commitment to religious restrictions. Obsessive-compulsive disorder is a common problem in Jewish men who seek cleanliness before prayer, or among women who are excessively concerned about ritual immersion after menstruation. (Catholics call excessive religious concerns "scrupulosity.")

Eight million Muslims live in the United States. In the Muslim community, mental illness is often marked by stigma. Problems which arise among Muslims include depression, cultural alienation, substance abuse, and homosexuality. Sometimes these problems are better dealt with by a non-Muslim therapist because of the embarrassment attached to mental illness in the Muslim community.

In the United States, there are one million Hindus and two million Buddhists. A barrier to receiving secular therapy to these faiths is the concern about family honor, stigma, and secrecy. Psychotherapy is usually the last resort of people living in these communities.

Atheism is "the denial of metaphysical beliefs in God or spiritual beings" (p. 140). Agnosticism states that knowledge of the existence of anything beyond the phenomena of experience is impossible (p. 141). If the Barna Research Group is accurate, seven percent of the adult population say they are atheists or agnostics—a group larger than Mormons, Jews, and Muslims (p. 143). Atheists and agnostics are confronted with many of the problems religious people face: suffering, death, addictions, and social dysfunction. While they think life has no purpose, they place

a high value on family and have perhaps the lowest divorce rate of any group (p. 147).

This book provides a quick overview of the tenets of the major religions in the United States and how contemporary psychotherapy seeks to help in relieving the psychiatric disorders frequently associated with these religions.

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

**THE CONSCIOUS UNIVERSE: The Scientific Truth of Psychic Phenomena** by Dean Radin. San Francisco, CA: Harper Edge, 2005. Hardcover; \$25.00. 362 pages. ISBN: 0062515020.

Radin is the director of the Consciousness Research Laboratory at the University of Nevada, Las Vegas. Prior to this, he did parapsychological research for AT&T, Contel, Princeton's Department of Psychology, the University of Edinburgh, SRI International, and the US government. This seventeen chapter book is divided into four themes: Motivation; Evidence; Understanding; and Implications. Radin is writing for a scientifically literate audience and defines psychic phenomenon in terms that make it measurable. Even the most hard-nosed skeptic will be convinced that he knows what constitutes evidence.

Radin presents the evidence in chapters on Telepathy, Perception at a Distance, Perception through Time, Mind-Matter Interaction, Mental Interactions with Living Organisms, and Field Consciousness. The chapters give detailed descriptions of the experiments' design and outcomes. He documents efforts to eliminate extraneous variables which may contaminate the results and create a false positive. One series of telepathy experiments conducted by Maimonides Medical Center in Brooklyn, New York, had senders mentally broadcasting randomly selected images to sleeping subjects who were completely separated from the senders by up to five miles. The receiving individuals would describe the images to third parties who would have no natural way of knowing what the image being broadcast was. They would select from a pool of eight pictures which picture most corresponded to the images the receiver described, ranking them one to eight. "Their results suggested that if someone is asked to send mental images to a dreaming person, the dreamer will sometimes incorporate those images in a dream" (p. 69). After 450 dream telepathy sessions from 1966 to 1973, the probability of achieving the hit rate by chance was 75 million to one.

Chapters on other forms of psychic phenomena also present hard data demonstrating their verifiability. Radin includes the experiments done by Stanford Research Institute on remote viewing and random-number generators (RNG) tests for psychokinesis (mind-matter interaction) conducted by Helmut Schmidt at Boeing Labs. He provides ample detail of the experiments' design and controls. Radin documents how the scientist who conducted these tests would correct any potential flaw found by the arch critics of parapsychology. Princeton engineer Robert Jahn's experiments on psychokinesis, using RNG, are also described in detail.

RNG is an electronic circuit that creates sequences of "heads" and "tails" by repeatedly flipping an electronic coin and recording the result. A participant in a typical experiment is asked to mentally influence that RNG output so that in a sequence of predefined length it produces, say, more "heads" than "tails" (p. 138).

The 108 participants were consistently able to beat chance and have a mean 51% hit rate in 1,268 studies. In 1987 Princeton University psychologist Roger Nelson reviewed the studies done by Bell Labs and Princeton and found that the result defined chance over a trillion to one.

Radn responds to parapsychology's arch critics well. For example, in professional debunker Mark Hansel's 1980 book, his "strategy was to suggest possible flaws that might have accounted for the experimental results without demonstrating that flaws actually existed and then assumes that such flaws must have occurred" (p. 222).

Irvin Child, chairman of the psychology department at Yale University, reviewed the Maimonides dream telepathy experiments and "found that Hansel's descriptions of the methods used in the Maimonides studies were crafted in such a way to lead unwitting readers to assume that fraud was a likely explanation, whereas in fact it was extremely unlikely given the controls employed by the researchers" (p. 222).

Those who dismiss evidence for psychic phenomena point to the December 3, 1987, press conference report of the National Research Council (NRC) with its negative conclusion. "The Committee finds no scientific justification from research conducted over a period of 130 years" (p. 215). The press did not pick up that the two main evaluators of the NRC committee report, psychologists Ray Hyman and James Alcock, both had long histories of skeptical publications accusing parapsychology of not being a legitimate science (p. 216). Hyman and Alcock ignored Harvard psychologists Monica Harris and Robert Rosenthal's NRC Committee reviews affirming the validity of Maimonides telepathy studies.

ASA members should take note that the arch critics of psychic phenomena are also arch critics of the validity of evidence for the power of prayer, miracles, and Intelligent Design. Most critics are members of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICP), which was founded by atheist professor emeritus of Buffalo University, Paul Kurtz. He also founded the Council for Secular Humanism and the National Center for Science Education. As PSI (parapsychology) may support the idea that there is something more to mind than just the mind-body system (p. 295), no wonder naturalists like the CSICP fight it vigorously.

Radn admits that the existence of PSI does not prove life after death. However, its very existence does discredit naturalism and shows that naturalists have made up their mind and do not want to be confused by the facts.

This reviewer would recommend this book to all ASA members, as it was recommended to me by William Dembski.

*Reviewed by Leland P. Gamson, 607 W. Spencer Ave., Marion, IN 46952.*

## Phenomenological Language in Ancient Revealed Narrative

Eshelbrenner<sup>1</sup> suggests that my restriction of "souls" to "higher animals"<sup>2</sup> is incompatible with the creation narrative's "swarms of living creatures,"<sup>3</sup> pointing to Cambrian invertebrates. But I used the term in a phenomenological way appropriate for an ancient text.

What would the ancient formulation imply in our modern way of speaking? Not that the writer knew, or that God teaches, modern science! But taking the creation story as narrative rather than myth is based on the premise that God revealed it to an ancient prophet. Surprisingly, a plausible reading is compatible with Earth's history, although God certainly used the prophet's own thought and vocabulary.

In the fifth "day" (or epoch) of the creation narrative, we have the first mention of animals, called "living souls," some of them dangerous, a host of swarming ones, all in the water, as well as "winged flyers" (including insects). What is common to these animals is their macroscopic size and their rapid, well-controlled movements. The ancients could not know microorganisms, which are therefore not expected to occur in this story. Each "day's" characteristics extend into all subsequent ones. That water and flying animals were created in the fifth "day" only implies that their first representatives appeared in that period.

In the late Precambrian, multicellular animals evolved, but only in its last part, the Ediacaran, did they reach macroscopic sizes. This became possible by the increased availability of free oxygen needed by each living animal cell. An enhancement of gas exchange was achieved with the evolution of a blood (or hemolymph) circulation, which made three-dimensionally extended body plans feasible, being no longer dependent on diffusion alone.

Nutritional benefits of predation grew, and evasion from predators improved, with fast movements. These faster movements required an active blood circulation and nerves linking sensory organs with muscles. Increased sophistication of nervous control systems in a brain allowed "deliberate" choices between alternative behavioral routines (e.g., feeding, flight, fight, courting), directed by a sentient functionality.

As stated,<sup>4</sup> the biblical "living souls" appear to be animals large enough to need an inner circulation and having a nervous system of sufficient complexity to allow fast movements. This would include many Cambrian and some Ediacaran invertebrates. For lack of a better biological term, I called them "higher animals." The only macroscopic pre-Ediacaran species were seaweed-like plants, in accordance with plants arising in the third "day."

In line with this "blood-and-nerves" specification of the first "living souls," the Old Testament correlates blood and "soul."<sup>5</sup> Significantly, God spoke to these creatures and blessed them.<sup>6</sup> For ancient Hebrews, organisms not conforming to this characterization would not be "living souls."

That the "living souls" were specially created does not deny their biological evolution. But a new dimension was created in them, sentient or psychological functionality, whose physical substrate had evolved. Science has not yet found a convincing explanation of the sentient (as distinct from behavioral) aspect.

Eshelbrenner's remark notwithstanding, I dealt with the spiritual dimension.<sup>7</sup> Humans alone are created in God's image, which provides a spiritual mode inaccessible to science. Furthermore, those accepting God's salvation are "born again" into a new, spiritual, eternal life. Thus, four "life dimensions" are shared by all such believers, three by all humans, two by "higher animals," while "lower" organisms and plants have the dimension of biological life only.

Eshelbrenner alludes to problems of a separation of body, soul, and spirit at death; of its reversal at resurrection; and even of a speculative intermediate state (unknown in the Bible). A plausible solution may be a "God-time," which is not collinear with physical time, but something like a second time dimension, allowing for an immediate shunt over large physical time periods for those "asleep."<sup>8</sup> God would keep the dead alive as hidden "seeds,"<sup>9</sup> like information in a mental database.

I agree with Eshelbrenner that Christ's incarnation, death, and resurrection are absolutely unique. Nevertheless, Christ's assuming common human body-soul-spirit dimensions provides for the cross and the resurrection, and thus for all believers' justification and transformation into eternal life. Although we have a foretaste through the Holy Spirit, we cannot yet conceive what we shall be as multidimensional body-soul-spirit-eternity persons after Christ's image.<sup>10</sup>

## Notes

<sup>1</sup>D. Eshelbrenner, "Soul-Doctrine," *PSCF* 57 (December 2005): 342-3.

<sup>2</sup>P. Rüst, "Dimensions of the Human Being and of Divine Action," *PSCF* 57 (September 2005): 191-201.

<sup>3</sup>Gen. 1:20.

<sup>4</sup>P. Rüst, "Dimensions of the Human Being and of Divine Action," endnotes 21 and 24.

<sup>5</sup>Gen. 9:4; Lev. 17:11-14.

<sup>6</sup>Gen. 1:22.

<sup>7</sup>P. Rüst, "Dimensions of the Human Being and of Divine Action," 195-7.

<sup>8</sup>Luke 23:43; 1 Thess. 4:13-17.

<sup>9</sup>1 Cor. 15:37-42; Matt. 22:31-32; Ps. 139:16.

<sup>10</sup>1 Cor. 15:47-54.

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## On Freedom and Incarnation in Nonreductionistic Materialism

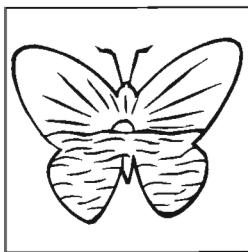
P. G. Nelson (*PSCF* 58, no. 1 [March 2006]: 86f) responds to my challenge to nonreductionistic materialism [*PSCF* 57, no. 3 [Sept. 2005]: 187-90]. He first attempts to defend human freedom, claiming that disturbing a balanced quantum mechanical state represents personal choice. For it to be a personal decision, the individual must be at least rudimentarily aware of the alternatives and make a conscious decision between them. What mechanism or process sets up the balanced state, produces awareness of it in the decider (awareness by the superscientist does not count), and then consciously switches it? How does the evanescent quantum state persist long enough to allow the decision? To be sure, Nelson introduces an "I" to decide, but the entity is without minimum, let alone effective, connection to the required awareness.

Secondly, if personality is a function of brain—with social interactions, of course—how does a nonphysical spiritual being have a personality? Furthermore, how does a nonphysical spirit "fuse" with a nonspiritual body in the hypostatic union? We are back to the Cartesian dualism that spawned Malebranche's occasionalism and Spinoza's neutral monism. I think of only two possible solutions. One may deny spirit by following Hobbes, the only philosopher I know of who is a materialistic theist, insisting God has a body. Alternatively, one may have an analog of monotheism, but more like demon possession than incarnation. However, I cannot exclude either additional unpalatable possibilities I have not recognized, or a more subtle solution that meets biblical requirements.

I fail to see that Nelson has moved toward a solution to the problem that I posed at Trinity Western University in 2004. Thus, the only viable resolution for the Christian remains the recognition that science cannot detect spirit, whether human or divine. This does not diminish the relevance of neuroscience. It merely underscores the recognition that no natural science determines ultimate metaphysical answers. Consequently, the original challenge remains: "... they need to produce a clearly stated Christology ..."

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## Art Eyes Science

*Glimpses: Nature in Praise*

# *Glimpses: Nature in Praise*

Lois Yoder

## *On Land*

### Seeds

life bursts —

trillions

fall —

embed —

wait —

buckle —

with silent heave —

move the earth



### Butterfly Roost

beneath prairie flowers

wings

downward

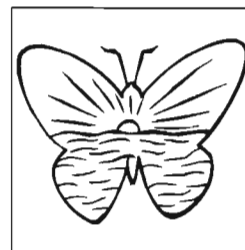
fold

pushing sky

overhead

the stars





## *And Sea Wave*

### Barnacle

opening

closing

food doors

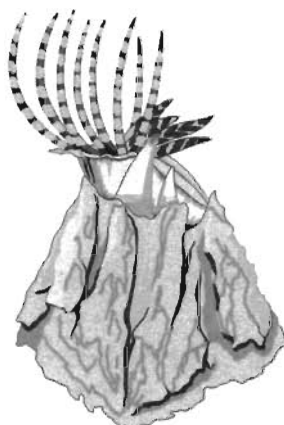
riding

seven seas

above

host's

eye — lid



### Squid

brisk

aerials

forward

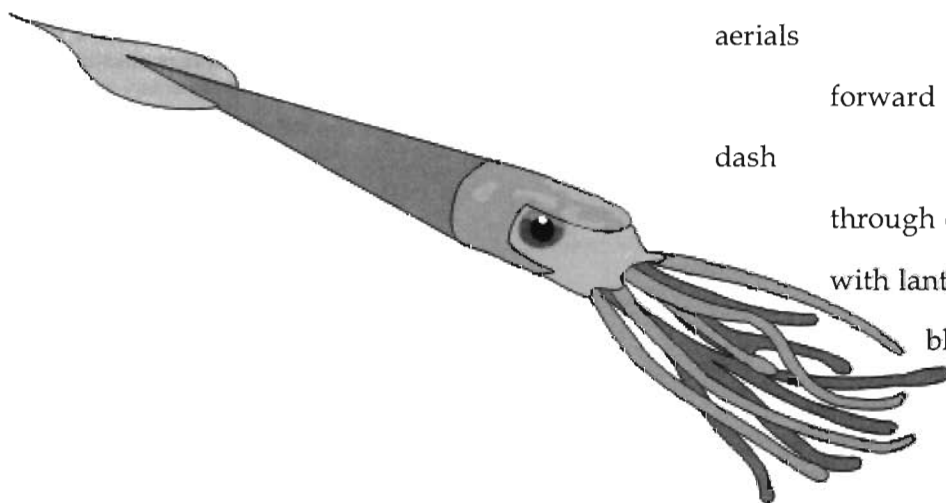
dash

through dark waves

with lanterns

blazing

prophets



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**Lois Yoder**, a writer from Harrisonburg, VA, earned her B.A. and M.A. in composition and rhetoric from the University of the District of Columbia. She states that "the spiritual is my life" which leads her to inquire into God's universe, including the human story, through poetry. The title of her inquiry is "From Bud to Blossom." Her poems are arranged in seventy poem cycles and many are in dramatic form. Her other works include children's stories and a cookbook.

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Articles appearing in *Perspectives on Science and Christian Faith* are abstracted and indexed in the *Christian Periodical Index*; *Religion Index One: Periodicals*; *Religious & Theological Abstracts*, and *Guide to Social Science and Religion in Periodical Literature*. Book Reviews are indexed in *Index to Book Reviews in Religion*. Present and past issues of *PSCF* are available in microfilm form at a nominal cost. For information write: University Microfilm Inc., 300 North Zeeb Rd., Ann Arbor, MI 48106.

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