PERSPECTIVES ON SCIENCE AND CHRISTIAN FAITH

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Reading Genesis: The Historicity of Adam and Eve, Genomics, and Evolutionary Science

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

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Editorial

Arie Leegwater

A Hard Lesson: Interpretation, Genomic Data, and the Scriptures

On a late April 2010 visit to the Smithsonian National Museum of Natural History in Washington, DC, I viewed a diversity of exhibits, particularly those in the David H. Koch Hall of Human Origins. To move from panel to panel describing and detailing the evolution of humans from primate forebears to modern humans, one is taken on a journey of over seven million years. This mind-boggling experience, coupled with a recent *Science* issue (328 [7 May 2010]: 710–22) detailing the mapping of the Neanderthal genome and its genomic heritage in modern humans, and reading this issue of *PSCF,* devoted to the historicity of Adam and Eve, genomics, and evolutionary science, challenged some of my long-cherished positions. Such encounters call for a serious examination and reconsideration of certain crucial matters.

Speaking personally, it was a hard lesson to digest, as I suspect it may be for many readers of *PSCF*. What should we make of all the diverse anthropological evidence collected from several continents as well as the recently acquired detailed genomic data? Should we sweep it under the rug, considering it to be the result of a shameful misguided investigation, since it assumes a view that calls into question the "plain straightforward reading of Scripture"? Or should we dispute the science and suggest the data is open to multiple concordist interpretations? Neither of these positions would be fair to the nature of scientific practice. "Science in God's world has its own proper task of giving joy, its own peculiar ministry of healing, its own God-given gift of serving up nuanced insight for one's neighbor" (Calvin Seerveld). Nor would either position honor the role of hermeneutics in interpreting biblical literature.

Parenthetically, as an editor, I have often hoped that I could keep these matters at a studied distance, because, in my opinion, there are many other pressing and important issues which the Christian community needs to address and which, due to the ferocity of the debates, frequently become emasculated. And secondly, and for perhaps far too long, a discussion of origins has functioned (for many) as the self-identity or touchstone of our affiliation.

But, back to the matter at hand. If we accept the long-drawn-out saga of the evolution of living forms in creation, how must we then understand ourselves? Where and how do we humans "fit" in this development? That question is often the dominant theme in our discussions. As someone has perceptively remarked, "It is not the 'fourth day,' but rather the 'sixth day' that is in question." To hold that the center and meaning of our life lies outside ourselves may be a posture that many persons and different religions share. But to honor this position as a Christian confession takes one on an eccentric and peculiar journey. In his *Institutes,* Calvin raised the classic question of human self-understanding, the question of how humans can know themselves. The answer that Calvin gives points us away from our desire to first examine ourselves: "Again it is certain that man never achieves a clear knowledge of himself unless he has first looked upon God's face, and then descends from contemplating him to scrutinize himself" (I.i.12). We, as humans, are essentially God-related creatures *(Homo religionis)*.

While recognizing our human condition, we also need to tread carefully. The intense debates often assume the stage is set by positing "hard scientific data" to be in tension with our (systematic) theologies. In simple terms, the scene is portrayed as a battle between believing science and believing Scripture. Should science be interpreted by Scripture or Scripture by science? We desire simple satisfying answers. To a large extent, however, we have simplified the issues. Putting the matter in

this way, I think, will cause us to lose sight of the integrity of both the Bible and of science. If the reliability of the Bible as the Word of God is wedded to its scientific reliability, the "scientific" battles for an infallible Word of God have been lost from the start. We have then placed both on the same (scientific) level, and in the process, we will lose the reliability of the Scriptures. The Scriptures are not written as a historical research report, nor do they give a scientific account. Rather, they are a testimony of faith, albeit in the form of God-inspired literature. The Bible is part of creation which bears witness to the Word of God who was present at Creation. The Bible points us to Christ. The Bible is not divine. The Holy Scripture in its entirety is revelation, but it is not the whole of revelation. Reducing the Word of God to the Scriptures can be a form of bibliolatry. The revelatory Word of God for creation speaks to its reliability and trustworthiness.

Stating it differently, the Bible speaks in pre-scientific language and pictures. It employs the language of the day, reflecting the world-picture of the original audience. The language of the Bible is accommodated to the cosmological and historical awareness of the day. In our eyes, these cosmological world-pictures may seem hopelessly scientifically naive, but the Word and Spirit are able—the church confesses—to penetrate our hearts, regardless of our local customs and situations, or of the world-pictures we hold.

In addition, we often discount the philosophical and historical contexts that undergird many of our procedures of interpretation. We live in a westernized rationalist culture which probably reached its zenith in the Enlightenment, but is still clearly regnant in the practice of the natural sciences and the theological sciences. This historical context has shaped our view of the Bible and its interpretation: we like (or deem it necessary) to compare the scientific propositions of science with the propositional revelation (teachings) of Scripture. In an effort to counteract the rational infallibility of scientific propositions, Christians respond with the rational infallibility of revealed propositions. Consequently, employing the term "inerrancy" to describe the character of the Scriptures seems inherently tied to a rationalistic and positivistic position and plays into the hands of higher criticism. Our intellectual instincts tend to treat faith as basically an intellectual matter. But faith is much richer in its purview. "Faith is the assurance of things hoped for, the conviction of things not seen" (Heb. 11:1, RSV). Faith has to do with promises and expectations, with the certainty of our identity as God-related creatures.

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In This Issue

As mentioned in the editorial, this special theme issue of *PSCF*, increased to eighty-eight pages, is devoted to a discussion of the historicity of Adam and Eve, genomics, and theological reflection in the light of evolutionary science. I owe a debt of gratitude to Walter Bradley (Baylor University) who organized a symposium on these topics at the 64th ASA Annual Meeting held at Baylor University in 2009. The authors of the four main articles have greatly refined their lectures since they were first delivered. I consider it important to publish this quartet in the same issue of *PSCF*. The articles are written by three theologians, C. John (Jack) Collins (Covenant Theological Seminar), Daniel Harlow (Calvin College), and John Schneider (Calvin College); and a geneticist, Dennis Venema (Trinity Western University). The issues discussed are of perennial interest to the evangelical community. The reader will encounter a number of diverging and challenging views. As is to be expected, this dialogue is conducted with Christian civility and sensitivity.

This issue concludes with an essay book review written by Michael Keas (College at Southwestern). It is a comparative evaluation of two recent books authored by Jack Collins and William Dembski; both were speakers at the ASA meeting at Baylor. Several book reviews and letters complete the issue.

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Adam and Eve as Historical People, and Why It Matters*

C. John Collins

C. John Collins

The best way to account for both the biblical presentation of human life and our own experience in the world is to suppose that Adam and Eve were real persons, and the forebears of all other human beings. The biblical presentation concerns not simply the story in Genesis and the biblical passages that refer to it, but also the larger biblical storyline, which deals with God's good creation invaded by sin, for which God has a redemptive plan; Israel's calling to be a light to the nations; and the church's prospect of successfully bringing God's light to the whole world. The biblical presentation further concerns the unique role and dignity of the human race, which is a matter of daily experience for everyone: all people yearn for God and need him, depend on him to deal with their sinfulness, and crave a wholesome community for their lives to flourish.

Throughout most of the church's history, Christians, like the Jews from whom they sprang, have believed that the biblical Adam and Eve were actual persons, from whom all other human beings are descended, and whose disobedience to God brought sin into human experience. Educated western Christians today probably do not grant much weight to this historical consensus. After all, they reason, for much of the church's history, most Christians thought that creation took place in the recent past over the course of six calendar days, and even that the earth was the physical center of the universe. We are right to argue that we do not change the basic content of Christianity if we revise these views, even drastically. Effective revisions are the ones that result from a closer reading of the Bible itself—when, after further review, we no longer think that the Bible "teaches" such things. Well, then, may we not study the Bible more closely and revise the traditional understanding of Adam and Eve as well, without a threat to the faith?

Some of the factors that lead to questioning a real Adam and Eve include the perceived impossibility that we could be affected at our deepest level by anything done long ago; the parallels between the themes in Genesis and what we find in stories from other Ancient Near Eastern cultures (which lead some to conclude that Genesis is just as "mythical" as these other stories are); and advances in biology that seem to push us further away from any idea of an original human couple through whom sin and

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death came into the world. Evolutionary history shows that death and struggle have been part of existence on Earth from the earliest moments. Most recently, discoveries about the features of human DNA seem to imply that the human population has always had at least as many as a thousand members. Prominent among the Christian biologists is Francis Collins and his "Biologos" perspective, which agrees that traditional beliefs about Adam and Eve are no longer viable.[1]

In this study, I aim to show why we should retain a version of the traditional view, in spite of these pressures. I will argue that the traditional position on Adam and Eve, or some variation of it, does the best job of accounting, not only for the biblical materials, but also for our everyday experience as human beings—an everyday experience that includes sin as something that must be forgiven (by God and by our fellow human beings) and struggled against as defiling and disrupting a good human life.

We look first at the shape of the biblical story—from creation to Fall to redemption and final consummation—and the worldview that rides on that story, and see whether it requires a historical Adam and Eve and a historical Fall. Second, we consider the biblical view of human uniqueness and dignity, and relate these to everyday moral and religious experience, asking whether these, too, favor the traditional position. And finally, we look at some sample scenarios for a scientific understanding of human origins. Due to space, I must save a great deal of detail for another venue—namely, a book-length treatment of these questions.

Admiring the way that C. S. Lewis used "mere Christianity" as his stance, I will christen my position here "mere historical Adam-and-Eve-ism." I am not entering into distinctions between various Christian positions on such topics as the origin of Adam's body, or how long ago he lived; the meaning of "the image of God"; how the sin of Adam and Eve comes to affect us; how Genesis 1–2 came to be part of the same book.[2] In fact, even though I will critically examine some of the specific views that Collins presents, I am not here offering a general critique of the Biologos perspective.

I have said "a version of" and "some variation of" the traditional ideas. One of the basic principles of critical thinking is expressed in Latin as *abusus usum non tollit*, "Abuse does not take away proper use." It is entirely possible that some killjoy has used a traditional view of the first sin of Adam and Eve to quell all delight in pleasure and beauty. But that is a *mis*use, and the possibility of misuse is not a logically valid argument against the traditional view. Suppose we do find some difficulties. This may mean that we should try to make some adjustments to the traditional view, but it does not, of itself, mean that we ought to discard the traditional view altogether.

Critical thinking also requires us to be careful in how we approach some of the terms traditionally used, such as "the Fall" and "original sin." When people deny a historical Adam and Eve for theological reasons, they are commonly objecting to these ideas. I cannot always tell whether they object to *some* version of these ideas, or to *every* one of them. As I have just observed, though, even if we are right in rejecting one version, that does not mean we are right in rejecting all versions. Further, it simply will not do to argue that since the Bible does not use these terms, therefore they are "unbiblical." Most people have been well aware of the absence of these terms as a philological fact, and have still used the terms as a theological shorthand. To the extent that I use the terms myself, I employ them as a shorthand as well. I imply, not simply that humans are "sinful" (which is something we all can see), but that sinfulness was not part of our original make-up, and derives from some primal rebellion on the part of our first ancestors. I am not developing a "doctrine" of original sin, since I am not trying to explain *how* that primal rebellion comes to affect all of us.[3]

This is important to clarify, because some authors suggest that we only hold on to Adam and Eve because of western and "Augustinian" views on "original sin"—views not shared by sectors of the church that do not consider Augustine (AD 354–430) reliable. Now it is true, for example, that the eastern churches do not talk about original sin the way that Augustine did; but it does not follow that they therefore have nothing to say on the subject. As a matter of fact, it is common for eastern writers (speaking Greek and Syriac) and pre-Augustinian western writers from the early church to accept Adam and Eve, and their first disobedience, both as historical and as having consequences for us their children. Examples of such writers include the Greek speakers Irenaeus (d. 202), Origen (185–254), Athanasius (293–373), John Chrysostom (c. 344–407), and Theodore of Mopsuestia (350–428); the Syriac speaker

Ephraem the Syrian (306–73); and the Latin speakers Tertullian (c. 160– 220) and Cyprian (d. 258).[4]

Whenever we read something, we must pay attention to what kind of literature it is. Certainly, the book of Genesis includes Adam and Eve in its story, using a narrative, which is "history-like" in its form. But just identifying that form does not, of itself, settle anything; there are at least four possible ways of taking the material in Genesis:

1. The author intended to relay "straight" history, with a minimum of figurative language.
2. The author was talking about what he thought were actual events, using rhetorical and literary techniques to shape the readers' attitudes toward those events.
3. The author intended to recount an imaginary history, using recognizable literary conventions to convey "timeless truths" about God and humans.
4. The author told a story without even caring whether the events were real or imagined; his main goal was to convey various theological and moral truths.

I think option 2 best captures what we find in Genesis, and best explains how the Bible and human experience relate to Adam and Eve. Option 1 is ironic: it is held both by many traditional Christians, especially young-earth creationists, and by many biblical scholars who endorse what is called "historical criticism." The difference is that the young-earth creationists think that Genesis was telling the truth, and the critical scholars think that Genesis is largely incorrect in its history. Mind you, this does not mean that critical scholars find no value in Genesis; they commonly resort to something like option 4.

Critical biblical scholars often (though not always) deny that Adam and Eve were real people, though they agree that the author of Genesis *intended* to write of real people. Those who follow option 3 say that the author never intended for us to think of Adam and Eve as real, while those who follow option 4 say that it simply does not matter. When a particular scholar denies that Adam and Eve were historical, I cannot always tell which interpretive option he or she has followed; sometimes I wonder if the scholar knows! Of course, all of us, traditional and otherwise, run the danger of *starting* with the affirmation or denial of a real Adam and Eve, and then looking for a way of reading our starting point into the Bible.

The Shape of the Biblical Story

Story and Worldview

A number of developments in biblical studies over the last several decades have deeply enriched our ability to read the Bible well. One of these is the way we have come to appreciate the literary qualities of the biblical books, and the rhetorical purposes that may govern the way the authors tell their stories.[5]

Another development is that we pay more attention to how the biblical writings function to shape a worldview in the people of God.[6] I am using the term "worldview" in the way students of ideology use the term, for the basic stance toward God, others, and the world that persons and communities hold.[7] It has further become clear that a worldview is instilled by means of the grand story, which tells a community where it came from, what went wrong, what has been done about it (whether by gods or by humans, or some combination), where it now is in the whole process, and where the whole world is headed. One missiologist suggests that tribal peoples learn their worldviews through the sacred stories their culture tells; but this is true of *all* peoples, not just of tribal ones.[8]

A number of theologians have argued that the Bible presents us with an overarching worldview-shaping story, and not simply with a bunch of edifying stories.[9] We will take up the specific contours of this story shortly. Albert Wolters and Michael Goheen have shown why this is a crucial insight:

> To miss the grand narrative of Scripture is a serious matter; it is not simply a matter of misinterpreting parts of Scripture. It is a matter of being oblivious to *which story is shaping our lives*. Some story will shape our lives. When the Bible is broken up into little bits and chunks—theological, devotional, spiritual, moral, or worldview bits and chunks—then these bits can be nicely fitted into the reigning story of our own culture with all its idols! One can be theologically orthodox, devotionally pious, morally upright, or maybe even have one's worldview categories straight, and yet be shaped by the idolatrous Western story. The Bible loses its forceful and formative power by being absorbed into a more encompassing secular story.[10]

People who write about the relationship between worldview and overarching story do not always use the same verbs for the relation between the story and the worldview. Does the story *carry* the worldview, *equate to* it, *communicate* it, or something else? However we articulate this, there is one common affirmation: the worldview is not an abstraction derived from the story; one cannot treat the story simply as the husk, which we then discard once we have discovered the (perhaps timeless) concepts. Of course, there may well be transcendent truths (such as moral norms); but they gain their power from their place in the story—that is, they equip the members of a community to play their parts in the story meaningfully.[11] It is the worldview story that, if well told, captures the imaginations of those who own it, thereby driving them on and holding their loyalty.

History, Myth, and Worldview Story

This notion of a worldview story ties in with the sense of "myth" in C. S. Lewis' essay, "The Funeral of a Great Myth."[12] Here Lewis is describing the story of "developmentalism," a purely naturalistic evolutionary tale of how we got here and where we are going. He distinguishes this story from the theories of the particular sciences: the story uses the theories to the extent these theories support the story.[13] What makes this "myth" attractive is its imaginative appeal; as Lewis said, "I grew up believing in this myth and I have felt—I still feel—its almost perfect grandeur."

Could it be that "myth" is the right category for the kind of stories we find in the ancient world, whether from the Egyptians, Mesopotamians, or even the Hebrews? The difficulty is that the word "myth" has so many different meanings;[14] in popular usage, the term implies a judgment that the story is not true. Further, consider how the Old Testament scholar Peter Enns defines "myth":

> It is an ancient, premodern, prescientific way of addressing questions of ultimate origins and meaning in the form of stories: Who are we? Where do we come from?[15]

One problem (among several) with Enns' definition is that telling stories to explain origins and meaning is by no means limited to "ancient, premodern, prescientific" cultures. Modern Western culture does exactly the same. For example, George Gaylord Simpson drew this conclusion from his study of evolution: "Man is the result of a purposeless and natural process that did not have him in mind."[16] This is, in fact, a story, albeit a bleak one, that puts our lives in perspective. If it is the true story of the world, it is a heightened version of what Macbeth said when he discovered that Lady Macbeth had committed suicide: "Life's … a tale told by an idiot, full of sound and fury, signifying nothing."[17]

We are comfortable applying the word "myth" to the stories from Ancient Near Eastern or Graeco-Roman peoples other than the Jews and Christians—because we do not accept them as factual. However, the evidence is that, at least in Mesopotamia (whose tales are the closest correlate to Genesis 1–11), the stories were felt to be true: true, that is, in the sense of talking about real events.[18] As Egyptologist Kenneth Kitchen has observed,

> The ancient Near East did *not* historicize myth (i.e., read it as imaginary "history"). In fact, exactly the reverse is true—there was, rather, a trend to "mythologize" history, to celebrate actual historical events and people in mythological terms … The ancients (Near Eastern and Hebrew alike) knew that propaganda based on real events was far more effective than that based on sheer invention.[19]

Kitchen further argues,

> As to definition [for the flood story], myth or "protohistory," it should be noted that the Sumerians and Babylonians had no doubts on that score. They included it squarely in the middle of their earliest historical tradition, with kings before it and kings after it.[20]

Thus, if we try to see those peoples from the inside, we can say that they thought they were telling the truth, of which history is a part. The function of the stories is to present life in terms of a coherent story, that is, the stories serve to convey a worldview and to equip the hearers to live in the world.[21]

Now, Genesis 1–11 has so many points of contact with Mesopotamian stories of origins, ancient kings, the flood, and subsequent kings, that we should find those stories as the proper literary backcloth against which the Genesis stories were written. Genesis 1–11 aims to provide the true pre- and protohistory of the Bible's alternative worldview story, whose "purpose is to shape Israel's view of God, the world, and mankind, and their place in it all."[22]

This leads us to the question of the relationship between "history" and the worldview story; but to

address this question, we must first decide what we mean by the word "history." The word "history" can be used in a variety of senses, and when writers are not clear on what sense they attach to the word, we can get confusion. A text might be "historical" in one writer's sense but not "historical" in another's. For example, some scholars use the word "historical" for an account that is told in proper chronological order, with few imaginative elements. Others restrict the word "history" to the kinds of accounts that trained historians write, or even to accounts that leave out all references to actions of God or the gods—and this could lead to the odd assertion, "This narrative is not *historical*, but that doesn't mean it didn't happen"![23]

Some connect "historicity" very tightly with "literalism" in interpretation, assuming that if a story is "historical," it must not make much use of figurative elements. This connection is common ground between the strict young-earth creationist Douglas Kelly and the evolutionary creationist Denis Lamoureux. Kelly apparently reasoned thus: since the creation story of Genesis is "historical," it therefore must be read in what he calls a "literal" fashion.[24] I think this leads to a poor interpretation of the creation story, but that is not my point here. Lamoureux comes to very different conclusions from the same starting point: since the creation passage is not "true" when read literalistically, therefore it is not "historical."[25] A proper reply to this assumption would require discussion of what happens when people communicate, drawing on speech act theory and rhetorical criticism. I hope to take that up elsewhere; for now, I simply observe that there is nothing in the meaning of the word "history," nor in common human behavior, that requires this tight connection.

I use the ordinary language sense of the word "history." A story is "historical" if the author wanted his audience to believe that the events recorded really happened. This definition does not settle every question of how we should correlate the literary statements with the way *we* would describe things, since we have to take into account the communicative purpose of the text we are considering. In particular,

1. "historical," in this sense, is not the same as "prose," and certainly does not imply that our account has no figurative or imaginative elements;
2. "historical" is not the same as "complete in detail" or "free from ideological bias," neither of which is possible or desirable anyhow;
3. "historical" is not the same as "told in exact chronological sequence," unless the text claims that for itself.[26]

This means that we should think of "history" less as a literary *genre* (another word that has multiple, and unregulated, meanings), and more as *a way of referring to events*. That is, if we say that something is (or is not) historical, we are describing, not the kind of literature it is, but the way it talks about (or does not talk about) real events. Differing literary genres refer to events in different ways for different purposes—or make up fictitious events.

The conclusion to which this discussion leads us is this: If, as seems likely to me, the Mesopotamian origin and flood stories provide the context against which Genesis 1–11 are to be set, then they also provide us with clues on how to read this kind of literature. These stories include divine action, symbolism, and imaginative elements; the purpose of the stories is to lay the foundation for a worldview, without being taken in a "literalistic" fashion. We should nevertheless see the story as having what we might call a "historical core," though we must be careful in discerning what that is. Genesis aims to tell the story of beginnings the right way.[27]

No one knows what materials the author of Genesis used in composing this story. Probably he had access to some versions of the Mesopotamian stories; but beyond that, God alone knows what else he might have had. Maybe there were Hebrew stories of the patriarchs, beginning with Abraham; some of them might even have been written. Perhaps Henri Blocher's suggestion is best, that the author of Genesis "reconstructed" the past, working backwards from ordinary human experience to what must have caused it, giving us a tale that provided a contrast to the other stories:

> Genesis aims to supply the true reconstruction, guided and guaranteed by divine inspiration, over against the fantasies and errors reconstructed by the others. There is nothing in that which allows us to take the event as a symbol.[28]

Blocher also points out that "the presence of symbolic elements in the text in no way contradicts the

historicity of its central meaning."[29] Another observation from Blocher is also helpful:

> The real issue when we try to interpret Genesis 2–3 is not whether we have a historical account of the fall, but whether or not we may read it as the account of a historical fall. The problem is not historiography as a genre narrowly defined—in annals, chronicles, or even saga—but correspondence with discrete realities in our ordinary space and sequential time.[30]

If we recognize this, then we can see that authors who say things like, "Genesis 1–11 aims to tell us, not history or science, but theology,"[31] are trying to say something worth saying about Genesis 1–11, but they are indulging in a problematic disjunction. The theology is not separable from the story, as we can see from the fact that one of those "theological truths" is that the One who created the world is the good God who revealed himself to Israel, and not the capricious gods of the other peoples—a historical assertion!

Some authors go even further, and propose that the main goal of the early part of Genesis is to convey "timeless truths."[32] I doubt whether these truths are really as "timeless" as supposed. Besides the "timeless theological truth" that "God created," which is actually historical (and therefore *not* "timeless"), scholars thinking along these lines might suppose that Genesis 3 teaches that "humans are sinful." But this is not a timeless truth on its own. Sooner or later someone will want to know, did God create humans with a tendency (or at least an openness) toward sinning, or did he make them good, only for humans to *become* sinful? If they became sinful, how did that happen? Do not our innermost intuitions favor the explanation that humans have somehow declined from a prior state of goodness and health? In other words, the supposed timeless truth, once it interacts with actual human experience, demands answers to historical questions.

If we recognize that these stories serve to convey a worldview, then that also guides us in how to receive these stories as Scripture. The stories tell us what combination of choices and actions, on the part of God and humans, have led up to where we are now. They call on us to learn from those choices, and they enlist the faithful to play their part in the ongoing story.

Now, this has not always been the way that Christian and Jewish preachers and devotional writers have approached the stories; often these preachers and writers have treated the tales as instantiations of some "timeless" moral or spiritual truism. I do not deny a place for this approach; we find something like it, for example, in Hebrews 11. But the historical element should always be there. The common devotional approach among Christians and Jews, however, usually loses the historical element altogether, in favor of the "timeless." This approach has a theorist, Aristotle, who wrote (*Poetics*, 9.1–3) about his preference for what he called "poetry" (fictional narrative) over "history" (a tale of things that actually happened, even if told in verse). For Aristotle, "poetry" deals with the universal and thus is more "philosophical," while "history" is too particular.

The recent Genesis commentary of Leon Kass strongly advocates that we read Genesis "anthropologically" and "philosophically" (intentional echoes of Aristotle?) rather than "historically": as a record, not of what *did* happen, but of what *might* happen, and what *always* happens.[33] This, he contends, gives us a much richer way of reading. Literary scholar Alan Jacobs, however, sees clearly that Genesis itself does not invite this kind of reading, since its audience is the heir of its events. Jacobs, reviewing Kass' book, observed:

> Philosophical reading strives to locate in the text whatever is universal to human experience, and to find ways of describing the particular experiences of particular people in the most broadly relevant terms possible …
>
> From one who belongs to a covenant community, then, the appropriation of the biblical narrative must be done by *historical* rather than what Kass would call philosophical means. Our task is not to find a conceptual vocabulary that will allow us to build analogical bridges between the biblical text and our experience; rather, we must understand that we dwell in the same history that the people of Israel relate in the Pentateuch … Genesis is not *analogous* to our experience, it *is* our experience, in its historical aspect.[34]

Against Kass' claim that Genesis is primarily about whether it is "possible to find, institute, and preserve a way of life that accords with man's true standing in the world and that serves to perfect his godlike possibilities," Jacobs replies,

> Genesis, and the culture from which it emerges, doesn't seem to give a damn about our "true

> standing in the world" and our "godlike possibilities"; rather, as far as I can tell, it is about God and what he has done, and is doing, to repair what his rebellious and arrogant creatures have broken: our relations with ourselves, with one another, with the creation, and with God Himself.[35]

To see individual biblical stories in relation to the larger worldview story enables us to appreciate that laying stress on the particularity of a historical event takes nothing away from the personal and experiential side; rather, the historical guarantees that our experience is in touch with reality. Relating the biblical narratives to the overarching worldview story, therefore, treats those narratives as they deserve.

Features of the Biblical Story

Here is a simple summary of the biblical story and its function as Scripture:

> The OT is thus the story of the one true Creator God, who called the family of Abraham to be his remedy for the defilement that came into the world through the sin of Adam and Eve. God rescued Israel from slavery in Egypt in fulfillment of this plan, and established them as a theocracy for the sake of displaying his existence and character to the rest of the world. God sent his blessings and curses upon Israel in order to pursue that purpose. God never desisted from that purpose, even in the face of the most grievous unfaithfulness in Israel.
>
> This overarching story serves as a grand narrative or worldview story for Israel: each member of the people was to see himself or herself as an *heir* of this story, with all its glory and shame; as a *steward* of the story, responsible to pass it on to the next generation; and as a *participant*, whose faithfulness could play a role, in God's mysterious wisdom, in the story's progress …
>
> The NT authors, most of whom were *Jewish* Christians, saw themselves as heirs of the OT story, and as authorized to describe its proper completion in the death and resurrection of Jesus and the Messianic era that this ushered in. These authors appropriated the OT as Christian Scripture, and they urged their audiences (many of whom were *Gentile* Christians) to do the same. There is debate over just how the NT authors used the OT as Scripture …, but the simplest summary of the NT authors' stance would be to say that they saw the OT as constituting the earlier chapters of the story in which Christians are now participating.[36]

Any telling of the biblical story must include the notion of *sin*. Humans are estranged from God, and Israel is God's means of bringing light to the world. The theologian Cornelius Plantinga describes sin as "culpable disturbance of shalom," and though this will not work as the actual definition of any Hebrew or Greek word, it does capture one of the ruling ideas in the biblical worldview.[37] Sin is an intrusive element, a disturbance, which is why Israel's ritual system includes provisions for dealing with personal and corporate sin. Some of the sacrifices "work atonement" (e.g., Lev. 1:4; 4:20; 5:16), and though scholars of Leviticus debate over just what this expression means, at the very least it tells us that the sacrifices deal with sin as a defiling element that ruins human existence and renders people unworthy to be in God's presence.[38] The New Testament authors use these atoning sacrifices to explain the benefits of Jesus' death in dealing with the sins of believers. For example, when Peter tells Christians that they were ransomed "with the precious blood of Christ, like that of a lamb without blemish or spot" (1 Pet. 1:19), he is using the burnt offering—one of the atoning sacrifices—to explain what Jesus achieved.[39]

Further, the biblical authors show a keen interest in seeing moral improvement in the faithful, portraying it, fundamentally, as *restoring the damaged creation pattern*. Christopher Wright observes that the two crucial aspects of proper moral conduct are imitating "the character and ways of God" and returning to the good pattern of creation. He goes on to say,

> The purpose of the ethical provisions given in the context of redemption, which include both the covenant law of the Old Testament and the ethics of the kingdom of God in the New, is to restore to humans the desire and the ability to conform to the creational pattern—God's original purpose for them.[40]

The way that Genesis presents the call of Abraham (Gen. 12:1–3) indicates that God's intention was that through this man and his family, the rest of humankind was to find blessing. Genesis presents Adam in such a way that we can see Abraham, and Israel, as a "new Adam." This presupposes in all human beings some kind of common situation: a need for God, a distance from him due to sin, and the possibility of their moral transformation as they receive

the message. This commonality has traditionally been held to stem from their common origin.

The biblical story of God's expanding influence among all kinds of people is headed to a glorious conclusion, the final defeat and banishment of sin from human experience; those who cling to their sins will have no place in such glory (Rev. 21:1–8). Humanity's original task was to work outward from Eden, spreading Edenic blessings throughout the earth, turning the whole world into a sanctuary. Human sin interfered with humanity's ability to carry this out, but did not deter God from this plan. The book of Revelation portrays the final victory of God's purposes, using Edenic and sanctuary imagery to describe glorified human life—for believing Jews and Gentiles.[41]

Many contemporary theologians, however, see "evil" as something inherent in the very idea of a creation in which rational beings have free will. Take one example among many: W. Sibley Towner surveyed trends in twentieth-century interpretations of Genesis 3, and the impact of those trends in contemporary formulations of "original sin." After describing formulations of "original sin" in Roman Catholicism and in traditional Presbyterianism, Towner asserts,

> Modern believers and unbelievers alike tend to hold as patent nonsense the notion that all human sin and all death are generically descended from a single act by a single pair of human beings who lived at a single moment in time, or that the cause of their original transgression was Satan in the guise of a snake.[42]

He quotes with approval the opinion of Bruce Vawter:

> There was, therefore, no "fall" in the sense that men and women became something other than what they had been created … The story of the "Fall" is a paradigm of human conduct in the face of temptation, not a lesson in biology.[43]

This pattern of conduct is, apparently, inherent in being human.

We could criticize Towner's study on a number of levels. He wants to make his presentation more persuasive by mentioning the tendency of "modern believers and unbelievers alike." But who are these "modern" people, and why should we follow them? What does it mean that they "tend" to think a certain way? Can Towner cite a survey, or does he simply mean the modern people he knows? Have these modern people given reasons for their tendency, and do those reasons account for other deep instincts these people doubtless share (see Human Uniqueness and Dignity, p. 155)? And if they are now a majority, what of it? By Towner's own admission, a majority once held the view he rejects. Majorities can be wrong.

Towner claims Irenaeus (d. AD 202), a leading Greek-speaking theologian of the early church, as a forerunner to this modern view, in seeing "the Fall as a movement from childish innocence toward adult maturity." If this is right, then it should give us pause. However, Towner has distorted Irenaeus' actual view. According to Irenaeus, the first humans were created morally innocent, their innocence being more like that of a child than of a full adult. God's goal was for them to mature into moral confirmation, but the Fall *interrupted* the process.[44]

Further, Towner is selective in presenting biblical scholars, leaving out anyone who takes Genesis 3 otherwise—from the moderately critical S. R. Driver to the fairly conservative Derek Kidner, not to mention Alexander Heidel, a highly respected Assyriologist also competent in handling biblical material.[45] Heidel's being an Assyriologist leads to another, and larger point: the biblical scholars he cites respond to the similarities between Genesis and other Ancient Near Eastern stories by treating both kinds as equally unhistorical; but students of the other Near Eastern cultures often just as easily conclude that the Bible writers had a concern for actual events (see History, Myth, and Worldview Story, p. 150). Finally, Towner never analyzes whether the trends in exegesis find their attractiveness more in the preferences of "modern believers and unbelievers," than in the features of the Bible itself.

A number of theological motivations lie behind these contemporary efforts, and each scholar has his own subset of this group of motivations. One motive is to defend the reality of human freedom; another is to address the existence of pain and suffering in a world that God is supposed to have made.

No one can avoid these big questions, it is true, but I judge efforts like Towner's a failure to do justice to those questions. If we say that being prone to sin is inherent in being human with a free will, then we must say the Bible writers were wrong in describing atonement as they did, and we must also say that Jesus was wrong to describe his own death in these

terms (e.g., Mark 10:45). Further, we have now made nonsense of the joyful expectation of Christians to live one day in a glorified world from which sin and death have been banished (Rev. 21:1–8). Do these theologians mean to imply that those who dwell in a glorified world will be less human because they no longer sin?

Nor do these attempts let God off the hook for pain and suffering; or if they succeed in doing so, then the price is sickeningly high. Did God know about evil before he made the world? Most believers would say yes, and they trust that he had his reasons for "allowing" it. But these recent efforts seem to imply that somehow God just could not help himself; the only world he *could* make was one in which people commit evil. At least in the traditional understanding, *humans* are to blame for the evil they do and the pain they inflict; here, we can only blame God. This is not the biblical view of God, whose very power and moral purity provokes such perplexity among his faithful (cf. Hab. 1:12–13). Neither does the modern approach give us any reason to hope that God will be able to succeed in achieving his final victory.

Another way to put my objections to these alternatives is to say that they end up telling a very different story from the one we find in the Bible. They also make God out to be a very different character from the One the Bible writers describe. Finally, they fail utterly to address one of our deepest intuitions, that there is something wrong with sin and death, and that we need God to help us and to heal us. This is exactly why Paul can describe the resurrection of Jesus as the firstfruits, the guarantee of our final healing (1 Cor. 15:23). In that same passage, he describes sin and death as enemies (cf. 1 Cor. 15:26, 56) that God will finally and utterly defeat for the sake of his faithful. Jesus, in rising from the dead, set in motion the undoing of Adam's first sin (1 Cor. 15:21–22).

On the whole, then, the features of the biblical story strongly support Plantinga's main point, that in "sin" we have something that is "not the way it's supposed to be." As he puts it,

> "Culpable disturbance of shalom" suggests that sin is unoriginal, that it disrupts something good and harmonious, that (like a housebreaker) it is an intruder, and that those who sin deserve reproach …
>
> A bad strain has gotten into the stock so that we now sin with the ease and readiness of people born to the task … This fact, empirical as well as biblical, lies behind a broad consensus on original sin. Although, partly because of the silence of Scripture, Christians of various theological orientations differ on central issues in the doctrine of original sin—for example, how a child acquires the fateful disposition to sin, whether this disposition is itself sin, how to describe and assess the accompanying bondage of the will—they agree on the universality, solidarity, stubbornness, and historical momentum of sin.[46]

The story of Adam and Eve, and their first disobedience, explains how sin, the alien intruder, first came into human experience, though it hardly pretends to explain how rebellion against God (as expressed in the serpent's speech) originated to begin with.[47]

Human Uniqueness and Dignity

Now I want to show how the biblical understanding of human nature—what is true of all people, and distinguishes us from the other animals—actually links up with everyday human experience, of believer and nonbeliever alike. The biblical picture, based on the biblical storyline, actually makes sense of this experience—and this very act of making sense commends the biblical picture to us all. A scientific history of humankind must account for this data, if it is to be worth believing.

The Image of God

The image of God is distinctly human in Genesis. Unfortunately, biblical scholars do not agree on just what the "image" means. Some suppose that this means that human beings are like God in some respects, such as intellectual, moral, and aesthetic experience. This *"resemblance"* view was once the most common interpretation, but two others are much more common today. Some think that the image of God is the way that humans are appointed to rule the creation on God's behalf; call this the *"representative"* view. Others conclude from the way in which Gen. 1:27 describes human beings as "male and female," that it is male and female together, or more broadly, humans in community, that functions as the image of God; this is the *"relational"* view.

It is common to treat these categories as mutually exclusive, but this is surely mistaken. The linguistic details favor the idea that "in our image, after our likeness" implies that humans were made with some

kind of resemblance to God; this was to enable them to represent God as benevolent rulers, and to find their fulfillment in their relationships with each other and with God. I combine all three views, though I start with the resemblance position.[48]

In the same way, anyone who is convinced of the representative or relational view must also recognize that these views presuppose some distinctive human capacities that make the ruling and relationships possible. Therefore, no matter which interpretation of the image of God we prefer, we can see that it implies something about human capacities that are different from those in any other animal. These capacities in humans echo those that God displayed in creation: intelligence, language, moral and aesthetic judgment, and a bent for relationships governed by love and commitment.[49] And these are not simply properties of the human *soul*; the interwoven body and soul express these capacities.[50]

But how did the "image" come to be bestowed, and how is it transmitted? None of the biblical authors would imply that this image is the outcome of natural processes *alone*. The commentator Derek Kidner, who allows for a kind of "evolutionary" scenario leading up to the first human, still insists that the first man must be the result of a special bestowal; his conclusion, "there is no natural bridge from animal to man," captures what the biblical text implies.[51] Some have suggested that perhaps, to make the first man, God used the body of a preexisting hominid, adding a soul to it. We should observe that, in view of the *embodied* image of God in Genesis, if this took place, then it involved some divine refurbishing of that body in order for it to work together with the soul to display God's image.

It is reasonable, then, to observe how these features distinguish humans from the other animals. We do not even have to be Jews or Christians to recognize some of the basic tenets of this position. Aristotle (384–322 BC) says that "the human being is by nature a political animal," meaning an animal that lives in political communities; he noticed a feature that distinguishes humans from other animals. He then observes that human communities go well beyond those of bees or gregarious animals, since humankind alone uses speech to discuss what is right and wrong, and what is advantageous and disadvantageous. Further, humans alone perceive moral qualities: "It is partnership in these things that makes a household and a city-state" (*Politics* I.i.9–11). How can we gainsay him?

Other animals may have features that are analogous to these special features of human beings, but the total assembly of characteristics that we find in humans is distinct. As Aristotle observed, human beings, whether they are discussing mathematics or morals, claim to have access to something that transcends their immediate bodily needs, namely *truth*. This is not a merely natural development of the capacities in other animals.[52]

Although some authors tend to be unduly optimistic about what it takes to get human language, linguists are aware of how distinct this characteristic is.[53] We should apply the linguists' recognition to other aspects of the image.

Finally, it looks like the image is transmitted by procreation. God made Adam "in the likeness of God," and Adam "fathered a son in his own likeness" (Gen. 5:1–3). Since Seth is presented positively in Genesis 4–5, this is not a low evaluation of Seth in comparison to Adam. Rather, it explains how human beings—all of them, and not only the first-created ones—come to be made in God's own image (Gen. 9:6). Consider further that when humans form unions (loving marriages, I hope) across "racial" lines, the children born to them will also bear God's image.[54]

These features of human life that make up the image of God, being uniquely human and universally human and transmitted by procreation, strongly favor the idea that all human beings descend from the same source. The conventional Christian alternative, some form of what is called "polygenesis" (from Greek *poly*, "many," and *genesis*, "origin"), held that God performed the special bestowal of his image in separate places of the world; a contemporary alternative, that perhaps God did this bestowing among several members of an existing population of hominids, is not really polygenism proper—but it will require more discussion below.

Universal Human Experiences: Yearning for Justice, Need for God

The biblical storyline, as outlined above, is one in which God's originally good creature, humankind, has been corrupted by sin; that is, sin is not part of humankind's created constitution. One of the major effects of that corruption was social: Adam against

Eve, Cain against Abel, Lamech the bigamist against everyone. One effect of redemption is to heal these ancient breaches, and one purpose of the Mosaic law was to make possible a just social system in one people, as an invitation for the rest of the peoples to come to know the true God (Deut. 4:5–8). God called Abram with a view toward bringing healing to the rest of the world, and the Old Testament nurtured the hope that the trickle of believing Gentiles (e.g., 1 Kings 8:41–43) would one day become a river, with widespread healing for all the world (e.g., Isa. 2:1–5; Psalm 87). The book of Revelation anticipates "a great multitude that no one could number, from every nation, from all tribes and peoples and languages, standing before the throne and before the Lamb" (Rev. 7:9); the New Testament authors insist on bringing this future reality into the present among Christian people (e.g., Rom. 15:5–7). When Christians call each other "brother" and "sister" (a manner of address inherited from the Jews), this is most naturally understood as more than a convention, and more than a legal fiction. It is an embracing of our common humanity as heirs of Adam rescued by God's grace, embracing a renewed social system.

The Rabbis articulated an ideal for humankind (Sanhedrin 4:5):

> But a single man was created [first] … for the sake of peace among mankind, that none should say to his fellow, 'My father was greater than your father,' Again, [a single man was created] to proclaim the greatness of the Holy One, blessed is he; for man stamps many coins with the one seal and they are all like one another; but the King of kings, the Holy One, blessed is he, has stamped every man with the seal of the first man, yet not one of them is like his fellow.[55]

It was among the early Christians that some measure of this ideal of peacefully enjoying human diversity came to fruition; a major goal of church life is to bring this ideal into increasingly complete and convincing expression. The pagan despisers of Christianity also noticed these effects. The worldly Epicurean Lucian of Samosata (ca. AD 120–200) observed of the second-century Christians,

> Their first lawgiver [Jesus, probably] persuaded them that they are all brethren of one another after they have transgressed once for all by denying the Greek gods and by worshipping that crucified sophist himself and living under his laws.[56]

The Christian message has reached and persuaded all kinds of people. People find ways to communicate with one another—both by learning each other's languages and by finding cultural analogies that illuminate the Christian message (think of *Peace Child*, or *The End of the Spear*). Even when some ignorant Europeans denied that some races were fully human—which removed all barriers to exploiting these "uncivilized" peoples—Christian missionaries at times stepped in on behalf of the oppressed.[57]

Of the many avenues along which we might discuss the shared human experience of redemption, such as the moral sense, the craving for a just society, the concern for the life of the world to come, I have chosen the general human sense of being lost—of feeling that something is wrong with ourselves, something that demands an explanation. Blaise Pascal put his finger on this when he wrote in his *Pensées*,

> Man's greatness is so obvious that it can even be deduced from his wretchedness, for what is nature in animals we call wretchedness in man, thus recognizing that, if his nature is today like that of the animals, he must have fallen from some better state which was once his own.
>
> Who indeed would think himself unhappy not to be king except one who had been dispossessed? ... Who would think himself unhappy if he had only one mouth and who would not if he had only one eye? It has probably never occurred to anyone to be distressed at not having three eyes, but those who have none are inconsolable.
>
> Man's greatness and wretchedness are so evident that the true religion must necessarily teach us that there is in man some great principle of greatness and some great principle of wretchedness. It must also account for such amazing contradictions.[58]

Pascal imagines God saying to humankind, "You are no longer in the state in which I made you." Anyone who wishes to be taken seriously must face this and account for it—and who has done better than the writer of Genesis?

Leon Kass' commentary on Genesis unexpectedly supports Pascal. I say "unexpectedly," because Kass insists on a purely symbolic reading of Adam and Eve, as we saw above. Earlier I commented on Kass'

preference for "permanent truths"; now, however, a key admission undermines his whole position:

> No matter how sophisticated and civilized we have become, most of us respond to this portrait of our mythical remotest past with something that feels, in fact, like nostalgia.[59]

It is Pascal who has captured the experience of many all over the world who become Christian believers, and who has thus shown how this nostalgia corresponds to something real.

G. K. Chesterton captures the refreshment that comes from realizing this:

> The Fall is a view of life. It is not only the only enlightening, but the only encouraging view of life. It holds, as against the only real alternative philosophies, those of the Buddhist or the Pessimist or the Promethean, that we have misused a good world, and not merely been entrapped into a bad one. It refers evil back to the wrong use of the will, and thus declares that it can eventually be righted by the right use of the will. Every other creed except that one is some form of surrender to fate. A man who holds this view of life will find it giving light on a thousand things; on which mere evolutionary ethics have not a word to say. For instance, on the colossal contrast between the completeness of man's machines and the continued corruption of his motives; on the fact that no social progress really seems to leave self behind; … on that proverb that says "the price of liberty is eternal vigilance," which is only what the theologians say of every other virtue, and is itself only a way of stating the truth of original sin; on those extremes of good and evil by which man exceeds all the animals by the measure of heaven and hell; on that sublime sense of loss that is in the very sound of all great poetry, and nowhere more than in the poetry of pagans and sceptics: "We look before and after, and pine for what is not"; which cries against all prigs and progressives out of the very depths and abysses of the broken heart of man, that happiness is not only a hope, but also in some strange manner a memory; and that we are all kings in exile.[60]

If we say, rightly, that there is a level of figurative and symbolic description in Genesis 1–4, we must still allow that the story we find there provides the best explanation for our lives now, and for our hunger for things to be better.

Some Scientific "Scenarios"

Preliminary Questions

In this section, I offer some guidelines for relating a historical Adam and Eve to various historical-scientific reconstructions. There are some questions we must settle before we can do that: unfortunately, space forbids me to discuss in detail such important issues as whether any kind of "harmonization" between the biblical materials and the scientific story is possible, or even right; what kind of "death" for Adam and Eve Genesis 2–3 has in view; whether Genesis 4–5 implies a Neolithic setting for Adam, Eve, Cain, and Abel; whether Genesis 4 implies, or at least allows for, other people contemporary with Adam and Eve. Here I can only summarize my conclusions, and develop the arguments in another venue.

Quite briefly, I take the biblical storyline to imply that Adam and Eve are historical persons at the headwaters of the distinctly human kind. To say that they are "historical," of course, lays on us no requirement of "literalism" for reading Genesis, if the material itself does not invite it. I think, for example, that the account of Cain and Abel uses "anachronism," describing aspects of older times in terms of what the writer and his audience were familiar with. Therefore those who find that the farming and the crafts of Genesis 4 imply a Neolithic setting,[61] are being unduly literalistic.[62] Further, it is well established that the genealogies of Genesis 5 do not intend to list every generation; gaps are to be expected. There is no way to know what size gaps the literary conventions allow, or even if there are any limits at all; this is not the kind of information these genealogies aim to convey.[63] Nothing in Genesis 2–4 tells us how long these events are supposed to have taken, which means the other people Cain fears could be his siblings, or their descendants. Of those who think of contemporary humans, collateral with Adam and Eve, the best are careful about what Genesis 4 does and does not imply.[64]

The "death" that Gen. 2:17 threatens is human "spiritual death," namely, alienation from God. This becomes clear once we see what happens to the human pair when they disobey in Genesis 3. This "death" will have as its consequence "physical death" (Gen. 3:19). Does this imply that there was no physical death before the Fall? And what of the fossil record, which many interpret to imply that the

humans had ancestors, who died? For our purposes here, all we have to insist on is that this particular couple were a fresh start, for whom physical death was not their intended outcome. The spiritual death resulting from their disobedience ruined whatever process would have kept them alive.

Therefore, the best way to think about the "historical" persons of Genesis 1–11 is to set up some guidelines that preserve the historical core and allow some freedom for those who would explore.[65]

Criteria for Good Scenarios

I have already given reasons to be very cautious about too strong a form of concordism for the early chapters of Genesis. It is easy to go wrong by ignoring the literary conventions. Another good reason for being cautious comes from Blocher, who appealed for modesty:

> It is also difficult to forecast what aspect of being the image of God would actually show up in a scientific description of mankind; so it is not quite certain what it is we are looking for when we try to discover the first man largely in terms of incomplete skeletons.[66]

He is speaking, of course, about reconstruction from the fossils; but the same would apply to the biochemical evidence. For these reasons, I will instead consider what I have called "scenarios," ways that can help us to picture events that really took place; I would not call them harmonizations.

My discussion so far does, in fact, provide us with some criteria for sound thinking about human origins and sin, which can help us discover some boundaries to what makes for a good scenario. But first, what are some of the relevant findings from the sciences that we should try to account for?

From the paleontologists, we learn that Adam and Eve, if they are indeed at the headwaters of the human race, must come before such events as the arrival of modern humans in Australia, which means before about 40,000 BC. According to John Bloom's survey, there are two important gaps in the available record of human development. The first occurs with the appearance of anatomically modern humans around 130,000 BC. The second gap occurs when culture appears, around 40,000 BC. At this point, we find that art and "the complexity and variety of artifacts greatly increases." As Bloom observes, "At present either of these transitions seems sharp enough that we can propose that the special creation of man occurred in one of these gaps and that it was not bridged by purely natural means."[67]

The geneticists give us two matters to account for. First, they conclude from the genetic similarities between humans and chimpanzees that humans and chimpanzees have some kind of "common ancestor." Second, some infer from features of the human genome that the human population needs to have been a thousand or more individuals, even at its beginning.[68] I will not assess this DNA evidence; I do not know whether the evidence is only *compatible* with these conclusions, or *strongly favors* them. I cannot predict whether future geneticists will still think the same way about DNA as contemporary ones do. I do know that biologists' understanding of DNA (e.g., so-called "junk DNA" now appears to have a function) has changed over the years, but I cannot say what biologists might think in the future. Hence, rather than try to say whether these inferences are good or bad, I have sought ways to allow advocates of these conclusions to stay within the bounds of sound thinking. In other words, even if someone is persuaded that humans had "ancestors," and that the human population has always been more than two, he or she does not *necessarily* have to ditch all traditional views of Adam and Eve; I have tried to provide for these possibilities more than to contend for my particular preferences on these matters.

Now then, how do we stay within the bounds of sound thinking? What criteria do all our reflections so far lead us to?

1. To begin with, we should see that the origin of the human race goes beyond a merely natural process. This follows from how hard it is to get a human being, or, more theologically, how distinctive the image of God is.
2. We should see Adam and Eve at the headwaters of the human race. This follows from the unified experience of humankind, as discussed earlier (pp. 155–8). How else could all human beings come to bear God's image?
3. The Fall, in whatever form it took, was both historical (it happened) and moral (it involved disobeying God), and occurred at the beginning of the human race. The universal sense of loss described earlier (pp. 155–8) makes no sense without this. Where else could this universality have come from?

Applying criteria 2 and 3 means that any valid model will cover, not only Middle Easterners and Europeans, but also those peoples who first populated what is now Australia and the Americas.[69]

Theories about multiple origins for human beings, the lines developing in parallel in different regions ("polygenesis"), do crop up from time to time.[70] These theories posit a natural transition from prehuman to human, which is unreasonable. A Christian should not find these attractive, either. Even if a theory suggests separate *creations*, it implies that there are some humans who do not need the Christian message because they are not "fallen"—or else that every time God made human beings they "fell," or that there is some other means of transmitting sin. The models that are more in favor among paleoanthropologists today seem to focus more on unified origin (as in the "out of Africa" hypothesis).

4. If someone should decide that there were, in fact, more human beings than just Adam and Eve at the beginning of humankind, then, in order to maintain good sense, he or she should envision these humans as a single tribe. Adam would then be the chieftain of this tribe (preferably produced before the others), and Eve would be his wife. This tribe "fell" under the leadership of Adam and Eve. This follows from the notion of solidarity in a representative. Some may call this a form of "polygenesis," but this is quite distinct from the more conventional, and unacceptable, kind.[71]

A Sampling of Scenarios Examined

I do not intend to propose my own "harmonization" of the biblical Adam and Eve with the paleontological and biological data, beyond the guidelines I have given above. The proposals that I will mention here can best be viewed as "scenarios," ways of imagining what the events might have looked like.

Young-earth creationists, and many old-earth creationists, commonly think of Adam and Eve as fresh creations, with no animal forebears. Others allow for God to have refurbished a preexisting hominid into Adam. While I am not making an issue of this, my first criterion (p. 159) shows why I think it is nevertheless crucial to affirm that, whatever the process, it was not a purely natural one. Regardless of where God got the raw material, we can say that humans are the result of "special creation."

An obvious scenario has Adam and Eve as the first members of the genus *Homo*. There are some difficulties with this proposal (e.g., about two million years with no specific cultural remains in the paleontological record) that make alternatives more attractive.[72]

The paleontological record suggests that a major development, corresponding to the rise of truly modern humans, took place somewhere between 100,000 and 40,000 years ago. Therefore this seems a promising period for the origin of Adam and Eve, and several scholars have made proposals consistent with the criteria above, both with and without animal "forebears."[73]

Derek Kidner has made what he calls "an exploratory suggestion," which "is only tentative, as it must be, and it is a personal view."[74] Kidner wanted to allow for a kind of "ancestry" for Adam and Eve, while at the same time retaining principles like those I have given above. The creation of Adam and Eve may have involved refurbishing an existing hominid.

> It is at least conceivable that after the special creation of Eve, which established the first human pair as God's viceregents (Gen. 1:27, 28) and clinched the fact that there is no natural bridge from animal to man, God may now have conferred his image on Adam's collaterals, to bring them into the same realm of being. Adam's "federal" headship of humanity extended, if that was the case, outwards to his contemporaries as well as onwards to his offspring, and his disobedience disinherited both alike.[75]

This suggestion is moving us away from the simplicity of the biblical picture, though it does have the virtue of seeking to preserve the "doctrine that mankind is a unity, created in God's image, and fallen in Adam by the one act of disobedience." Further, solidarity in the Bible is not based on legal fiction but on some actual connection; perhaps this can still apply to the "collaterals," provided they are closely enough related. If we imagine Adam as chieftain, or "king," whose task it is not simply to *rule* a people but more importantly to *represent* them (the basic idea of a king in the Bible), we can say that Kidner's proposal satisfies the criteria mentioned earlier (pp. 159–60) and deserves consideration.

Kidner's approach shows how we can adjust the scenario from C. S. Lewis that appeals to Francis

Collins. In the *Problem of Pain,* Lewis devotes chapter 5 to "The Fall of Man."[76] The chapter's thesis is "that man, as a species, spoiled himself, and that good, to us in our present state, must therefore mean primarily remedial or corrective good," and he goes on to wonder what this spoiling might have looked like. Here is how he describes it:

> For long centuries, God perfected the animal form which was to become the vehicle of humanity and the image of Himself. He gave it hands whose thumb could be applied to each of the fingers, and jaws and teeth and throat capable of articulation, and a brain sufficiently complex to execute all of the material motions whereby rational thought is incarnated … Then, in the fullness of time, God caused to descend upon this organism, both on its psychology and physiology, a new kind of consciousness which could say "I" and "me," which could look upon itself as an object, which knew God, which could make judgments of truth, beauty and goodness, and which was so far above time that it could perceive time flowing past … We do not know how many of these creatures God made, nor how long they continued in the Paradisal state. But sooner or later they fell. Someone or something whispered that they could become as gods … They wanted some corner in the universe of which they could say to God, "This is our business, not yours." But there is no such corner. They wanted to be nouns, but they were, and eternally must be, mere adjectives. We have no idea in what particular act, or series of acts, the self-contradictory, impossible wish found expression. For all I can see, it might have concerned the literal eating of a fruit, but the question is of no consequence.[77]

Lewis certainly meets the first three criteria (p. 159), and a small tweak will bring it into line with the fourth criterion. He is clear on the kind of divine supervision necessary (that is, humans resulted from a process that went beyond the purely natural) and on the moral issues involved. Also to Lewis' credit, whenever it comes to imaginative presentation of the ideas in his other books, he keeps to a particular Adam and Eve, as he has great respect for the form of the story in Genesis.[78]

Further, Lewis preserves the historical character of the Fall, that is, it is an event—or cluster of events—that actually took place, and changed human life forever. This certainly sets his view apart from all views that see sin as the result of something nonhistorical, or as something inherent in God's creation.

The main difficulty lies in Lewis' clause, "We do not know *how many* of these creatures God made."[79] He is not asserting that there *must* have been more than Adam and Eve; he is declaring the question irrelevant. If, however, we take our cue from Lewis' own mention of solidarity, and "in Adam" (comments that escaped Collins' attention), we see how to make it more like Kidner's scenario, with Adam as the chieftain and Eve as his queen.

Two of these scenarios, from Kidner and Lewis, may be attractive to those who favor the "population size approaches" based on human DNA. As I have said, I am not assessing the science, but displaying how to keep our reasoning within the bounds of sound thinking. Nothing requires us to abandon monogenesis altogether for some form of polygenesis; rather, a modified monogenesis, which keeps Adam and Eve, can do the job.

I admit that these scenarios leave us with many uncertainties, but these uncertainties in no way undermine our right to hold fast to the biblical storyline with full confidence.

Conclusions

I do not claim to have solved every problem or to have dealt with every possible objection. But I trust I have shown why the traditional understanding of Adam and Eve, as our first parents who brought sin into human experience, is worthy of our confidence and adherence. Let me summarize why I think it is important for Christians to affirm the results of this study.

First, I have emphasized throughout that a major goal of the Christian story is to enable those who believe it to make sense of the world. If we abandon the conventional way of telling the Christian story, with its components of a good creation marred by the Fall, redemption as God's ongoing work to restore the creatures to their proper functioning, and the consummation in which the restoration will be complete and confirmed, then we really give up all chance of understanding the world. Specifically, if we deny that all people have a common source that was originally good, but through which sin

came into the world, then the existence of sin becomes God's fault, or even something that God could not avoid. In either case, there is little reason to be confident that any relief is headed our way.

Second, the notions of sin as an alien invader that affects all people, and of atonement as God's way of dealing with the guilt and pollution that come from this defiling influence, depend on the story of the original family and their original disobedience. The biblical terms for atonement, which have the associated ideas of propitiation, expiation, and cleansing, become meaningless without this part of the story. If this is so, then the death of Jesus loses a crucial aspect of its meaning as well.

Third, if we cannot insist on a common origin for all humankind, then we have given up the grounds, both from the Bible and common sense, for affirming the common dignity of all people, and their common need of the solution that the biblical faith claims to offer. Therefore, abandoning our common origin looks like a dangerous mistake. ◈

Notes

*This is a severely shortened version of a paper read to the 2009 ASA Annual Meeting in Waco, TX, 31 July–3 August. I thank all those who gave their feedback, and especially Walter Bradley, who invited me, together with my dialog partners Daniel Harlow and John Schneider, and Loren Haarsma who moderated. My fuller, book-length treatment of all this is coming soon; I apologize to all those whose work has received short shrift here due to space.

[1]Francis Collins, *The Language of God: A Scientist Presents Evidence for Belief* (New York: Free Press, 2006). Collins and others have established the Biologos Foundation, with a website (biologos.org).

[2]Lewis made it clear that his own views were those of a faithful member of the Church of England, and he professed general adherence to the *39 Articles*. Again, in imitation of Lewis' model, I come clean. I am a minister in a conservative Presbyterian body, which practices what it calls "good faith subscription" to the *Westminster Confession of Faith*. Like Lewis, who explained that no one is actually supposed to live simply on "mere Christianity," but must instead associate himself or herself with a church, I readily acknowledge that "mere historical Adam-and-Eve-ism" is not a suitable stopping point.

[3]Some noteworthy recent efforts to defend ideas of original sin are Edward Oakes, "Original Sin: A Disputation," *First Things* 87 (November 1998): 16–24; Henri Blocher, *Original Sin: Illuminating the Riddle*, New Studies in Biblical Theology (Grand Rapids, MI: Eerdmans, 1997).

[4]For example, Chrysostom (on Rom. 5:12) remarked, Adam "having sinned, even those who did not eat from the tree, all of them, became mortal because of him"; he describes humankind as "those who came from" Adam—just as Augustine would do. Of course, there are many differences between Augustine and Chrysostom, and it is not part of my task here to adjudicate. See Panayiotis Papageorgiou, "Chrysostom and Augustine on the Sin of Adam and Its Consequences," *St Vladimir's Theological Quarterly* 39, no. 4 (1995), 361–78, for a presentation that favors the Greek father. References for the other Patristic authors will be supplied in my fuller work.

[5]A highly regarded presentation of this approach is Meir Sternberg, *The Poetics of Biblical Narrative: Ideological Literature and the Drama of Reading* (Bloomington, IN: Indiana University Press, 1985); see also Gordon J. Wenham, *Story as Torah: Reading Old Testament Narratives Ethically* (Grand Rapids, MI: Baker, 2000).

[6]For a general discussion of worldview, see David K. Naugle, *Worldview: The History of a Concept* (Grand Rapids, MI: Eerdmans, 2002).

[7]Some writers use the term "worldview" to include such concepts as the shape of the world and the things in it, e.g., John H. Walton, *Ancient Near Eastern Thought and the Old Testament: Introducing the Conceptual World of the Hebrew Bible* (Grand Rapids, MI: Baker, 2006), 165–78. Similarly, Peter Enns, *Inspiration and Incarnation: Evangelicals and the Problem of the Old Testament* (Grand Rapids, MI: Baker), 53–6. I find this confusing, and prefer to separate world*view* from world *picture*, as I discuss in *Genesis 1–4: A Linguistic, Literary, and Theological Commentary* (Phillipsburg, NJ: P & R Publishing, 2006), 260–2. Even more confusing is the way Francis Collins, *The Language of God*, describes the "scientific worldview" and the "spiritual worldview" as potentially complementary perspectives held by the same person.

[8]Don Pederson, "Biblical Narrative as an Agent for Worldview Change," *International Journal of Frontier Missions* 14, no. 4 (1997): 163–6.

[9]These include N. T. Wright, *The New Testament and the People of God* (Minneapolis, MN: Fortress, 1992); Craig G. Bartholomew and Michael Goheen, *The Drama of Scripture: Finding Our Place in the Biblical Story* (Grand Rapids, MI: Baker, 2004); Michael D. Williams, *Far as the Curse Is Found: The Covenant Story of Redemption* (Phillipsburg, NJ: P & R Publishing, 2005); Albert M. Wolters and Michael W. Goheen, *Creation Regained: Biblical Basics for a Reformational Worldview,* 2d ed. (Grand Rapids, MI: Eerdmans, 2005); Christopher J. H. Wright, *The Mission of God: Unlocking the Bible's Grand Narrative* (Downers Grove, IL: InterVarsity Press, 2006). For a brief (and, one hopes, accessible) summary of this approach, see C. John Collins, "The Theology of the Old Testament," in *The English Standard Version Study Bible*, ed. Lane T. Dennis et al. (Wheaton, IL: Crossway Bibles, 2008), 29–31.

[10]Wolters and Goheen, *Creation Regained*, 125.

[11]In "The Theology of the Old Testament,," 30b–31a, I explain why we should be careful not to say that we read the whole Bible *as* a story, but rather *in relation to* the story.

[12]C. S. Lewis, "The Funeral of a Great Myth," in *Christian Reflections* (Grand Rapids, MI: Eerdmans, 1967), 82–9.

[13]Lewis rightly says that the sciences are logically separable from the mythic tale; at the same time, there seems to be something about the human mind that cannot rest content with an account of origins until it is given a "mythic" or "poetic" (i.e., imagination-capturing) quality. The last para-

graph of Charles Darwin's *Origin of Species* (my copy is the 6th ed. of 1872, and was published in the Harvard Classics series by P. F. Collier and Sons of New York, 1909) has us contemplating a "tangled bank" as the product of the laws Darwin has described in his book. He tells us in words approaching poetry,

> There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.

I do not count this "poetic orientation" as a shortcoming, whether of Darwin or of anyone else; instead, it simply illustrates the general point that no one lives life in airtight compartments. As Lewis observed elsewhere, "All world views yield poetry to those who believe them by the mere fact of being believed"; see his "Is Theology Poetry?" in *The Weight of Glory and Other Addresses* (1965; reprint, New York: Simon & Schuster, 1996), 97.

[14]See the fascinating discussion of the many meanings in G. B. Caird, *The Language and Imagery of the Bible* (Philadelphia, PA: Westminster, 1980), 219–24; see also J. W. Rogerson, "Slippery Words, V: Myth," *Expository Times* 90 (1978): 10–4.

[15]Enns, *Inspiration and Incarnation*, 40.

[16]George Gaylord Simpson, *The Meaning of Evolution* (New Haven, CT: Yale University Press, 1967), 365.

[17]William Shakespeare, *Macbeth*, V.v.26–8.

[18]My forthcoming book provides a fuller discussion, comparing Ancient Near Eastern texts and Genesis 1–11, to justify this evaluation of the Mesopotamian stories.

[19]Kenneth A. Kitchen, *On the Reliability of the Old Testament* (Grand Rapids, MI: Eerdmans, 2003), 262, 300. The same issue that applies to origin stories—that is, can miraculous and figurative accounts refer to actual events, whether in the past or in the future?—applies also to language we find in the Gospels and in apocalyptic material; see N. T. Wright, *The New Testament and the People of God* (Minneapolis, MN: Fortress, 1992), 424–7. As Wright observes,

> The language of myth, and eschatological myths in particular (the sea, fabulous monsters, etc.), are used in the biblical literature as complex metaphor systems to denote historical events and to invest them with their theological significance. The Gospels, then, *are* "myth" in the sense that they are foundational stories for the early Christian worldview.

[20]Kitchen, *On the Reliability of the Old Testament*, 425–6.

[21]John Walton, *Ancient Near Eastern Thought*, puts it well: "Most peoples of the ancient world found the past interesting and found in it a key to social coherence lending meaning to life in the present" (p. 223). Similarly, S. G. F. Brandon finds in a Sumerian origins story, "a Sumerian aetiological myth designed to explain three things," among which is "the purpose of mankind, namely, to serve the gods." See Brandon, "The Origin of Death in Some Ancient Near Eastern Religions," *Religious Studies* 1 (1966): 222.

[22]Collins, *Genesis 1–4*, 242. See also Kitchen, *On the Reliability of the Old Testament*:

> Gen. 1–11 is the Hebrew answer on how to present "prehistory/protohistory" before the time of their first fully "historical" people, the patriarchs Abraham to Jacob. Again, the approach they adopted was common to their neighbors, using the same basic tools and concepts of that time: the succession of human generations, and how to span them. Mesopotamia chose to expand "heroically" the too-few reigns available. The Hebrew genealogies became telescoped through time, keeping a representative number. (P. 447)

Compare also Claus Westermann, *Genesis 1–11* (Minneapolis, MN: Augsburg, 1984), 65.

[23]For more discussion, see V. Philips Long, *The Art of Biblical History* (Grand Rapids, MI: Zondervan, 1994), especially 58–87 (chapter 2).

[24]This notion of "history" serves as an unargued and therefore almost invisible premise of Douglas Kelly, *Creation and Change: Genesis 1.1–2.4 in the Light of Changing Scientific Paradigms* (Fearn, Ross-shire: Christian Focus, 1997); e.g., see pages 41–2, 51 ("the text of Genesis is clearly meant to be taken in a literal, historical sense"). This is apparently also a premise in Kelly's fellow young-earth creationist Kurt Wise's *Faith, Form, and Time* (Nashville, TN: Broadman and Holman, 2002). For example, on page 44, Wise equates "taken at face value" with "intended to convey history."

[25]Compare Denis Lamoureux, *Evolutionary Creation: A Christian Approach to Evolution* (Eugene, OR: Wipf and Stock, 2008), 150: "Therefore, since the heavens are not structured in this way [i.e., according to a literalistic reading of Genesis 1], Gen. 1 cannot be a historical account of the actual events that created the heavens."

[26]See Collins, *Genesis 1–4*, 249–51. There I use the example of Ps. 105:26–38, which

> retells the story of the plagues in Egypt, but it tells them in a different order from that in Exodus, and it does not tell about all of the plagues. Is the psalm—a poem—thereby unhistorical? Or should we set it against Exodus, and maybe declare Exodus the product of a different tradition? Neither: they are two different types of writing, with different communicative purposes.

[27]Martin Emmrich (whose conclusions about authorship are to the "left" of mine) puts the matter well in "The Temptation Narrative of Genesis 3:1–6: A Prelude to the Pentateuch and the History of Israel," *Evangelical Quarterly* 73, no. 1 (2001), 3–20: "I think that the text demands the acknowledgement of at least a core of historical referentiality." Within that core he includes "an actual garden (the location of which we cannot be sure about) with two occupants, despite the mythical character of much of the J source [i.e., of the putative source of Genesis 2–3]. In all likelihood, this is the way the original audience would have taken the story" (page 4, and note 6). To support this last assertion, he calls in Gerhard von Rad, *Genesis* (1956; reprint, London: SCM, 1961), 73.

[28]Henri Blocher, *In the Beginning* (Downers Grove, IL: InterVarsity Press, 1984), 159.

[29]Ibid., 155.

[30]Blocher, *Original Sin: Illuminating the Riddle*, 50. Blocher has reaffirmed his views in the recent article, "The Theology of the Fall and the Origins of Evil," in *Darwin, Creation and the Fall: Theological Challenges*, ed. R. J. Berry and T. A. Noble

(Leicester: Apollos, 2009), 149–72. Throughout this article, Blocher also indicates his agreement with the relevant points in my *Genesis 1–4*.

[31]E.g., John Stek, "What Says the Scripture?" in *Portraits of Creation*, Howard J. Van Till, Robert E. Snow, John H. Stek, Davis A. Young (Grand Rapids, MI: Eerdmans, 1990), 242, cf. p. 263. Gordon Wenham is far more careful when he writes,

> Though historical and scientific questions may be uppermost in our minds as we approach the text, it is doubtful whether they were in the writer's mind, and we should therefore be cautious about looking for answers to questions he was not concerned with. (Gordon Wenham, *Genesis 1–15*, Word Biblical Commentary 1; Milton Keynes: [Word, 1991], liii)

See also Bruce Waltke with Cathy J. Fredericks, *Genesis* (Grand Rapids, MI: Zondervan, 2001), 75–8.

[32]For example, see Daniel Harlow, "Creation According to Genesis: Literary Genre, Cultural Context, Theological Truth," *Christian Scholar's Review* 37, no. 2 (2008): 198: one of his "timeless theological truths" is that "God created." Actually, in light of his entire presentation, one wonders how the empirical sinfulness of human beings is a "timeless truth." It seems to become "God created mankind with a tendency (or at least openness) toward sinning"—a historical statement with much to argue about!

[33]Leon Kass, *The Beginning of Wisdom: Reading Genesis* (New York: Free Press, 2003), 9–11.

[34]Alan Jacobs, "Leon Kass and the Genesis of Wisdom," *First Things* 134 (June/July 2003): 30–5, at 32ab.

[35]Ibid., 34b (citing Kass, *Beginning of Wisdom*, 661).

[36]Collins, "The Theology of the Old Testament," 30b.

[37]Cornelius Plantinga Jr., *Not the Way It's Supposed to Be: A Breviary of Sin* (Grand Rapids, MI: Eerdmans, 1995), 16.

[38]For a fine recent discussion, see Jay Sklar, *Sin, Impurity, Sacrifice, Atonement: The Priestly Conceptions* (Sheffield: Sheffield Phoenix Press, 2005).

[39]For a brief survey of these usages, see C. John Collins, "The Eucharist as Christian Sacrifice," *Westminster Theological Journal* 66 (2004): 1–23, especially 21–3. Of course, there are more aspects to what Jesus accomplished with his death, and I am not arguing here that we must make this the only, nor even necessarily primary, model for understanding the cross: only that it be included.

[40]Christopher Wright, *Walking in the Ways of the Lord: the Ethical Authority of the Old Testament* (Downers Grove, IL: InterVarsity, 1995), 13–45. See also Wright's *Old Testament Ethics for the People of God* (Downers Grove, IL: InterVarsity Press, 2004); and Gordon Wenham, *Story as Torah*. My discussion of creation ordinances, and of the reflections on marriage based on Gen. 2:24, in *Genesis 1–4*, 129–32, 142–45, applies these ideas.

[41]This is the main theme of Gregory Beale, *The Temple and the Church's Mission: A Biblical Theology of the Dwelling Place of God,* New Studies in Biblical Theology 17 (Downers Grove, IL: InterVarsity Press, 2004). I have supported this idea independently, e.g., Collins, *Genesis 1–4*, 69, 185–6; *New International Dictionary of Old Testatment Theology* 2: 582–3 (on Hebrew √*k-b-d*).

[42]W. Sibley Towner, "Interpretations and Reinterpretations of the Fall," in Francis A. Eigo, ed., *Modern Biblical Scholarship: Its Impact on Theology and Proclamation* (Villanova, PA: Villanova University Press, 1984), 57–8.

[43]Ibid., 76. Others of this trend include James Barr, *The Garden of Eden and the Hope of Immortality* (Minneapolis, MN: Fortress, 1993); and Keith Ward, *Divine Action: Examining God's Role in an Open and Emergent Universe* (1990; reprint, Philadelphia, PA: Templeton Foundation Press, 2007).

[44]Towner, "Interpretations and Reinterpretations of the Fall," 60. For a careful study of Irenaeus, see Anders-Christian Jacobsen, "The Importance of Genesis 1–3 in the Theology of Irenaeus," *Zeitschrift für antikes Christentum* 8, no. 2 (2005): 299–316. The description of the temptation and fall that I advocate in, e.g., *Genesis 1–4*, 115–6, is actually closer to the "Irenaean" reading.

[45]See S. R. Driver, *Genesis*, Westminster Commentary (London: Methuen, 1904); at 56–7, he accords a kind of historical core to the Fall story. Derek Kidner, *Genesis,* Tyndale Old Testament Commentary (Downers Grove, IL: InterVarsity Press, 1967), 26–31. Alexander Heidel, *The Babylonian Genesis* (Chicago: University of Chicago Press, 1951); see pages 122–26 comparing the Mesopotamian Adapa story with Genesis 3.

[46]Plantinga, *Not the Way It's Supposed to Be*, 16, 33.

[47]For discussion of the literary portrayal of the serpent as Tempter, see Collins, *Genesis 1–4*, 170–2.

[48]For my discussion, see my *Genesis 1–4*, 61–7; *Science and Faith: Friends or Foes?* (Wheaton, IL: Crossway, 2003), 124–32 (with additional notes, 373–6).

[49]Collins, *Genesis 1–4*, 66.

[50]See further Collins, *Science and Faith*, 130–1.

[51]Kidner, *Genesis*, 28–9.

[52]Francis Collins has recognized this in his embrace of C. S. Lewis' "moral argument"; see his *The Language of God* (New York: Free Press, 2006), 21–31 (cf. 200, point 6: "humans are also unique in ways that defy evolutionary explanation"; Collins does not explain how this is coherent with his points 4–5).

[53]See my discussion in *Science and Faith*, 279–80, regarding what evolutionary biologist John Maynard Smith says he learned from his colleagues in the linguistics department, in his *The Theory of Evolution* (Cambridge: Cambridge University Press, 1993), 343, and 24–5. See further in *Science and Faith*, 405, my discussion of the proposal of Steven Pinker for how language might have developed gradually in his book, *The Language Instinct: The New Science of Language and Mind* (London: Penguin, 1995), 403.

[54]The biblical ethic welcomes interracial marriages, when the marriage partners are both Christians. See J. Daniel Hays, "A Biblical Perspective on Interracial Marriage," *Criswell Theological Review* 6, no. 2 (Spring 2009): 5–23.

[55]Cited from Herbert Danby, *The Mishnah* (Oxford: Oxford University Press, 1933), 388, with comparison of the Hebrew. In the Talmud, see Sanhedrin 38a.

[56]Lucian, *On the Death of Peregrinus*, c. 13; cited from J. Stevenson, *A New Eusebius: Documents Illustrative of the History of the Church to AD 337* (London: SPCK, 1968), 135–6. The Greek text is available in the Loeb series, *Lucian* (vol. v).

[57]For an example, see John Paton, *John G. Paton, D.D., Missionary to the New Hebrides: An Autobiography*, ed. James Paton (London: Hodder and Stoughton, 1894). Paton worked primarily among the Melanesian islanders in the

New Hebrides, often protecting them from exploitation by French, British, and Americans. On pages 259–75, he tells an episode of his time in Australia (1863), when he combated the abhorrent idea that the Australian Aboriginals were nothing more than "brutes in human shape." Paton gained the trust of the Aboriginals, and proved that they really did have a religion; and he lauded an Aboriginal Christian woman.

[58]Blaise Pascal, *Pensées*, ed. A. J. Krailsheimer (London: Penguin, 1995), nos. 117, 149. The French original can be found in Blaise Pascal, *Pensées*, ed. Ch.-M. des Granges (Paris: Éditions Garnier Frères, 1964), nos. 409, 430 (using the Brunschvicg numbers). For insightful application of this line of reasoning, see Douglas Groothuis, "Deposed Royalty: Pascal's Anthropological Argument," *Journal of the Evangelical Theological Society* 41, no. 2 (1998): 297–312.

[59]Kass, *Beginning of Wisdom*, 61.

[60]G. K. Chesterton, *As I Was Saying*, ed. Robert Knille (Grand Rapids, MI: Eerdmans, 1985), 160.

[61]E.g., Davis Young, "The Antiquity and the Unity of the Human Race Revisited," *Christian Scholar's Review* 24, no. 4 (1995): 380–96. For more discussion, see my *Genesis 1–4*, 201–3.

[62]This is one reason that I will not treat the suggestion of John Stott, *Romans* (Downers Grove, IL: InterVarsity Press, 1995), 162–6, in detail here, since he makes Adam the first real human in the Neolithic period.

[63]For fuller argument, see Collins, *Genesis 1–4*, 203–7.

[64]The wisest is Kidner, *Genesis*, 29–30 (see below).

[65]The term "concordism" can have some connotations that I am not at all supporting, namely, a kind of literalism that leads to bending the evidence to make it all work out. This seems to underlie Daniel Harlow's rejection of concordism in "Creation According to Genesis: Literary Genre, Cultural Context, Theological Truth," 198, where he insists that "the theological truths that Genesis reveals are both timeless and vital" (see my discussion, pp. 150–3). Likewise Lamoureux, *Evolutionary Creation: A Christian Approach to Evolution*, rejects concordism in favor of what he calls the "Message-Incident Principle" (pp. 110–1 and throughout); it appears that, first, he assumes that historical or scientific concordism requires literalism, and, second, that a timeless message can be abstracted from the story.

[66]Henri Blocher, *In the Beginning*, 231. See more recently his "The Theology of the Fall and the Origins of Evil," in *Darwin, Creation and the Fall: Theological Challenges,* ed. R. J. Berry and T. A. Noble (Leicester: Apollos, 2009), 169–72.

[67]John Bloom, "On Human Origins: A Survey," *Christian Scholar's Review* 27, no. 2 (1997): 199–200.

[68]See Francis Collins et al., "Question 21: Who Was Mitochondrial Eve? Who Was Y-Chromosome Adam? How Do They Relate to Genesis?" in *The Biologos Foundation: Questions* (biologos.org), 2009 (accessed July 13, 2009). The research behind this comes from Francisco Ayala et al., e.g., "Molecular Genetics of Speciation and Human Origins," *Proceedings of the National Academy of the Sciences* 91 (July 1994): 6787–94. John Bloom shows why the conclusion is not above critique in "On Human Origins: A Survey," 195–6.

[69]The views expressed in Denis Alexander, *Creation or Evolution: Do We Have to Choose?* (Grand Rapids, MI: Kregel, 2008), especially chapters 9–13, deserve more consideration than space allows here. At this point, I will simply observe that he wants a historical Adam in the Neolithic period (and thus not the first human). His approach falls foul of the first three criteria here.

[70]Described in Fazale Rana with Hugh Ross, *Who Was Adam? A Creation Model Approach to the Origin of Man* (Colorado Springs, CO: NavPress, 2005), 36–7, 124–6.

[71]It appears that Bruce Waltke, *An Old Testament Theology* (Grand Rapids, MI: Zondervan, 2007), 202–3, would agree with my first three criteria, and perhaps the fourth. I consider his description of the Fall, that *'adam* [man or humankind?] freely chose to "follow their primitive animal nature," to be inadequate, but it is still moral. I cannot say whether in referring to *'adam* and saying "their" he means to leave open how many humans there were to begin with. Waltke associates himself with Francis Collins' perspective (p. 202, n. 81), but he is clearer than Collins on the special origin and importance of Adam and Eve.

[72]See Bloom, "On Human Origins: A Survey," 199, n. 72.

[73]Fazale Rana with Hugh Ross, *Who Was Adam?* They discuss the genetic issues in chapter 4, pages 55–75. This general approach finds support in Bloom, "On Human Origins: A Survey." Bloom tells me (personal communication, July 9, 2009) that he has updated his essay in light of new genetic evidence, and generally supports Rana's approach—though he does not claim that the scientific evidence *proves* the model, or a single first pair. Bloom's background in both physics and Ancient Near Eastern studies makes his opinions worthy of attention. Gavin Basil McGrath's proposal, "Soteriology: Adam and the Fall," *Perspectives on Science and Christian Faith* 49, no. 4 (1997): 252–63, is in the same time ballpark, though he explicitly posits hominid forebears, specially upgraded. David Siemens commended aspects of McGrath's approach in a letter in *Perspectives on Science and Christian Faith* 50, no. 1 (1998): 78, including his orthodox soteriology.

[74]Kidner, *Genesis*, 26–31.

[75]Ibid., 30.

[76]My copy is from 1943, published in London by Geoffrey Bles.

[77]The portion of text in this block quote is the same as that excerpted in Collins, *The Language of God*, 208–9.

[78]E.g., in *Perelandra*, and in Aslan's words to Prince Caspian at the end of that story: "You come of the Lord Adam and the Lady Eve. And that is both honour enough to erect the head of the poorest beggar, and shame enough to bow the shoulders of the greatest emperor in earth. Be content."

[79]There are further demurrals from Lewis' full presentation in Blocher, *Original Sin: Illuminating the Riddle*, 56–7 (Lewis could be taken to imply that sin was a natural consequence of human free will), 89 (Did humans by their fall actually lose their proper nature?). These are insightful, but do not affect our topic. (On pages 97–8, Blocher approves Lewis' recognition of solidarity.)

Dennis R. Venema

Article

Genesis and the Genome: Genomics Evidence for Human-Ape Common Ancestry and Ancestral Hominid Population Sizes

Dennis R. Venema

The relatively new and rapidly expanding field of comparative genomics provides a wealth of data useful for testing the hypothesis that humans and other forms of life share common ancestry. Numerous independent lines of genomics evidence strongly support the hypothesis that our species shares a common ancestor with other primates. Additional lines of evidence also indicate that our species has maintained a population size of at least several thousand individuals since our speciation from the ancestors of other great apes. This article will provide an overview of genomics evidence for common ancestry and hominid population sizes, and briefly discuss the implications of these lines of evidence for scientific concordist approaches to the Genesis narratives.

Evolutionary theory has long proposed that humans and other great apes share common ancestors.[1] Evolutionary theory thus predicts that the genomes we observe in living primates (such as humans and chimpanzees) are, in fact, modified forms of an original genome present in the common ancestor of these species. This simple hypothesis can be readily tested using several independent lines of evidence derived from comparing the complete genomes of the two species.[2]

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The first line of evidence, and perhaps the one most widely discussed by Christian apologetics organizations, is that of gene sequence similarity. If, indeed, humans and chimpanzees are descended from a common ancestral species, then the individual gene sequences of these two species would be predicted to have a high degree of similarity due to inheritance from a common ancestor, or *homology*. Moreover, homology for individual genes should exist at two levels: the amino acid level (the functional sequence of a given gene's protein product), and at the nucleotide code level (the underlying DNA code for the required amino acid sequence). Since the nucleotide code has numerous coding options for a given amino acid sequence (i.e., the nucleotide code is *redundant*), genes in related organisms are predicted not only to share amino acid sequences but also nucleotide sequences,

despite a large number of possible coding options. Thus, related organisms should display homology at both levels of code.

A second, unrelated line of evidence is that of *synteny*. Synteny is a technical term for conservation of gene order along chromosomes between relatives. Put more simply, the hypothesis of common ancestry predicts that not only will related species have similar genes, but that they will also have these genes in a very similar spatial pattern.

A third line of evidence is that of *pseudogenes*. Pseudogenes (literally, "false genes") are the mutated remains of gene sequences that persist in the genome after their inactivation. Common ancestry predicts that related species should share pseudogenes that were present in the genome of their common ancestor. Moreover, these pseudogenes should be in the same genomic location in both descendant species (i.e., they should exhibit shared synteny) and retain gene sequence similarity (i.e., continue to exhibit homology) in spite of their inactivation.

The DNA sequence of the human genome was completed and published between 2001 and 2004.[3] Shortly thereafter, the genome sequence of the chimpanzee was completed.[4] The availability of complete genome sequences for both organisms allows for a comparison of homology, synteny, and shared pseudogenes at a genome-wide level for these two species. As such, these analyses function as independent tests of, and provide independent lines of evidence for, the hypothesis of human-chimpanzee common ancestry.

Sequence Similarities in Primate Genes: Evidence from Homology

Homology is defined as similarities derived from shared ancestry. It has long been known that humans and chimpanzees have nearly identical sequences for individual genes.[5] Complete genome sequencing has confirmed that this pattern of near identity is consistent across the genomes of both species. The human genome has approximately 3.0×10^9 nucleotides; of this number, 2.7×10^9 nucleotides match the chimpanzee genome with only a 1.23% difference between the species.[6]

In short, the vast majority of the human genome matches the chimpanzee genome with only rare differences. The inclusion of sequence alignment gaps between the two genomes that are thought to have arisen through either insertions or deletions (so-called "indel" mutations) drives the identity of the two genomes down to about 95%.[7] Restricting the comparison to the sequences responsible for coding for proteins raises the value to 99.4%.[8] By any measure, humans and chimpanzees have genomes that are highly homologous and readily interpreted as modified copies of an original ancestral genome.

Codon Usage in Homologous Genes: Evidence from Redundancy

The DNA code used to specify amino acids within proteins is based on nucleotide triplets, or "codons." Since there are four nucleotides (A, C, G, and T), there are 64 (i.e., 4^3) possible nucleotide triplets available; however, only twenty amino acids are present in biological proteins. Since three of the 64 codons are used as "stop" codons to halt the translation process, 61 codons are available for coding twenty amino acids. Thus, most amino acids can be encoded by more than one codon (i.e., the codon code is partially redundant). For example, a comparison of the nucleotide and amino acid sequences for insulin (a peptide hormone) of human, chimpanzee, gorilla, orangutan, a species of bat, and mouse is shown in figure 1.[9]

The unprocessed insulin peptide in all six species has 110 amino acids, the majority of which can be coded by alternate codons. This redundancy in the code means there are over 10^{19} different possible nucleotide sequences for human insulin that maintain the observed amino acid sequence. The sequence we observe, however, is one nearly identical to the nucleotide sequences seen in other mammals (figure 1A). The chimpanzee sequence differs by only six nucleotides; the gorilla, only by four. At the protein level, chimpanzees differ by two amino acids compared to humans, whereas the gorilla sequence is identical to ours (figure 1B). The amino acid and nucleotide homologies for other mammals become progressively less identical with the human sequence in a nested pattern that matches their phylogeny based on morphological criteria (figure 1C). While this is a very small sample (330 nucleotides), this pattern is representative: a genome-wide comparison of human and chimpanzee coding sequences reveals they are 99.4% identical across 1.85×10^7 nucleotides.[10]

Figure 1. Nucleotide and Amino Acid Homology for Insulin in Mammals

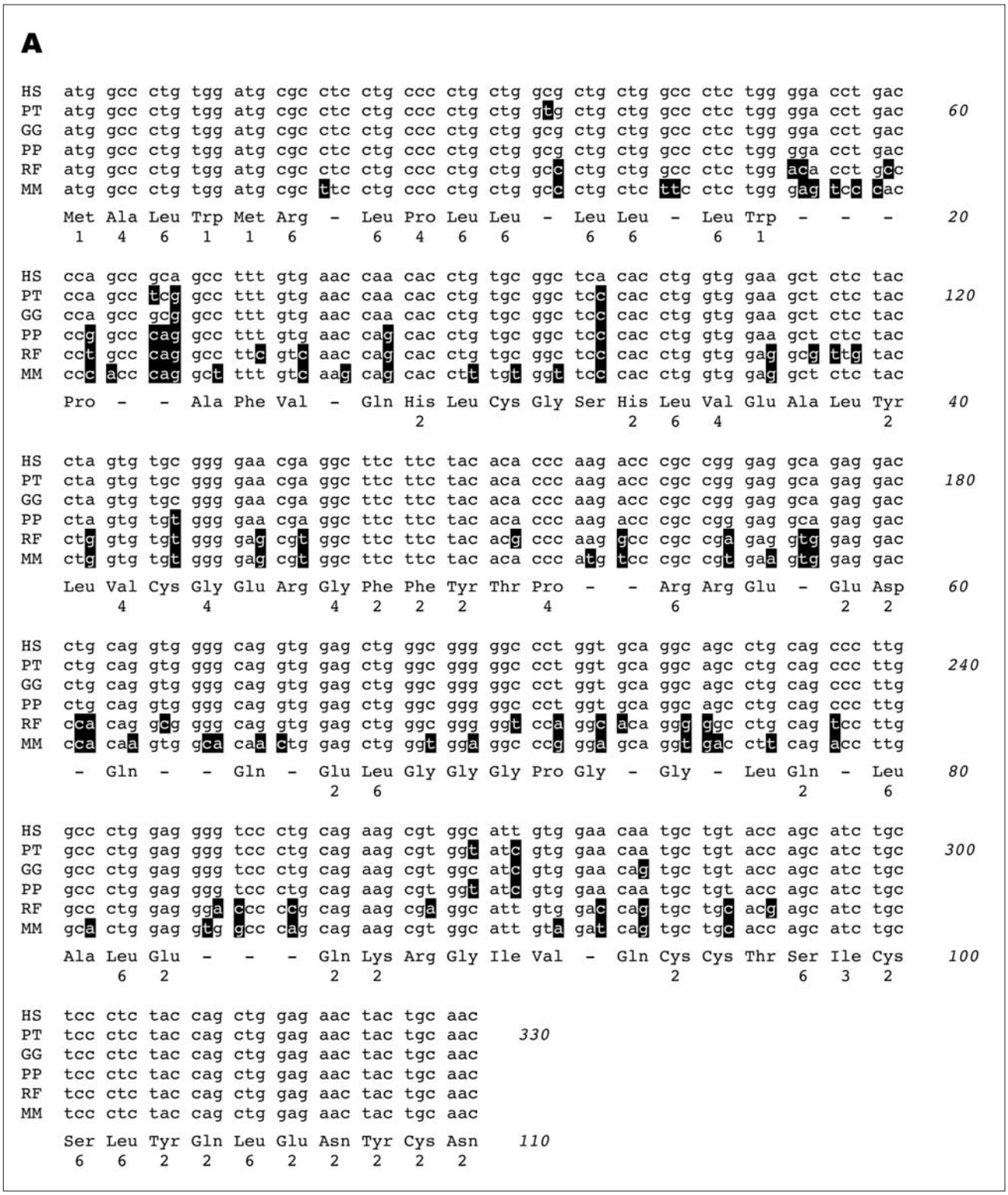

Figure 1A. The complete nucleotide coding sequence for pre-proinsulin aligned for four primate species (HS = *Homo sapiens* /human, PT = *Pan troglodytes*/chimpanzee, GG = *Gorilla gorilla*/gorilla, PP = *Pongo pygmaeus*/Bornean orangutan), one chiropteran (RF = *Rhinolophus ferrumequinum*/greater horseshoe bat) and one murid (MM = *Mus musculus*/mouse). Nucleotides that differ from the human sequence are shaded in black. Amino acids conserved in all six species are given below the nucleotide sequence. Numbers below codons conserved in all six species indicate the number of codon alternatives for that position.

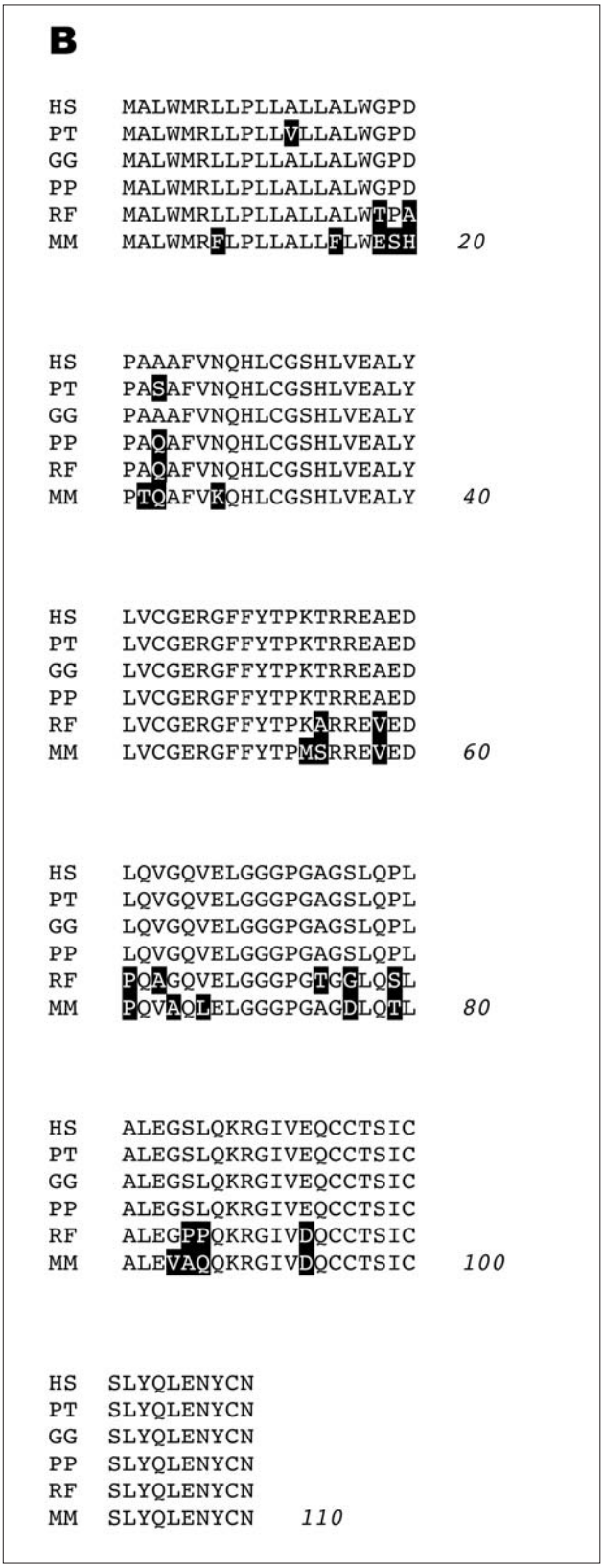

Figure 1B. The complete amino acid sequence of pre-proinsulin aligned for the same species as in (A). Amino acids that differ from the human sequence are shaded in black.

This argument can be extended to situations in which amino acid differences are observed in specific proteins between species. For example, the differences between human and chimpanzee insulin at the nucleic acid level are as small as possible despite the amino acid differences. The twelfth amino acid in chimpanzee insulin, for instance, is valine (codon GTG), whereas in the other mammals examined here (figures 1A, 1B), it is alanine (codons GCG or GCC). There are four codons that code for valine (GT followed by any of A, C, G, or T) and four that code for alanine (GC followed by any of A, C, G, or T). What we see when comparing this codon in humans and chimpanzees is the two closest possible codons despite the altered amino acid. Put another way, the nucleic acid code is consistent with only single nucleotide changes of a common ancestral sequence, even though there are multiple codon options for the different amino acids.

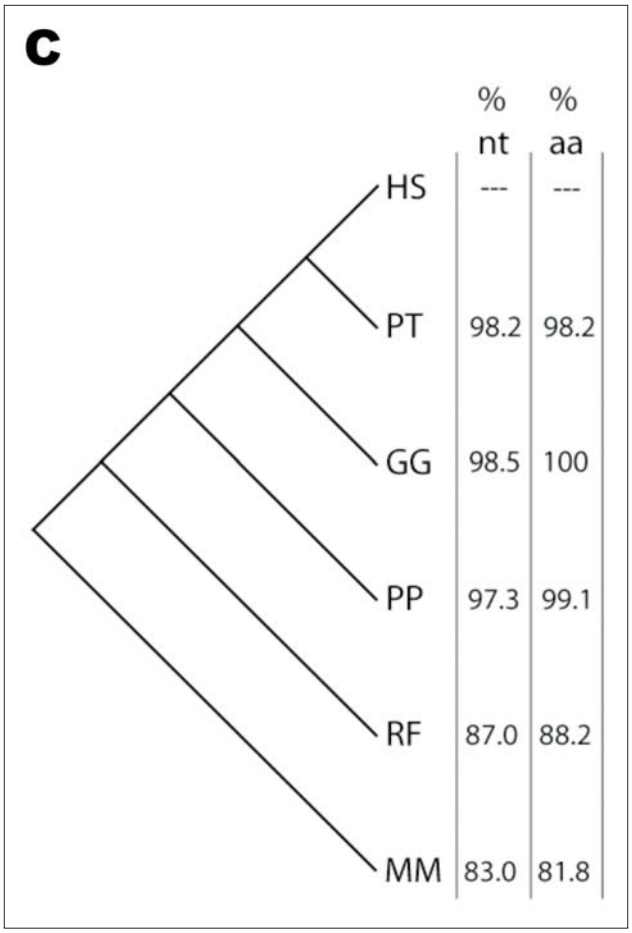

Figure 1C. Phylogeny for the same six species, with percent homology for pre-proinsulin relative to the human sequence shown for nucleotide (nt) and amino acid (aa) sequences.

Extending this type of analysis to other insulin sequences from organisms predicted to be less related to humans produces the same pattern: gorillas and orangutans use the same GCG codon for the alanine at the twelfth position, whereas bats and mice use a GCC codon for this alanine. This pattern persists across the entire coding sequence for insulin. Significant nucleic acid homology is retained despite the numerous options for the conserved amino acid sequence (figure 1C), and changes are highly consistent with single-nucleotide substitutions of an ancestral sequence (figure 1A). In summary, the observed pattern of gene homology across species is precisely what common ancestry predicts at two levels of code.

Genomic Spatial Organization: Evidence from Synteny

Synteny, in comparative genomics context, speaks to the observation that related organisms not only have high sequence homology for individual genes, but that the spatial organization of those genes is also similar. In short, organisms thought to be close evolutionary relatives have their genes in essentially the same order, with small differences arising from known mechanisms such as sequence inversions, translocations, and chromosome fusion events. As before, the hypothesis of common ancestry predicts such an outcome, since the two species in question are hypothesized to have once been a single species.

The fact that the human and chimpanzee genomes exhibit striking synteny with only subtle differences in genomic organization has been known for some time, based on chromosome staining and molecular hybridization techniques.[11] The main differences between human and chimpanzee chromosome sets are nine intrachromosomal inversions and one chromosome fusion.[12] These observations have now been confirmed at the molecular level by whole-genome sequencing of humans and chimpanzees.[13] Perhaps the best-known example of a difference between humans and chimpanzees with respect to genome organization is the telomere-to-telomere fusion resulting in human chromosome 2.[14] This chromosome corresponds to what are two separate chromosomes in chimpanzees and other great apes, suggesting that the human chromosome is the result of a fusion between what has persisted as two separate chromosomes in these other species. The evidence for the fusion event is based on synteny: the genes from the two ape chromosomes line up with the one human chromosome in the exact pattern one would expect from a tip-to-tip fusion event.

Synteny also predicts where certain byproducts of such a fusion event would be found. Chromosomes have special sequences called telomeres at their tips, as well as an internal sequence called a centromere that is used during cell division. Based on the two chromosomes we see in apes, we would predict *internal* telomere sequences where the human chromosome 2 sequence changes from aligning with the one ape chromosome to the other. We would also predict the presence of *two* centromeres that line up with the locations of those found in the ape chromosomes. In both cases, we find in human chromosome 2 exactly what common ancestry would predict: internal telomere sequences precisely at the expected fusion point, and the presence of two centromeres in their predicted locations, though one has been inactivated through accumulated mutations.[15]

In summary, when comparing the complete human and chimpanzee genomes, we observe that the spatial organization of genes in both species matches precisely what one would predict based on common ancestry: overwhelming similarity, with subtle differences arising since speciation.

Genomic Archaeology: Evidence from Pseudogenes

A third, and very compelling, line of evidence for common ancestry of humans and great apes comes from shared pseudogenes. *Pseudogenes* (literally, "false genes") are gene sequences that have been inactivated by mutation that persist in the genome as nonfunctional sequences. Pseudogenes remain recognizable for several reasons. First, only small changes are needed to inactivate a gene (for example, a change of one codon to an inappropriate "stop" codon, truncating protein translation). In such cases, the gene "remnants" are nearly identical to the functional gene and are readily identifiable by their homology. Secondly, comparative genomics allows us to identify pseudogenes not only by sequence homology to functional genes in other organisms, but also through synteny: pseudogenes retain their spatial orientation to neighboring functional genes after their inactivation. Thirdly, once inactivated, a pseudogene accumulates mutations only slowly,

because the proofreading mechanisms that govern DNA replication do not distinguish between functional and nonfunctional DNA sequences. These features allow for identification of pseudogenes in various states of disrepair as they are slowly mutated beyond recognition over millions of generations.[16]

Common ancestry also predicts that, beyond human-chimpanzee common ancestry, the common primate ancestor also shares ancestry with other vertebrates in the more distant past. For example, evolutionary theory predicts that humans, like all vertebrates, are descended from egg-laying ancestors.[17] As with all placental mammals, humans do not use egg yolk as a source of nutrition for their embryos. Other vertebrates such as fish and birds do employ egg yolk, as do a small number of extant mammals such as the platypus.

One protein used as a yolk component in egg-laying vertebrates is the product of the *vitellogenin* gene.[18] Since placental mammals are proposed to be descended from egg-laying ancestors, researchers recently investigated whether humans retained the remnants of the *vitellogenin* gene sequence in pseudogene form. To assist in their search, this group determined the location of the functional *vitellogenin* gene in the chicken genome, noted the identity of the genes flanking the *vitellogenin* sequence, and located these genes in the human genome. They found that these genes were present side-by-side and functional in the human genome; then they performed an examination of human sequence between them. As expected, the heavily mutated, pseudogenized sequence of the *vitellogenin* gene was present in the human genome at this precise location.[19] The human genome thus contains the mutated remains of a gene devoted to egg yolk formation in egg-laying vertebrates at the precise location predicted by shared synteny derived from common ancestry.

While the *vitellogenin* pseudogene is compelling, it is but one example of thousands that could be given.[20] For example, there are hundreds of genes used for the sense of smell (olfactory receptor genes) in the human genome that have become pseudogenes.[21] Moreover, many of these pseudogenes have identical inactivating mutations shared among humans, chimpanzees, and gorillas.[22] Furthermore, determining degrees of relatedness solely based on genomes that share identical inactivating mutations in olfactory receptor pseudogenes, independently arranges humans as most closely related to chimpanzees (most errors in common), and less so with gorillas (fewer errors in common), and even less with orangutans (fewer still errors in common).[23] Additionally, no "out of place" pseudogenes were found in this study: pseudogenes with identical inactivating mutations common to humans and gorillas were also present with the identical mutation in chimpanzees; mutations common to humans and orangutans were present in chimpanzees and gorillas.

This pattern is precisely what common ancestry predicts for these species, since an identical mutation present in two species is most readily explained by its presence in the common ancestor of both species. The common ancestor of humans and gorillas is also the common ancestor of chimpanzees, hence inactivating mutations present in humans and gorillas are also predicted to be present in chimpanzees. In short, the existence of shared pseudogenes between primate genomes, their syntenic locations, and their patterns of inactivation and distribution all coherently support the same model of common ancestry based on comparative sequence homology criteria alone.

Comparative Genomics: Evidence for Common Descent or Common Design?

While genomics evidence from homology, synteny, and pseudogeny independently supports the hypothesis that humans and chimpanzees share a common ancestor, it is also possible to assess these lines of evidence from an anticommon descent perspective such as intelligent design (ID). While it is true that a few individuals within the ID movement accept human-chimpanzee common ancestry,[24] this position appears to be a minority in the movement as a whole, which prefers an explanation of common design in lieu of common descent.[25] While a more complete treatment of these issues is beyond the scope of this article, a brief overview of genomics evidence from an anticommon descent framework is instructive in investigating the relative strengths and weaknesses of anticommon descent ID and standard evolutionary common ancestry as explanatory frameworks for primate comparative genomics data.

Homology, Redundancy, and Common Design

> Why couldn't the designer use some similar DNA and body structure for different organisms as well? Genetic similarity between chimps and humans does make sense from an evolutionary standpoint, but it is also consistent with intelligent design.[26]
>
> … designers often reuse part designs for different applications. If a designer wanted to generate a species similar to humans, it naturally follows that the designer would redeploy many of the same genes.[27]

It is perhaps reasonable to conclude that a designer may reuse parts to accomplish a similar design implementation (i.e., special creation) event. What we observe, however, is that human and chimpanzee genes match one another at the amino acid (i.e., functional) level as well as in their underlying nucleotide codes.

As we have seen, there is a vast array of nucleotide sequences available to a designer to encode a given amino acid sequence. Even if a designer were constrained by amino acid sequence in order to achieve protein functionality in similar organisms (which, in itself, is questionable, since nonhomologous enzymes can perform the same reaction), it would be easy for such a designer to choose alternate nucleotide codes to avoid the appearance of common ancestry. Yet what we observe, time and again, is that genetic codes in organisms thought to be close evolutionary relatives based on nongenetic criteria, match at the nucleotide as well as at the amino acid levels. This is precisely what common ancestry predicts, since the hypothesis is that similar organisms once were the same species with identical genomes. From an anticommon ancestry design perspective, this pattern is problematic. It suggests that the designer was unwilling (or worse, unable) to avoid the overwhelming appearance of shared ancestry when implementing design for what, in fact, are separately created organisms.

Synteny and Common Design

Discussions of synteny in the ID literature are few and unsubstantial. One example, in an attempt to rebut the conclusion that the signs of chromosomal fusion in human chromosome 2 support common ancestry, displays the basic arguments:

> … chromosomal fusion evidence simply strengthens the evidence for genetic similarity between chimps and humans. Since similarity could have been expected apart from Darwinism and common ancestry, similarities between organisms may just as easily be the result of functional requirements implemented via common design.[28]

This argument, as we have seen, evades the issue that synteny and homology are not necessarily to be expected together from a common design viewpoint.

Additionally, the ID literature does not mention that this prediction of a "shared synteny requirement" is not supported by evidence when comparing the genomes of other groups of highly similar organisms. For example, complete genome sequences of twelve fruit fly (Drosophilid) species are now available[29] and their genomic organizations have been compared.[30] The results of these analyses demonstrate that the Drosophilid body plan and biochemistry are well served by a wide array of synteny arrangements, with chromosomal rearrangements greatly more diverse in this group than that observed between humans and chimpanzees. Moreover, the size of genes held together in syntenic blocks between Drosophilid species is a function of their time since speciation based on molecular clocks. The more divergent the individual gene sequences are between two species, the fewer genes are retained in syntenic groups.[31] Put more simply, the designer seems to have employed a wide array of different genomic organizations for fruit flies, all of which provide appropriate biological function and Drosophilid morphology. The pattern of decreasing synteny matches the pattern of decreasing gene sequence homology as predicted by common descent. Therefore, it is easier to argue that various Drosophilid species are separate, independent designs than it is to argue that humans and chimpanzees are separate, independent designs, despite the fact that the fly species in question are difficult for a nonspecialist to distinguish by eye.

The problem with this line of ID argumentation is similar to what we have seen with redundancy. There is no a priori reason to expect a pattern of similar genomic organization (i.e., shared synteny) for humans and chimpanzees based on an anticommon descent design perspective. Moreover, there is every reason to predict a *very different* pattern, suggestive of independent special creation. Once again, synteny

evidence is not only strongly supportive of human-chimpanzee common ancestry, but also highly problematic for anticommon descent interpretations.

Pseudogenes and Common Design

Anticommon descent ID literature displays three common features with regard to pseudogenes: (1) conflation of pseudogenes with all noncoding DNA under the rubric "junk DNA"; (2) no discussion of the observation that pseudogenes with identical inactivating mutations are shared among organisms in the precise pattern predicted by common ancestry; and (3) the suggestion that pseudogenes have an as-of-yet undetermined function that explains their presence as the result of deliberate design.[32] The one positive argument, that of undetermined pseudogene function, does not address the many instances where a function is known for a given gene product. For example, the function of the *vitellogenin* gene in amniotic organisms is known, as is the function of the numerous olfactory receptors we observe as pseudogenes in humans and other primates.

Moreover, the ID literature does not address the fact that we observe these pseudogenes in the precise syntenic arrangement predicted by common ancestry. To accept the ID argument is to hold that the designer placed these sequences into the human genome in the precise syntenic location where we observe functional versions of these genes in other organisms, with highly homologous sequences that share apparent mutations in a nested hierarchy that matches phylogenies based on independent criteria, to perform an unrelated, as-of-yet unknown function. While such a possibility can never be absolutely ruled out, one wonders why the designer would choose a method of design that would give such a strong impression of common ancestry.

Common Design: A Theory in Crisis

In summary, homology, redundancy, synteny, and shared pseudogenes are independent lines of genomics-based evidence that converge on a single conclusion: humans are not biologically independent, *de novo* creations, but share common ancestry with other forms of life. Moreover, attempts to account for genomics evidence from an anticommon-ancestry ID, common-design viewpoint are enormously strained and severely ad hoc. While each line of evidence is individually problematic from an anticommon-descent, common-design standpoint, their combined, cohesive pattern is devastating.

Genomics and Ancestral Hominid Population Sizes: The Question of Adam and Eve

While much attention has focused on the implications of the human genome project for common ancestry with other primates, other advances in comparative human genomics have provided insight into other aspects of our biological past. One such area is the use of modern-day human genetic variation to estimate effective ancestral human population sizes at several time points in our evolutionary history.

The process for estimating population sizes from comparative genomics data is quantitative in nature,[33] and as such, it is less accessible to a nonspecialist audience. It is, however, possible to appreciate this data qualitatively as well as quantitatively. For example, a small, but significant, fraction of the human genome is more similar to the modern gorilla genome than to the chimpanzee genome.[34] For this subset of sequences, our *species* tree does not match the *gene* tree (figure 2).[35] This discordance is expected for closely related species that have diverged from each other in a short amount of time.[36] Put another way, the reason our genome is overwhelmingly more similar to the chimpanzee genome is that we most recently shared a common ancestor with chimpanzees. Yet, in spite of this, we retain some regions of our genome that are more closely related to gorillas. This situation arises because the population that gave rise to the human-chimpanzee common ancestor was large enough, and genetically diverse enough, to transmit this variation to us without passing it on to chimpanzees. Chimpanzees and humans are thus separate genomic samplings of a diverse ancestral population. Had this pool been small, the human-chimpanzee gene trees would match the species tree in almost every case. The proportion of gene trees that do not match the species tree can therefore be used to estimate the population size of the ancestral population.[37]

Early studies, using limited data sets, consistently estimated that the effective ancestral population size for *Homo sapiens* was in the range of 10,000 individuals, with the lower bound of the 90% confidence

interval in the 6,000 range.[38] This value, because it uses chimpanzees and/or gorillas as a comparison, is a measure of the effective population size of our lineage since speciation with chimpanzees (~4–6 million years ago) or gorillas (~6–9 million years ago).[39] The availability of the complete chimpanzee genome, as well as extensive sequences available from the ongoing gorilla genome project, have allowed for these ancestral population estimates to be made with increasing precision. Consistent with the older work, newer studies have returned estimates in the 8,000–10,000 range using very large data sets.[40]

Perhaps the most sophisticated study to date uses the completed human and chimpanzee genome sequences to assess alternative gene trees for sequences in situ within their human chromosome context (i.e., incorporating synteny).[41] This study, while agreeing with previous estimates, also shows that sequences with the alternative tree (i.e., human and gorilla sequences coalescing before human and chimpanzee) are grouped together in small blocks of synteny, as expected.[42]

Recent progress in examining genetic diversity solely *within* our species has provided a complementary means to estimate our ancestral effective population size, using assumptions independent of those used for cross-species, comparative-genomics approaches. The International HapMap Project is a large-scale effort to map and catalog human single nucleotide polymorphisms (SNPs).[43] While SNPs are like any other source of genetic variation when considered individually, when examined in groups linked together on the same chromosome, they can be used to estimate ancestral population dynamics using an effect called Linkage Disequilibrium (LD).[44]

SNPs linked far apart recombine easily during meiosis, but SNPs linked closely do not, and they tend to be inherited together. Comparing the frequency of individual SNP alleles with their patterns of linkage to other SNPs in the same population reveals that many SNP pairs are in LD: they show up linked to other SNP alleles more frequently than would be expected, based on a random distribution. The biological basis for LD is that SNP pairs are inherited from ancestors and spread through a population without being broken up: closely linked ones stay together longer, and more widely separated ones recombine at a faster rate. Thus, known recombination frequencies between SNPs and the distribution and proportions of SNP pairs in a population can be used to estimate population sizes.[45] Since recombination frequency is determined by the physical distance between SNP pairs, LD studies can be used to estimate population sizes over time in a way

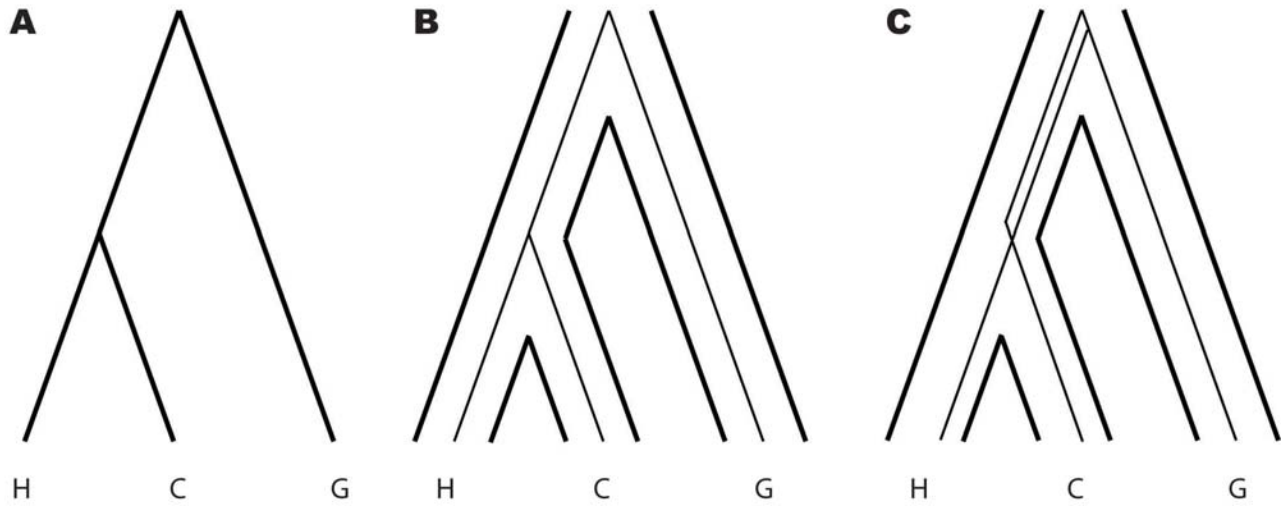

Figure 2. Species and Gene Trees for Human, Chimpanzee, and Gorilla

A. Comparative primate genomics strongly supports a primate species tree that groups humans (H) and chimpanzees (C) as more recently diverged relative to gorilla (G). Most genes in humans and chimpanzees coalesce before coalescence with gorilla (**B**); however, a minority coalesce first with gorilla (**C**). This alternative gene tree arises when variants of these genes were maintained in the human-chimpanzee common ancestral population after gorillas branch off (**C**). Accordingly, the proportion of genes in humans with a gene tree discordant with the species tree can be used to infer the effective population size of the lineage leading to humans from the present to the point of divergence with gorilla. See text for details.

that mutation-based estimates cannot. Selection of tightly linked markers allows for estimates in the deeper past, while more distantly linked SNPs (with their accordingly faster rates of recombination) are useful for more recent estimates. Also, since there are many thousands of SNP pairs to examine in the human genome, any sampled human population provides a multitude of data points for LD-based methods.

Studies based on SNP/LD approaches have now estimated ancestral population dynamics for various human groups over time in more detail than is possible with mutation-based estimates. African groups have a higher effective population size (~7,000) than do non-African groups (~3,000) over the last 200,000 years.[46] This approach, though based on methods and assumptions independent of previous work, nonetheless continues to support the conclusion that humans, as a species, are descended from an ancestral population of at least several thousand individuals. More importantly, the scalability of this approach reveals that there was no significant change in human population size at the time modern humans appeared in the fossil record (~200,000 years ago), or at the time of significant cultural and religious development at ~50,000 years ago.[47]

Taken individually and collectively, population genomics studies strongly suggest that our lineage has not experienced an extreme population bottleneck in the last nine million years or more (and thus not in any hominid, nor even an australopithecine species), and that any bottlenecks our lineage did experience were a reduction only to a population of several thousand breeding individuals. As such, the hypothesis that humans are genetically derived from a single ancestral pair in the recent past has no support from a genomics perspective, and, indeed, is counter to a large body of evidence.

What about Mitochondrial Eve and Y-Chromosomal Adam?

The genomics data presented above may appear to be at odds with the observation that human mitochondrial DNA coalesces to a common ancestor in the recent past (~170,000 years ago), and that human Y-chromosome sequences also coalesce to a common ancestor even more recently (~50,000 years ago).[48] This appearance of conflict, while commonly exploited in antievolutionary literature,[49] is in error. The reason for the rapid coalescence of mitochondrial and Y-chromosome sequences is that these DNA sequences are inherited in a manner distinct from (non-Y) chromosomal DNA. Mitochondrial DNA is passed only through mothers; Y chromosomes are passed only from father to son. As such, mitochondrial DNA lineages end abruptly if a mother has only sons; similarly, Y-chromosome lineages end abruptly if a father has only daughters. In both cases, however, non-Y chromosomal DNA lineages continue (i.e., fathers and mothers pass chromosomes to offspring of both genders).

Consider an extended family (figure 3). In this example, all females in the third generation derive their mitochondrial DNA from one common female ancestor in the first generation. Examining the females in generation three would produce the following results: their mitochondrial lineage would coalesce rapidly, but their chromosomal DNA lineage would not, since it is in part (50%) derived from two individuals in the second generation who are unrelated to the source of their mitochondrial DNA. Accordingly, variation in their genomic sequences would indicate that they are derived from a larger population that did not pass on its mitochondrial DNA to the present. In other words, it would be inappropriate to conclude that their matrilineal ancestor in the first generation was the only female present at that time, or that she lived at a time of a severe population bottleneck.

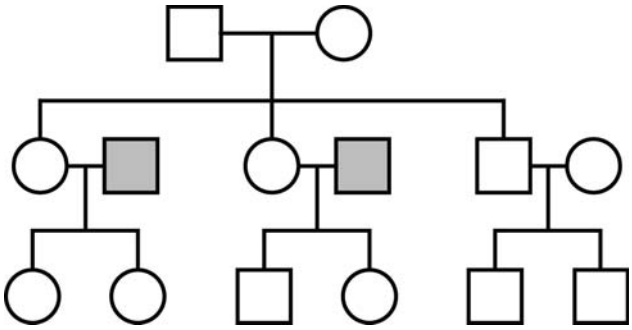

Figure 3. Mitochondrial and Chromosomal Inheritance in Humans

Squares indicate males, circles represent females. All females in the third generation have inherited their mitochondrial DNA from their common grandmother; however, they have inherited chromosomal DNA from their fathers as well (grey squares). As such, variation in their chromosomal DNA is the appropriate basis for estimating their population size.

So, too, for modern human populations. Though our mitochondrial DNA lineage coalesces to "Mitochondrial Eve" in the relatively recent past, present-day variation of human chromosomal DNA indicates that she was but one member of a substantial breeding population. The same logic, *mutatis mutandis*, applies to the inheritance of the Y-chromosome and the coalescence of human Y-chromosome variation to a single "Adam" in the recent past. While the rapid coalescence of these specially inherited DNA sequences is interesting in its own right, such sequences are not useful measures of ancestral human population sizes because of their unique modes of inheritance.[50]

Genesis and the Genome: "Ratcheting Concordism" or Divine Accommodation?

In summary, the expectation that the Genesis narratives provide scientific biological details of human ancestry fails in light of human genomics evidence on two fronts: humans share ancestry with other forms of life; and our speciation was through an interbreeding population, not an ancestral pair. As such, Christian "scientific concordist" approaches to Genesis are now under pressure from these lines of evidence.[51] The expectation that Genesis offers—at least at some level—scientific information, coupled with a view that science is a valid enterprise that provides an increasingly reliable understanding about the created order, produces a phenomenon I refer to as "ratcheting concordism." This approach is recognizable in that those who employ it, at first, resist the implications of new research that conflict with their concordist expectations, often deferring a decision on the claim of insufficient evidence. However, if contrary evidence continues to mount against their position, eventually such an individual may concede the point, discard the specific concordist expectation in question, and "ratchet" over to the next available position that retains the balance of their expectations. Considering the evidence presented here, one example might be a shift from denying common ancestry to its acceptance, while still retaining the expectation that our common ancestry was derived biologically through a single pair in the recent past.[52]

In contrast to a ratcheting concordist approach, an Evolutionary Creationist framework, such as that advanced recently in the works of Denis Lamoureux,[53] readily accepts and incorporates new scientific information. This view, in that it approaches the science of the Genesis narratives as divine accommodation to an Ancient Near-Eastern culture, has no expectation that Genesis will be in concord with modern science. While such a view may be criticized as a "low view" of Scripture, a ratcheting concordist approach is open to the same criticism, in that it postulates that only a *subset* of Genesis contains reliable scientific information. The implication for this approach, therefore, is that while Genesis is intended to convey scientific information, certain scientific features of Genesis are inaccurate or obscured due to accommodation. Evolutionary Creationism, in contrast, views the Genesis narratives as seamless documents of divine accommodation to their original audience, narratives that are written without intent to address modern scientific concerns. ◈

Notes

[1]C. Darwin, *The Descent of Man, and Selection in Relation to Sex* (New York: D. Appleton and Company, 1871).

[2]The Chimpanzee Sequencing and Analysis Consortium, "Initial Sequence of the Chimpanzee Genome and Comparison with the Human Genome," *Nature* 437 (2005): 69–87.

[3]International Human Genome Sequencing Consortium, "Initial Sequencing and Analysis of the Human Genome," *Nature* 409 (2001): 860–920; International Human Genome Sequencing Consortium, "Finishing the Euchromatic Sequence of the Human Genome," *Nature* 431 (2004): 931–45.

[4]The Chimpanzee Sequencing and Analysis Consortium, "Initial Sequence of the Chimpanzee Genome and Comparison with the Human Genome."

[5]M. C. King and A. C. Wilson, "Evolution at Two Levels in Humans and Chimpanzees," *Science* 188 (1975): 107–16.

[6]The Chimpanzee Sequencing and Analysis Consortium, "Initial Sequence of the Chimpanzee Genome and Comparison with the Human Genome"; R. J. Britten, "Divergence between Samples of Chimpanzee and Human DNA Sequences Is 5%, Counting Indels," *Proceedings of the National Academy of Sciences of the USA* 99 (2002): 13633–5.

[7]Ibid.

[8]R. Nielsen, C. Bustamante, A. G. Clark et al., "A Scan for Positively Selected Genes in the Genomes of Humans and Chimpanzees," *PLoS Biology* 3 (2005): e170.

[9]Tetrapod insulin sequences in Figure 1 were assembled from data accessed from National Center for Biotechnology Information public genome databases using BLAST searches (http://blast.ncbi.nlm.nih.gov/Blast.cgi).

[10]Nielsen, Bustamante, Clark et al., "A Scan for Positively Selected Genes in the Genomes of Humans and Chimpanzees."

[11]King and Wilson, "Evolution at Two Levels in Humans and Chimpanzees"; J. W. Ijdo, A. Baldini, D. C. Ward et al., "Origin of Human Chromosome 2: An Ancestral Telomere-

Telomere Fusion," *Proceedings of the National Academy of Sciences of the USA* 88 (1991): 9051–5; T. Ried, N. Arnold, D. C. Ward, and J. Wienberg, "Comparative High-Resolution Mapping of Human and Primate Chromosomes by Fluorescence in Situ Hybridization," *Genomics* 18 (1993): 381–6.

[12]H. Kerher-Sawatzki, B. Schreiner, S. Tanzer et al., "Molecular Characterization of the Pericentric Inversion That Causes Differences between Chimpanzee Chromosome 19 and Human Chromosome 17," *American Journal of Human Genetics* 71 (2002): 375–88; see also references therein.

[13]L. W. Hillier, T. A. Graves, R. S. Fulton et al., "Generation and Annotation of the DNA Sequences of Human Chromosomes 2 and 4," *Nature* 434 (2005): 724–31; The Chimpanzee Sequencing and Analysis Consortium, "Initial Sequence of the Chimpanzee Genome and Comparison with the Human Genome"; L. Feuk, J. R. MacDonald, T. Tang et al., "Discovery of Human Inversion Polymorphisms by Comparative Analysis of Human and Chimpanzee DNA Sequence Assemblies," *PLoS Genetics* 1 (2005): e56.

[14]Ijdo, Baldini, Ward et al., "Origin of Human Chromosome 2"; Hillier, Graves, Fulton et al., "Generation and Annotation of the DNA Sequences of Human Chromosomes 2 and 4"; The Chimpanzee Sequencing and Analysis Consortium, "Initial Sequence of the Chimpanzee Genome and Comparison with the Human Genome."

[15]Hillier, Graves, Fulton et al., "Generation and Annotation of the DNA Sequences of Human Chromosomes 2 and 4."

[16]While the mutation rate within pseudogenes *appears* faster than that observed in functional sequences (because purifying selection removes mutations from the population), it is, in fact, slow, in an absolute sense, due to proofreading by DNA polymerases during chromosome replication.

[17]D. Brawand, W. Wali, and H. Kaessmann, "Loss of Egg Yolk Genes in Mammals and the Origin of Lactation and Placentation," *PLoS Biology* 6 (2006): 0507–17.

[18]Ibid.

[19]Ibid.

[20]This article has limited the discussion of pseudogenes to *unitary* pseudogenes: sequences that lack a homologous sequence within the same genome, but are present at the expected syntenic area in functional form in other organisms. Indeed, if one considers repetitive elements, endogenous retrovirus insertions, processed pseudogenes, and so forth, examples could be multiplied many times over.

[21]T. Olender, D. Lancet, and D. W. Nebert, "Update on the Olfactory Receptor (OR) Gene Superfamily," *Human Genomics* 3 (2008): 87–97.

[22]Y. Gilad, O. Man, S. Paabo, and D. Lancet, "Human Specific Loss of Olfactory Receptor Genes," *Proceedings of the National Academy of Sciences of the USA* 100 (2003): 3324–7.

[23]Ibid.

[24]M. Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free Press, 2007).

[25]For example, two recent, popular-level ID books attempt to cast doubt on human-chimpanzee common ancestry, and conflate common ancestry with "Darwinism": see W. A. Dembski and S. McDowell, *Understanding Intelligent Design: Everything You Need to Know in Plain Language* (Eugene, OR: Harvest House, 2008), 55–7 and C. Luskin and L. P. Gage, "A Reply to Francis Collins's Darwinian Arguments for Common Ancestry of Apes and Humans," in *Intelligent Design 101: Leading Experts Explain the Key Issues*, ed. H. W. House (Grand Rapids, MI: Kregel Publications, 2008), 215–35.

[26]Dembski and McDowell, *Understanding Intelligent Design: Everything You Need to Know in Plain Language*.

[27]C. Luskin, "Finding Intelligent Design in Nature," in *Intelligent Design 101: Leading Experts Explain the Key Issues*, 90.

[28]Luskin and Gage, "A Reply to Francis Collins's Darwinian Arguments for Common Ancestry of Apes and Humans," 221.

[29]*Drosophila* 12 Genomes Consortium, "Evolution of Genes and Genomes on the Drosophila Phylogeny," *Nature* 450 (2007): 203-18.

[30]S. W. Schaeffer, A. Bhutkar, B. F. McAllister et al., "Polytene Chromosomal Maps of 11 Drosophila Species: The Order of Genomic Scaffolds Inferred from Genetic and Physical Maps," *Genetics* 179 (2008): 1601–55; A. Bhutkar, S. W. Schaeffer, S. M. Russo et al., "Chromosomal Rearrangement Inferred from Comparisons of 12 Drosophila Genomes," *Genetics* 179 (2008): 1657–80.

[31]Ibid.

[32]For an example that features the key ID approaches, see Luskin and Gage, "A Reply to Francis Collins's Darwinian Arguments for Common Ancestry of Apes and Humans," 224–31.

[33]For a review, see N. A. Rosenberg and M. Nordborg, "Genealogical Trees, Coalescent Theory and the Analysis of Genetic Polymorphisms," *Nature Reviews Genetics* 3 (2002): 380–90.

[34]A. Hobolth, O. F. Christensen, T. Mailund, and M. H. Schierup, "Genomic Relationships and Speciation Times of Human, Chimpanzee, and Gorilla Inferred from a Coalescent Hidden Markov Model," *PLoS Genetics* 3 (2007): e7.

[35]Additional gene trees are possible, for example, where gene divergence occurs within an ancestral population prior to speciation. Also, additional factors such as hypermutability must be accounted for when estimating population sizes from discordant gene/species trees. Figure 2 is in part an adaptation and condensation of figure 1 in Holbolth, Christensen, Mailund, and Schierup, "Genomic Relationships and Speciation Times of Human, Chimpanzee, and Gorilla Inferred from a Coalescent Hidden Markov Model." For a more thorough discussion of these issues, see the complete article; and Rosenberg and Nordborg, "Genealogical Trees, Coalescent Theory and the Analysis of Genetic Polymorphisms."

[36]Rosenberg and Nordborg, "Genealogical Trees, Coalescent Theory and the Analysis of Genetic Polymorphisms"; Hobolth, Christensen, Mailund, and Schierup, "Genomic Relationships and Speciation Times of Human, Chimpanzee, and Gorilla Inferred from a Coalescent Hidden Markov Model."

[37]Ibid.

[38]For an example, see W. Li and L. A. Sadler, "Low Nucleotide Diversity in Man," *Genetics* 129 (1991): 513–23.

[39]Hobolth, Christensen, Mailund, and Schierup, "Genomic Relationships and Speciation Times of Human, Chimpanzee, and Gorilla Inferred from a Coalescent Hidden Markov Model."

[40]F. C. Chen and W. H. Li, "Genomic Divergences between Humans and Other Hominoids and the Effective Population Size of the Common Ancestor of Humans and Chimpanzees," *American Journal of Human Genetics* 68 (2001): 444–56; Z. H. Yang, "Likelihood and Bayes Estimation of Ancestral Population Sizes in Hominoids Using Data from Multiple Loci," *Genetics* 162 (2002): 1811–23; Z. Zhao, L. Jin, Y. Fu et al., "Worldwide DNA Sequence Variation in a 10-kilobase Noncoding Region on Human Chromosome 22," *Proceedings of the National Academy of Sciences of the USA* 97 (2000): 11354–8.

[41]Hobolth, Christensen, Mailund, and Schierup, "Genomic Relationships and Speciation Times of Human, Chimpanzee, and Gorilla Inferred from a Coalescent Hidden Markov Model."

[42]Ibid.

[43]See www.hapmap.org

[44]A. Tenesa, P. Navarro, B. J. Hayes et al. "Recent Human Effective Population Size Estimated from Linkage Disequilibrium," *Genome Research* 17 (2007): 520–6.

[45]Ibid.

[46]Ibid.

[47]Reasons to Believe maintains a literal Adam and Eve as progenitors of the entire human race and places them at ~50,000 years ago.

[48]M. Ingman, H. Kaessmann, S. Paabo, and U. Gyllensten, "Mitochondrial Genome Variation and the Origin of Modern Humans," *Nature* 408 (2000): 708–13; R. Thomson, J. K. Pritchard, P. Shen et al., "Recent Common Ancestry of Human Y Chromosomes: Evidence from DNA Sequence Data," *Proceedings of the National Academy of Sciences of the USA* 97 (2000): 7360–5.

[49]For example, see F. Rana and H. Ross, *Who Was Adam?* (Colorado Springs: Navpress, 2005), 123–31.

[50]F. Ayala, A. Escalante, C. O'Huigin, and J. Klein, "Molecular Genetics of Speciation and Human Origins," *Proceedings of the National Academy of Sciences of the USA* 91 (1994): 6787–94.

[51]D. Lamoureux, *Evolutionary Creation: A Christian Approach to Evolution* (Eugene, OR: Wipf & Stock, 2008).

[52]Denis Lamoureux (personal communication) has also collected anecdotal evidence of individuals ratcheting from one concordist position to another in light of new evidence. In his experience, the most prominent "positions" on the ratchet are Young-Earth Creationism; Old-Earth Creationism; Evolutionary Creationism that retains a literal Adam and Eve as biological progenitors of humanity (evolutionary monogenism); and Evolutionary Creationism proper (with no scientific concordist expectations of Genesis remaining). Further gradations are, of course, possible.

[53]D. Lamoureux, *Evolutionary Creation: A Christian Approach to Evolution*; ____, "Lessons From the Heavens: On Scripture, Science and Inerrancy," *Perspectives on Science and Christian Faith* 60 (2008): 4–15.

After Adam: Reading Genesis in an Age of Evolutionary Science

Daniel C. Harlow

Daniel C. Harlow

Recent research in molecular biology, primatology, sociobiology, and phylogenetics indicates that the species Homo sapiens *cannot be traced back to a single pair of individuals, and that the earliest human beings did not come on the scene in anything like paradisal physical or moral conditions. It is therefore difficult to read Genesis 1–3 as a factual account of human origins. In current Christian thinking about Adam and Eve, several scenarios are on offer. The most compelling one regards Adam and Eve as strictly literary figures – characters in a divinely inspired story about the imagined past that intends to teach theological, not historical, truths about God, creation, and humanity.*

Taking a nonconcordist approach, this article examines Adam and Eve as symbolic-literary figures from the perspective of mainstream biblical scholarship, with attention both to the text of Genesis and ancient Near Eastern parallels. Along the way, it explains why most interpreters do not find the doctrines of the Fall and original sin in the text of Genesis 2–3, but only in later Christian readings of it. This article also examines briefly Paul's appeal to Adam as a type of Christ. Although a historical Adam and Eve have been very important in the Christian tradition, they are not central to biblical theology as such. The doctrines of the Fall and original sin may be reaffirmed without a historical Adam and Eve, but invite reformulation given the overwhelming evidence for an evolving creation.

Modern science has amply demonstrated that phenomena such as predation, death, and the extinction of species have been intrinsic and even necessary aspects of life on earth for billions of years, long before the arrival of *Homo sapiens*. For this reason, many Bible-believing Christians have long found it difficult to read Genesis 1–3 as a factual account of human origins. The status of Adam and Eve, in particular, has become a keen topic of interest in Christian circles over the last several years. Much of this interest has been sparked by a variety of studies that call into question (in effect, if not intent) the historicity of the Bible's first couple. The ever-growing hominid fossil record unmistakably shows that human beings did not appear suddenly but evolved gradually over the course of six million years.[1] Further, anthropologically sensitive studies of Genesis have observed that the biblical Adam and Eve and their early offspring are portrayed as figures living in the Neolithic period, around 9,000 to 7,000 BCE, which is some 30,000 years *later* than the earliest archaeological evidence for religious behavior and culture among humans.[2]

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More recently, research in molecular biology indicates that the genetic diversity of the present human population cannot possibly be traced back to a single couple living in Mesopotamia a few thousand years ago. The best mathematical models suggest, rather, that the ancestors of all modern *Homo sapiens* were a population of about 10,000 interbreeding individuals who were members of a much larger population living in Africa around 150,000 years ago.[3] This genetic evidence corroborates the fossil evidence for the date and location of the earliest anatomically modern human beings.

One needed clarification of the molecular evidence concerns the early human whom geneticists have nicknamed "Mitochondrial Eve." The popular press has misled some into thinking that scientists have discovered evidence for the very first female human, and many Christians have taken this announcement to support the biblical portrait of monogenism.[4] Mitochondrial Eve, though, is not the founding mother of the human race but only the matrilineal carrier of an ancestral mitochondrial DNA (mtDNA) molecule that gave rise to all mtDNA in women today. The human mitochondrial genome is tiny compared to our nuclear/chromosomal genome (less than 1% its size), and is passed down only through females. Variations in chromosomal DNA today indicate that Mitochondrial Eve was only one member of a large breeding population. Thousands of other men and women were her contemporaries, and they no doubt contributed other parts of our full genetic makeup.[5] The same is true, *mutatis mutandis,* of the so-called Y-chromosomal Adam, the patrilineal common ancestor for all Y chromosomes in men living today, who lived around 60,000 years ago, that is, some 100,000 years *after* Mitochondial Eve.[6]

Recent studies in primatology, sociobiology, and phylogenetics are also pertinent to the historicity of Adam and Eve and to the Christian doctrines of the Fall and original sin. Here a range of evidence establishes that virtually all of the acts considered "sinful" in humans are part of the natural repertoire of behavior among animals—especially primates, but also birds, insects, and other species—behaviors including deception, bullying, theft, rape, murder, infanticide, and warfare, to name but a few.[7] The shared patterns of behavior, both "selfish" and "altruistic," are homologous and owe at least in part to the common genetic heritage of all creatures, stretching back to the very beginning of life. Though not completely determined by genes, animal and human behaviors are strongly influenced by them. The source of the human inclination toward self-aggrandizement, then, is to be found in animal nature itself. Far from infecting the rest of the animal creation with selfish behaviors, we humans inherited these tendencies from our animal past.

Together, these newer lines of research join other, well-established ones in making it hard to imagine that the earliest human beings appeared on the scene in anything like paradisal physical or moral conditions. They would instead have had to struggle to sustain themselves, and to do so, they would have possessed strong tendencies toward the same types of behavior common to all animals. Only over time would they have developed a sufficient spiritual awareness to sense that many selfish behaviors are contrary to God's will, and the moral imperative to transcend those behaviors.

How do the biblical Adam and Eve fare in all this? If they were not actual persons, then what becomes of the Bible's teaching about sin and death entering the world through their transgression? If there was no singular sinful act, and if biological death as such is not divine punishment for sin, then what happens to the doctrine of the Fall? And if there was no fall from a primordial state of moral innocence and physical perfection, then what becomes of original sin and of the need for redemption in Christ?

Broadly speaking, there are three possible responses to the apparent erosion of biblical truth by modern science: (1) dispute the science, (2) finesse one's interpretation of Scripture to accord with the science, or (3) assign the Bible and science to two separate spheres of authoritative discourse. Strategies 2 and 3 have enabled most Christians to accept scientific ideas that were once thought to undermine biblical truth, especially a heliocentric solar system and an old earth. By contrast, among fundamentalists and evangelicals, the theory of evolution still meets with a great deal of hesitance and suspicion, if not downright hostility. This is especially so in the matter of hominid evolution, which, for many, seems to diminish the status of human beings as bearers of the divine image.[8]

In current Christian thinking about Adam and Eve, five basic scenarios are on offer.[9] (1) The traditional view, still held today by young-earth creationists, is that Adam and Eve are *recent ancestors* of the human race—actual persons specially created by God about 10,000 years ago. (2) Another view, held by old-earth creationists, posits that God created humans around 150,000 years ago but then selected a pair of them about 10,000 years ago to represent all of humanity; this would make Adam and Eve *recent representatives*. (3) A third view sees Adam and Eve as *ancient ancestors*—a pair of evolved hominids whom God selected and miraculously modified into the first *Homo sapiens* about 150,000 years ago. (4) A variant of this scenario envisions Adam and Eve as *ancient representatives:* God revealed himself to a large group of early humans around 150,000 years ago, and the biblical Adam and Eve are symbolic of this group. (5) Over against these four scenarios stands the view of the majority of contemporary biblical scholars, theologians, and Christians working in the sciences, a view that is largely unknown in evangelical circles: Adam and Eve are strictly literary figures—characters in a divinely inspired story about the imagined past that intends to teach primarily theological, not historical, truths about God, creation, and humanity.

The attractiveness of this last position is twofold: it does not contradict modern science (as the first scenario does), and it does not read into the biblical text anachronistic notions that would have been inconceivable to the ancient author(s) and audience(s) of Genesis (as the second, third, and fourth concordist scenarios do). In this article, I explore Adam and Eve as symbolic-literary figures from the perspective of mainstream biblical scholarship. Along the way, I explain why most interpreters do not find the doctrines of the Fall and original sin in the text of Genesis 2–3 but only in later Christian readings of it. The final section of my article briefly examines Paul's appeal to Adam as a type of Christ. In the conclusion I propose that, although a historical Adam and Eve have been very important in the Christian tradition, they are not central to biblical theology as such. I also join many theologians in maintaining that the doctrines of the Fall and original sin should be reaffirmed but reformulated in the light of evolutionary science.

Recognizing Adam and Eve as Strictly Literary Figures

For the most part, biblical scholars have arrived at their current understanding of the Adam and Eve narrative independently of developments in modern science. The consensus view has the advantage of being compatible with the findings of science without relying on a concordist strategy of interpretation dictated by consideration of science.

The Literary Genre of Genesis 1–11

The most general reason why biblical scholars recognize Adam and Eve as strictly literary figures has to do with the genre of the narratives in chapters 1–11 of Genesis. The vast majority of interpreters take the narratives in these chapters as story, not history, because their portrait of protohistory from creation to flood to Babel looks very stylized—with sequences, events, and characters that look more symbolic than "real" events and characters in "normal" history. All of the episodes are to a great extent etiological, designed to explain the origins or cause of aspects of human life in the world—marriage, sexual desire, and patriarchy; toil in agricultural labor; pain in childbirth; the beginnings of material culture and civilization; diversity in language; and so forth. The stories in these chapters are somewhat different from ancient Near Eastern myths. For example, they do not collapse a timeless past into the present as myths usually do but place primal events within a temporal framework. Nevertheless, they do draw their raw materials from myths, and they function in large measure as myths do: to explain humanity's current condition and to articulate a particular conception of the world and of the divine-human relationship.

Ancient narratives do not typically announce their genre or pronounce on their own historicity. They are not accompanied by prefaces, publishers' blurbs, or dust jackets. And in the case of Genesis 1–11, we cannot really know very much about how the earliest Israelite-Jewish audiences received the material in these chapters. The reason for this is that the Adam and Eve story is not even mentioned in the Old Testament outside Genesis or in early Jewish literature before the second century BCE. The best we can do is pay close attention to clues within the text about how it should be taken, with a sidelong glance at similar texts that are roughly contemporaneous with it. Having done this for many years now,

I have come to share the view that the narratives in Genesis 1–11 were probably written and read as both paradigmatic and protohistorical—*imaginative portrayals of an actual epoch in a never-to-be-repeated past that also bears archetypal significance for the ongoing human situation.*

How, though, are we to take them today? The very fact that these chapters deal with *prehistoric* times convinces most interpreters that they contain no history in the modern sense of that term. The author is too distant from the events for the narrative to be historical; the characters have symbolic names and act like stock figures; the episodes look prototypical; the events bear no relation to specific times or datable occurrences; and many details cannot be reconciled with findings in several branches of modern science.[10] In biblical scholarship, however, it is not so much the scientific discoveries of the last two hundred years that have prompted recognition of the story-character of Genesis 1–11 as the archaeological recovery of literary texts from the ancient Near East.[11]

Genesis' Reliance on and Refutation of Mesopotamian Myths

When read in their wider literary context, the early chapters of Genesis appear to offer an inspired retelling of ancient Near Eastern traditions about cosmic, world, and human origins—by way of both adaptation and critique.[12] Over against older Mesopotamian myths, the creation accounts in Genesis 1 and 2 make several pointed theological assertions. These include the sovereignty of the one God, as opposed to the belligerent and capricious deities of other religions; the goodness but also finiteness of creation, in place of viewing elements of the cosmos such as the sun, moon, and stars as divine and hostilely disposed toward human beings; and the dignity of humanity as central to God's plan for creation, not an afterthought fashioned to relieve the gods of work. The stories in Genesis 3–11, too, are somewhat polemical in nature: instead of an optimistic tale of human progress, they tell of a steady decline in humanity's condition and relation to the divine, a sorry state that owes not to the whims of the gods or to the malevolent forces of the cosmos but to humanity's disobedience to the divine will.

In treating these matters, the author(s) of Genesis evidently found it desirable to borrow and transform sequences, themes, and motifs from pagan myths. Among the numerous specific details that Genesis 2–3 adapts from Mesopotamian stories are the following:

- a garden paradise of god(s) in the East (e.g., *Enki and Ninhursag; Gilgamesh Epic)*
- humans created out of clay to cultivate the land (e.g., *Enki and Ninmah; Atrahasis Epic; Gilgamesh)*
- creation through a process of trial and error (Gen. 2:18–22; *Atrahasis*)
- a "lady of life" or "lady of the rib" (the goddess Ninti in *Enki and Ninhursag)*
- acquiring wisdom as becoming like god(s) *(Gilgamesh)*
- an immortality-conferring plant and a serpent *(Gilgamesh; Gilgamesh, Enkidu, and the Underworld)*
- gods keeping immortality from humans *(Adapa; Atrahasis; Gilgamesh)*
- nakedness as a symbol of primitive life, clothing of civilized life *(Gilgamesh)*

The more noteworthy of these examples deserve further comment. The Garden of Eden is Genesis' rendition of a widespread motif in ancient Near Eastern literature. Perhaps the most oft-cited parallel is found in the Sumerian myth of *Enki and Ninhursag* (third millennium BCE), which features an island paradise called Dilmun, a land where predation and death were unknown:

> The land Dilmun is pure,
> the land Dilmun is clean;
> The land Dilmun is clean,
> the land Dilmun is most bright …
> In Dilmun, the raven utters no cries …
> The lion kills not,
> the wolf snatches not the lamb,
> Unknown is the kid-devouring wild dog …
> Its old woman (says):
> "I am not an old woman,"
> Its old man (says):
> "I am not an old man."[13]

The picture in Genesis 2 of Yahweh God improvising in finding an appropriate mate for the original human (2:18–22) has an interesting (albeit loose) parallel. The LORD God realizes that it is not good for the man to be alone, so he forms animals out of the ground. But because none of the animals proves a suitable partner for the man, the LORD makes a woman. The *Gilgamesh Epic* describes the creation of the primal man Enkidu in a similar way.[14] At first he lives in the wild and is more akin to the animals than to humans. He wears

no clothes but is covered with hair. He romps about and eats and drinks with the beasts. But the gods decide that Enkidu should become a competitor to the god-man Gilgamesh, whose oppressive conduct as the king of Uruk has provoked complaints to the gods. So the gods send a harlot named Shamhat (literally, "Joy Girl") to make a man out of Enkidu. His sexual intercourse with the woman over six days and seven nights has the effect of civilizing him. The woman teaches him to eat and drink like a human, and clothes him to complete his transformation. Even more striking is that, after Shamhat succeeds in her task, she says, "You are wise, Enkidu! You have become like a god!" This comment recalls the words of the serpent to the woman in Genesis 3, "You will become like God (or "gods"; Hebrew: *ʾĕlōhîm*), knowing good and evil" (3:5).

To take another example, the central theme in Genesis 3 of immortality being denied to human beings calls to mind the *Myth of Adapa.* This story from the third millennium BCE features Adapa (literally, "Man"), a first-generation human and priest of the god Ea in the city of Eridu. While fishing one day, Adapa is attacked by the south wind but manages to break its wing by uttering a curse. With no wind blowing for seven days, the rains cannot come to Eridu, and the city suffers from drought and disease. Anu, the high god of the divine assembly, responds to this crisis by summoning Adapa to heaven. But instead of punishing Adapa, Anu ends up offering him the bread and water of immortality, which will enable him to join the gods. However, on the advice of Ea, who had warned Adapa beforehand that he would be offered the bread and water of death, Adapa declines the offer and is sent back to Earth as a mortal. It is unclear in the story who is deceiving Adapa—Anu or Ea—or whether Anu has a change of heart and Ea simply misjudges Anu's intentions. In any case, Adapa fails to attain immortality. Genesis replaces an obedient Adapa with a disobedient Adam, and for its trickster figure introduces a talking serpent. Table 1 summarizes the basic correspondences between the two primal men.[15]

The picture in Genesis 3 of immortality being sought but lost because of a serpent has an even closer parallel in Mesopotamian mythology. In the *Gilgamesh Epic,* the eponymous hero goes on a quest for immortality after the death of his competitor-turned-friend Enkidu. Gilgamesh's journey takes him to Utnapishtim (literally, "He Found Life"), the survivor of the great flood whom the gods had specially granted eternal life.[16] After hearing the story of the flood and failing a series of tests to see if he is worthy of immortality, Gilgamesh is given a consolation prize for his efforts: he is told of a youth-renewing plant in the waters of the great deep. Gilgamesh finds the plant and journeys home with it, but along the way he stops to refresh himself with a swim, leaving the plant on the ground. A snake, smelling the fragrance of the plant, steals it and casts off its skin as it departs.

In addition to these specific points of contact, the very outline of primeval antiquity in the early chapters of Genesis relies on older Mesopotamian tradition. This is best seen in a comparison of Genesis 2–8 with the Babylonian *Atrahasis Epic,* illustrated in Table 2.[17]

The crucial differences between *Atrahasis* and Genesis come in their respective portraits of the character and motives of the divine. The gods of Mesopotamia appear capricious and immoral (or at least amoral): they send the flood because humans are disturbing their rest with too much noise, and after the flood, they take steps to limit the overpopulation of humanity, decreeing singlehood for some women;

Table 1. Correspondences between Adapa and Adam

Adapa	Adam
Name means "man/human"	Name means "man/human"
The special creation of the god Ea	The special creation of the god Yahweh
Commanded about eating and not eating	Commanded about eating and not eating
Misses out on the chance for immortality	Misses out on the chance for immortality
Clothed by Anu with new garments	Clothed by Yahweh with garments of skin
Returned from heaven to Eridu to die	Driven out of Eden to toil until he dies

infertility, miscarriage, and stillbirth for others. Yahweh in Genesis, by contrast, sends a flood to cleanse the earth of human wickedness, and after the flood the LORD renews the command that humanity "be fruitful and multiply and fill the earth." For all these differences in theological portraiture, however, the literary similarities are undeniable.

The parallels cited above should suffice to establish that virtually all of the narrative details in Genesis 2–8 are borrowed from Mesopotamian mythology but transformed to craft new stories with a decidedly different theology. (The tree of the knowledge of good and evil, unique to Genesis 2, is the only exception.) Stories of a primeval paradise and a primordial flood are not limited to Genesis and ancient Mesopotamian texts, a fact which has tempted some Bible readers to speculate that the parallels imply cross-cultural memories of actual primal events. A better appraisal of the evidence, however, suggests that people in different cultures have dealt with similar existential issues (such as the toil involved in cultivating food) and experiences (such as devastating floods) in similar ways. The parallels are not historical but mythic, in the proper sociocultural sense of the term.[18] And herein lies the crucial point for determining by literary means whether early Genesis is story or history: no one today takes *Gilgamesh, Atrahasis,* or *Adapa* as historical writings; therefore, since early Genesis shares the same literary genre as these older works—and even borrows details from them—it should not be taken as historical either.

Acknowledging that the author(s) worked in this fashion should shape our view of the kind of divine inspiration these chapters manifest. Traditionally, Christian readers of Genesis have tended to receive

Table 2. Comparison and Contrast of Atrahasis Epic and Genesis 2–8

Atrahasis	Genesis 2–8
Agriculture by irrigation	Eden watered by irrigation
Igigi gods are original laborers	Yahweh is original laborer (plants garden)
Annunaki gods enjoy privileges of divine rank	Yahweh has a private garden with magic trees of life and wisdom
Primeval humans *(Lullû)* created as laborers for gods • modeled from clay + rebel god's blood • implicitly immortal (no natural death)	Primeval human *(ha-'ādām)* created to care for Yahweh's garden • modeled from clay + divine breath • potentially immortal (tree of life)
Institution of marriage	Institution of marriage
Lullû (proto-humans) rebel against the divine sovereign	*Ha-'ādām* rebels against Yahweh
Lullû punished: life diminished by plague, drought, and famine	*Ha-'ādām* punished: life diminished by exile from garden, denial of access to tree of life, and hard labor
The god Enlil sends a flood to drown out humanity's noise and control over-population	Yahweh sends a flood to punish humanity's wickedness and cleanse the creation
The god Enki tells Atrahasis to build an ark and so escape the flood	Yahweh tells Noah to build an ark and so escape the flood
Atrahasis survives the flood and offers a sacrifice	Noah survives the flood and offers a sacrifice
The gods smell the sacrifice and bless the survivors	Yahweh smells the sacrifice and blesses creation
Enlil is reconciled to noisome humanity	Yahweh is reconciled to sinful humanity
Limitations imposed on humans: *Lullû* become normal humans	Limitation of 120-year lifespan imposed on humans: *ha-'ādām* become normal humans
Sign of divine goodwill: Nintu's fly necklace	Sign of divine goodwill: duration of seasons (and Yahweh's bow [9:12–17])

these chapters as purveyors of propositional revelation, and to assume that the writer (usually identified as Moses) was conveying the substance of a vision or audition he had received, or else he was recording a very ancient oral tradition. However, it is more fitting and faithful to the text to think of God inspiring the writer's creative narrative imagination and using it as a vehicle of theological truth.[19] What we have in Genesis is not propositional revelation, but narrative theology. Like the parables of Jesus, though, the stories in early Genesis are no less divinely inspired for being stories.

The Presence of Two Creation Accounts

Apart from the ancient Near Eastern parallels, another compelling reason for not taking Genesis 2–3 as factual history (and Adam and Eve as actual persons) is that the book presents not one but two creation accounts. The first one runs from Gen. 1:1 to 2:3; the second one, from Gen. 2:4b to 2:25. The recognition of two distinct accounts here is not unique to modern scholarship but goes back to the first-century Jewish exegete Philo of Alexandria.[20] Interestingly, the fourth-century Syrian church father Ephrem speculated that the second account may originally have stood at the very beginning of Genesis, in an earlier edition of the book, before the later account in Genesis 1 was added.[21] These ancient anticipations of modern scholarly views are worth noting, because they demonstrate that critical perspectives on the Bible did not suddenly emerge in the wake of Enlightenment skepticism, as evangelical scholars sometimes claim.[22] In its present context, the second account complements the first one by offering a different perspective on creation with a different focus: anthropogony instead of cosmogony. Yet even in its complementarity, it still manifests several obvious contrasts with 1:1–2:3. As Table 3 illustrates, the two accounts differ in their portrait of the duration of creation; the precreation scenario; the sequence, contents, and method of the Creator's work; and the portrait of God and humanity.[23]

For our present topic, the key point in Table 3 worth highlighting is that Genesis 1 portrays God creating an unspecified number of male and female human beings at the same time—after land animals, on day six of its seven-day schema. Genesis 2, by contrast, pictures Yahweh God creating one man, then animals, and then one woman—on the only day of creation it envisions. The traditional approach to dealing with this difference is to read chapter 2 as if it is backtracking and elaborating on day six of chapter 1's account. But going this route requires a fair bit of interpretive gymnastics. For instance, the New International Version employs the English past perfect (or pluperfect) verb tense to render Hebrew verbs in the converted imperfect (past) tense. Thus in Gen. 2:8, the NIV says that God "*had* planted" the garden (implication: on day three, *before* the creation of man); and in Gen. 2:19, it reads, "the LORD God *had* formed out of the ground all the beasts of the field" (implication: earlier on day six, *before* the creation of humans). Both of these translations violate the clear sense of the immediate context in chapter 2. Genesis 2:5 states that before Yahweh God created the first man, "no plant of the field was yet *(terem)* in the earth, and no herb of the field had yet *(terem)* sprouted because the LORD God had not made it rain upon the earth." This statement makes the translation "had planted" in 2:8 dubious in the extreme. Even more obviously, translating "had formed" in 2:19 is nonsensical when one reads verses 18 and 19 together: "Then the LORD God said, 'It is not good that the man should be alone; I *will make* a helper for him. So out of the ground the LORD God *formed* [not *had* formed!] a helper as his partner.'"

Even if one were to accept the NIV's translational sleights of hand in 2:8 and 2:19, the many differences listed in Table 3 would not disappear. And here is the heart of the matter: because Genesis has two creation accounts with so many discrepancies, neither of them can be taken to offer factual history. To take them as such would make them contradictory instead of complementary. But if we recognize that the early chapters of Genesis are not historical in our modern sense of the term, then we need not prefer one over the other, or concoct strained translations and harmonizations of them, but may appreciate the distinctive theological message of each.

Narrative Indicators in the Text of Genesis 2–3

Comparisons with Genesis 1 aside, there are several details in the text of Genesis 2–3 itself that support a symbolic rather than a historical reading.

- The presence of trees, rivers, gold, jewels, cherubim, and other accouterments links the Garden of Eden with the desert tabernacle and later Israelite sanctuaries, including the Jerusalem temple. Together they evoke the presence and life-giving power of God in a way that makes the garden

God's temple.[24] Because Genesis 2–3 in its present form is a relatively late text, its symbolism probably relies on traditions about the tabernacle and Temple found elsewhere in the Old Testament, rather than having influenced those traditions.

- The very names of the two human protagonists in the story, Adam ("human") and Eve ("living one"), are symbolic titles that indicate a representative role for the couple. The first man is called *ha-'ādām,* the generic Hebrew term for human being. The term is introduced in 2:7 with a pun based on a folk etymology: "then the LORD God formed the *'ādām* from the dust of the *'adāmāh*"—the *earthling* from the *earth* or the *human* from the *humus*. In the Hebrew text, the word *'ādām* does not start being used as a proper name until the genealogical note in 5:1–5, after which Adam is never mentioned again.[25]
- The talking snake, who is also introduced with a Hebrew wordplay,[26] is a trickster figure of the sort familiar from both ancient and modern folklore. Only in later Jewish and Christian interpretation does it get identified with Satan.[27] On one level, the serpent represents disorder in God's well-ordered creation; it is a nonhuman creature "that the LORD God had made" (3:1), with a free will of its own. On another level, it may be taken as "an embodiment of the separated and beguiling voice of autonomous human reason speaking up against innocence and obedience."[28] In ancient Near Eastern mythology, snakes were variously a symbol of life, wisdom, and chaos—precisely those themes seen in Genesis 3. The serpent does not spout outright lies, but it does utter misleading half-truths. The statement that it was "more crafty than any other wild animal" (3:1) is obviously not a herpetological observation but a folkloric trope. No more factual is the notion that snakes once walked upright and now eat dirt, a notion implied in the curse on the serpent in 3:14.
- The portrait of Yahweh God walking and talking in the garden is patently anthropomorphic, as is the picture of him creating a suitable mate for the man by a process of trial and error (2:18–22) and of his being alarmed at the prospect of the *'ādām* eating of the tree of life (3:22)—as if the LORD had not foreseen the outcome of his creation.

Table 3. Two Distinct Accounts of Creation in Genesis

	Genesis 1:1–2:3	Genesis 2:4b–25
Duration of Creation	• six days	• one day implied (*bĕyôm*, 2:4b)
Primordial Scenario	• dark, watery chaos	• desert-like oasis
Sequence of Creation	• light (nonsolar) • sky-dome (solid) • dry land • plants • lights set in the sky-dome • sea and sky creatures • land animals • humans	• man • garden with trees and river • land animals and birds • woman
Method of Creation	• God speaks, separates, names, and blesses	• Yahweh God forms, breathes, plants, puts to sleep, builds
Portrait of God	• transcendent • sovereign over creation • some anthropomorphism	• immanent • actively involved in creation • lots of anthropomorphism
Portrait of Humanity	• unspecified number of males and females created simultaneously • royals created in divine image, given dominion over the earth	• one *'ādām* from the *'adāmāh;* then one woman (*ĩššāh)* from the man *(ĩš)* in two separate acts • servants made caretakers of a garden

The story of Cain and Abel in Genesis 4, which is closely linked with the Garden of Eden scene, also creates problems for those who want to take the early chapters of the book as factual history. After Yahweh curses Cain (the archetypal farmer who builds the first city, 4:2, 17) for the murder of his brother Abel (the prototypical pastoralist),[29] expelling him from the divine presence to be a "fugitive and wanderer on the earth" (4:12), Cain voices the fear that "anyone who meets me may kill me" (4:13). In the story, Yahweh is portrayed as presuming that Cain's fear is justified, so the LORD threatens a sevenfold vengeance on whoever kills him and gives him an identifying mark (4:15). Just two verses later, Cain is having relations with a wife (4:17). His son and grandsons also take wives for themselves. The crux here has long been puzzled over by Bible readers: according to the preceding and following context, there are no other men on Earth to murder Cain, no women to provide him or his male descendants with wives, and no population to build or support a city. "Literal" interpretations of this story fail to take it literally enough; they regard these details as gaps that must be filled. But filling the gaps can be done only by reading into the narrative—not out of it—additional sons and daughters of Adam and Eve born before Cain and Abel. Such desperate attempts to salvage the historicity of the story go against the plain sense of the text, whose details strongly hint that it is not reporting historical events but picturing paradigmatic ones.

Meeting an Objection

A common objection to viewing Adam and Eve as strictly literary characters comes from those who point to the genealogy from Adam to Noah in Genesis 5. Now, it is certainly true that in this chapter Adam is *pictured* as a real, particular individual, and like other figures in the list he is assigned a lifespan. But there is a massive consensus among Old Testament scholars and Assyriologists that the genealogies in the early chapters of Genesis (4, 5, 10, and 11) are no more historical than the narratives they intersperse.[30] Protohistorical genealogies (the Sumerian and Lagash king lists, for example) were a popular and largely fictional literary device in the ancient Near East for asserting a people's cultural importance or a dynasty's political legitimacy. In this context, the imagining of lengthy lifespans for early humans was commonly used to suggest the superiority of primeval times over the present.

The genealogies in Genesis 5 and 10, with ten generations between Adam and Noah balanced by ten generations between Noah and Abram, are literary-theological assemblages displaying the Israelite-priestly ideal of a perfectly ordered creation. The one in Genesis 5 is actually based on the one in Genesis 4 and borrows its particular form from Mesopotamian king lists. Further, the ages given for the antediluvian people named in Genesis 5 are not randomly distributed, as we would expect in a list of real people, but neatly contrived according to a precise numerical scheme, a base-60 or sexagesimal system of Babylonian origin.[31] So Genesis 5 mimics not only the form but also the numerology of the fictional lists of Mesopotamia. Its "competitive genealogizing" is a strategy for claiming an ancient pedigree for the Hebrew people over against the pretensions of Mesopotamian culture.

The branched or segmented genealogy of Noah's three sons in Genesis 10—an ethnographic "family tree" often called the Table of Nations—is full of anachronisms: many of the ethnic and national entities it lists, seventy in all, do not even fit the primeval epoch being pictured in the surrounding narratives, but reflect the geopolitical map of the first millennium BCE as the Israelites viewed it. Genesis also reflects the naïveté of ancient ethnographies, that the origins of cities, nations, and peoples could be traced to named individuals. None of these observations serves to discredit the Bible but only to clarify the nature of the passages in question. The ancient biblical authors did not miswrite these genealogies; we moderns have simply misread them.[32]

Taking Genesis 2–3 on Its Own Terms

Given that Genesis 2–3 provides the biblical basis for the Christian understanding of how sin and death entered the world, it is somewhat surprising how little of our classic doctrines of the Fall and original sin finds direct support in the text. They are rooted more in interpretations of Genesis—principally those of Paul and, in the West, of Augustine—than in Genesis itself. This is not to say that the doctrines are "wrong" or that they should be dispensed with; it is only to acknowledge whence they take their real point of departure. In Christian theology, doctrines are based on particular interpretations of passages in the Bible, and often these interpretations were first crafted as alternatives to rival Christian readings of

the same passages. Only seldom do doctrinal formulations offer a simple restatement or mere paraphrase of Scripture. Instead, they usually synthesize discrete passages scattered across the canon, attempt to harmonize discordant voices in the biblical witness, and privilege some scriptural voices over others, extrapolating from them and applying them to issues that were not necessarily on the agenda of the biblical authors themselves. The discussion in this section, then, is not intended to dismiss the classic Augustinian and Reformation doctrines of the Fall and original sin, but only to examine Genesis 2–3 in its own context, an exercise otherwise known under the negative-sounding label "historical criticism."

To begin with, *read on its own, Genesis does not teach that the first human beings were created immortal and that death entered the world only after and as a consequence of their transgression.* In Gen. 3:22–23 we read, "Then the LORD God said, 'See, the *'ādām* has become like one of us, knowing good and evil; and now, lest he reach out his hand and take also from the tree of life and live forever'—therefore the LORD God sent him forth from the garden of Eden." Here mortality is regarded as part of humanity's original created nature. Indeed, the story presumes that the man and woman were created mortal; otherwise, the tree of life would be superfluous and God's panic pointless. In 2:17 the LORD tells the *'ādām* that he will die "on the day" he eats of the tree of the knowledge of good and evil; the man, though, does not die immediately but lives to the ripe old age of 930 (5:5). This does not make God a liar anymore than it makes the serpent a truth-teller. Yahweh's warning looks more like an unfulfilled threat—something every parent can relate to. If it is not an idle threat, then physical death as such cannot be meant. What the man and woman experience on the day of their eating the fruit is not physical death but a kind of living death—an estrangement from God, the garden, and each other that brings with it the painful consciousness of their own mortality and its eventual outcome.

Significantly, when God pronounces judgment on the man in 3:17–19, he does not list death as a punishment. The punishment lies rather in the area of work, not work in itself (after all, tending the garden was a kind of work), but the fuss and frustration of having to eke out an existence by tilling a cursed ground. The point of 3:19 ("By the sweat of your face you shall eat bread until you return to the ground, for out of it you were taken; you are dust, and to dust you shall return") is not that the man will die but that he will have to toil away *until* he dies. Death is not the punishment but "only the mode in which the final stage of the punishment works out."[33] Their expulsion from the garden denies the man and woman access to the tree of life, which would have granted them immortality. According to Genesis, then, human death was a natural part of God's created world, not part of the fallout of a fall.

What of animal death in the beginning? Genesis 1:30 envisions a primeval vegetarianism, with plants as the sole source of food for both animals and humans. After the flood, as a concession to the evil inclination of the human heart (8:21), God allows meat-eating for humanity (9:2–3, with no mention of animal carnivorousness), the only restriction being meat with the lifeblood still in it (9:4–6). All this is probably best understood as an idealizing extrapolation of how things must have been in the beginning. If that conclusion smacks of special pleading, consider that other passages in Scripture mention animal predation as an unobjectionable aspect of creation. Thus Psalm 104: "The lions roar for their prey, seeking their food from God" (104:21, NRSV). Similarly Job 38, where God says to the protagonist: "Can you hunt the prey for the lion, or satisfy the appetite of the young lions, when they crouch in their dens, or lie in wait in their covert? Who provides for the raven its prey, when its young ones cry to God, and wander about for lack of food?" (38:39–41). True, both of these passages are speaking of God's providential care for creation in its present state, but there is no hint in them that animal predation owes to any fall from a deathless beginning.

Another point worth noting is that *Genesis itself does not picture the first humans being created in a state of spiritual maturity and moral perfection.* The moral integrity of Adam and Eve is a prominent theme in the Latin church fathers' and the Reformers' reading of Genesis but not in the Orthodox tradition.[34] Some of the Greek fathers writing before Augustine took Adam and Eve as childlike figures who partook of the forbidden fruit too early, when they were not yet mature enough to be eased by God into the necessary knowledge (experience) of good and evil. Theophilus of Antioch, for instance, commented, "Adam, being yet an infant in age, was on this account as yet unable to receive knowledge worthily." In a similar vein, Irenaeus of Lyons remarked, "The

man was a young child, not yet having a perfect deliberation."[35] These and other second-century apologists saw that Genesis 2–3 can be read on a certain level as a coming-of-age story, a "falling up" that was also a falling out with and falling away from God. The man and woman's lack of shame at being naked implies a self-forgetfulness typical not only of animals but of children. Also typical of children is the special attraction of the forbidden. The woman quickly gives in to the insinuations of the serpent, and the man even more quickly joins her in eating of the forbidden fruit. In short, what Genesis describes is a "process, whose starting point is not perfection but *nascence*."[36] The first couple's humanity was not given to them complete but was a work in progress. God created them neither mortal nor immortal, neither good nor bad (morally speaking), but neutral and free.

Perhaps most surprising for Christians accustomed to reading the text with Augustinian lenses, *Genesis 3, read in its immediate context, does not depict the man and woman's transgression as an act that infected all subsequent humanity.* The narrative does not envision either a fall or original sin as traditionally conceived, but as only the first instance of the common human tendency toward self-assertion, present from the very beginning.[37] There is no indication in the biblical text that the first couple passed on to their descendants either their guilt or a newly acquired inclination to sin. In Genesis, Adam and Eve's sin is neither the greatest sin nor the cause of all future humanity's sins but only the first in a series of sins. In chapters 4 through 11, we get a succession of tales which illustrate a remark attributed to the LORD in Gen. 8:21, that "the inclination of the human heart is evil from youth." Thus we have Cain's murder of his brother, Lamech's blood lust, the flood generation's wickedness, and the Babel builders' hubris. Seen against these atrocities, the man and woman's transgression is certainly not trivial, but it is not particularly heinous either.

More than this, *the Adam and Eve story does not have as its main themes sin and death but knowledge and immortality*.[38] The "knowledge of good and evil" the couple gain by eating of the fruit is the experience of autonomous wisdom—deciding what is right without reference to the divine will, and having to face unforeseen but inevitable consequences. This knowledge distances them further from the animals and brings them precipitously close to the prerogatives of the divine. It also brings a shameful self-awareness, the burden of adult responsibility, and a world of pain they had not anticipated.[39] The tree of life is even more enigmatic than the tree of knowledge; the text provokes but does not bother to answer several questions: Why did the LORD God not forbid eating from *this* tree? Did the man and woman eat of it before their expulsion from the garden? If not, why? And why only *after* they have eaten of the other tree is God alarmed at the prospect of their eating from this one and becoming immortal? What, indeed, is the relation of the two trees?

These questions aside, it has often been noted that the term "sin" is not found in Genesis 3. The significance of this fact has been exaggerated—the couple do indeed sin by disobeying God's command. But another observation is more telling: *not only are Adam and Eve nowhere referred to elsewhere in Hebrew Scripture,*[40] *but the rest of the Old Testament (and the New Testament apart from Paul) assumes that sin is avoidable.* This is true already in the story of Cain, for after God rejects his offering in favor of Abel's, the LORD says to Cain, "If you do well, will you not be accepted? And if you do not do well, sin is lurking at the door; its desire is for you, *but you must master it*" (4:7). For teaching about the Fall and original sin, then, we must wait for Paul and the church fathers.

Understanding Paul's Adam-Christ Typology

In the New Testament, Paul is the only writer to appeal to the story of Adam, Eve, and the serpent. Nowhere in the Gospels, the Acts of the Apostles, the General Epistles, or the book of Revelation is the story appropriated. Besides Paul, Luke is the only other New Testament writer even to mention Adam. He does so in a genealogy of seventy-eight names that traces Jesus' ancestry back to "Adam, son of God," implying a symbolically perfect seventy-seven generations (Luke 3:38). In the eyes of most New Testament scholars, Luke's genealogy does not lend itself to being taken as purely factual or historical since, like all ancient genealogies, it engages in artificial schematizing and numbered groupings. Contemporary commentators recognize that Luke's genealogy (and Matthew's very different one) does not rely on public or family records. It looks more like a literary-theological construct that serves to affirm the universality of the salvation which God inaugurated in Jesus at the climax of Israel's history.[41]

A similar purpose is served in Luke's presentation of Paul's speech on the Areopagus in Athens, when the apostle tells his pagan listeners, "From one man *(henos)* he made every nation of humanity to dwell upon the entire face of the earth" (Acts 17:26).

The two relevant passages in Paul's epistles are Rom. 5:12–21 and 1 Cor. 15:21–22, 45–49.[42] Romans 5:12 reads, "Therefore, just as sin entered the world through one man, and death through sin, so death spread to all because all sinned." 1 Corinthians 15:21–22 says, "For since death (came) through a human being, so also resurrection of the dead (has come) through a human being; for just as in Adam all die, so also in Christ all will be made alive." Evangelical interpreters tend to insist that since Christ was an actual historical person, then so must Adam be. Others disagree. In his commentary on Romans, the prominent New Testament scholar James Dunn offers a perspective that is more in touch with how typology can work:

> It would not be true to say that Paul's theological point here depends on Adam's being a "historical" individual or on his disobedience being a historical event as such. Such an implication does not necessarily follow from the fact that a parallel is drawn with Christ's single act: an act in mythic history can be paralleled to an act in living history without the point of comparison being lost. So long as the story of Adam as the initiator of a sad tale of human failure was well known … such a comparison was meaningful … [T]he effect of the comparison between the two epochal figures, Adam and Christ, is not so much to historicize the individual Adam as to bring out the more than individual significance of the historic Christ.[43]

In formulating his typology, Paul's main interest is to depict Christ as a representative figure, one whose act affected not only himself but the entire human race. He brings in Adam less as a figure of history than as a type of Christ—a symbolic stand-in for fallen humanity. Paul, like Luke, no doubt regarded Adam as a historical person, but in his letters he assumes the historicity of Adam instead of asserting it, and in Romans 1–3 he can describe the problem and universality of sin at great length without any reference at all to Adam.[44] This latter point, in particular, suggests that a historical Adam was not essential to his teaching. Paul had little reason *not* to regard Adam as a historical figure, whereas today we have *many* reasons for recognizing him as a strictly literary one.

What does the apostle actually say about Adam's *role* in sin and death? If one examines carefully Paul's wording in Rom. 5:12, his use of prepositions is revealing. He says that sin entered the world *through* (not because of) Adam, and that death spread to all *because* (Greek: *'ep' hō*) all sinned. Adam was the first sinner, but the responsibility for humanity's sin falls squarely on the human race as a whole, as in Rom. 1:18–3:20. Moreover, Paul never claims or even implies that human nature underwent a fundamental change with Adam's sin. For Paul, then, Adam's act *affected* the human race but did not *infect* it; he attributes to Adam less a causal role in the sin of all humanity than a temporal and representative one.[45] Something similar to Paul's view was held by his near contemporary, the author of the Jewish apocalypse 2 Baruch: "Adam is therefore not the cause, except only for himself, but each of us has become our own Adam" (54:19; cf. 54:15; 4 Ezra 7:118). This was also the view of early Christian writers like Justin Martyr, who wrote that human beings, "having become like Adam and Eve, work out death for themselves … and shall be judged and convicted as were Adam and Eve" (*Dialogue with Trypho,* 124).[46] If this reading is right, then Paul is not really the initiator of the doctrine of original sin. That credit must go rather to Jerome, whose Latin translation of Rom. 5:12, which says that Adam was the one "in whom" *(in quo)* all humanity sinned, was taken up and interpreted by Augustine.[47]

What *kind* of death does Paul think entered the world through Adam? In neither Romans 5 nor 1 Corinthians 15 is he thinking of death simply as the cessation of biological life, any more than he thinks that the resurrection of Christ and the eternal life made possible in him involve merely the revival of biological life. Since Paul goes on in Romans 5 (verse 21) to contrast death with eternal life, he is probably thinking in verse 12 not of physical death, but of spiritual death—the estrangement from God that results from sin. In Paul's thought, though, spiritual death and physical death are ultimately related: sin leads to spiritual death, and spiritual death finally includes biological death.[48]

To judge from his surviving correspondence, Paul does not seem to have made Adam the object of much theological reflection. Nor did he make

exegesis of Genesis 3 a centerpiece of his theological analysis of sin. Rather than reasoning forward in his theology from the plight of humanity to God's solution in Christ, Paul appears to have reasoned backwards "from solution to plight"—from Christ's saving work to the human race's need for redemption.[49] And "Rather than Adam being a model or image for humanity or even the first real human being, it is Christ who is both. Christ is the first true human being, and Christ is the image of God and the 'model' for Adam."[50]

Rethinking the Fall and Original Sin

The story of Adam and Eve conveys divinely inspired theological truths about the nature of humanity and its relation to both God and the rest of creation. By no means is Genesis 2–3 irrelevant to real knowledge about the human race. On these two points all Christians can agree. Yet the question remains: how central are Adam and Eve to biblical theology, whether as historical or strictly literary figures, and how theologically necessary is their historicity for the doctrines of the Fall and original sin? At least in quantitative terms, they are not constitutive of the Bible's fundamental truth claims about sin and salvation. If they were, we should expect them to receive at least some attention in the Old Testament beyond Genesis 2–3, in the teaching of Jesus, and in the apostolic preaching about Christ presented in the book of Acts. But they do not. More pervasive in and essential to biblical teaching than Adam and Eve are Scripture's statements concerning the reality and effects of sin, the unity of the human race in the grip of sin, and the universal need for redemption from sin in Jesus Christ.

Can and should the Augustinian doctrines of the Fall and original sin be retained with conviction in the age of evolutionary science? I think the answer is yes, as long as we are willing to make some serious modifications to it. On the one hand, evolutionary biology can be seen to confirm those essential components of original sin that are among Augustine's most enduring theological intuitions: the inevitability of human sin and the inability of human beings to overcome their inherited tendency to sin. If anything, evolutionary biology reinforces Paul and Augustine's sense of how serious the human predicament is. And when assessed from a theological perspective, it substantiates another of their key insights: the absolute necessity of God's supernatural grace in Christ, not only to forgive sin but also to transform sinful human beings into new creatures whose lives conform to the image of Christ.

On the other hand, evolutionary biology gives us a better explanation than Augustine did of why all humans are united in sin: not because we bear the guilt and fractured will of a single ancestral couple who fell from a state of original righteousness, but because we share a transtemporal and universal biological and cultural heritage that predisposes us to sin. If the above is true, then we must be willing to detach the doctrine of the Fall from the notion of a single primordial event that brought about a drastic transformation in the human condition. Realizing that Genesis itself does not picture such a catastrophic change should make the detachment less painful than it otherwise would be. We must also be willing to decouple original sin from the notion that all humans have descended from a single pair. This is not so radical a move when one considers that original sin does not absolutely require monogenism, even though classic formulations of the doctrine assume it.

Nonevangelical theologians have been rethinking original sin in light of evolutionary biology for several decades now. In recent years, the proposals of scientist-theologians like Daryl Domning, Jerry Korsmeyer, and George Murphy have been especially helpful.[51] They and others have proposed that original sin is a biologically inherited state, a by-product of billions of years of evolution. Intrinsic to the process of evolution is the inclination toward self-preservation at the expense of other creatures. Yet selfish behavior did not become sin (culpable wrongdoing) in human beings until the evolution of their self-consciousness (and God-consciousness) allowed our remote ancestors to override their innate tendency to self-assertion by the exercise of their free will. The same is true of us today, as, at a certain age, we reach moral awareness. So understood, original sin is not the result of a single fall but of repeated falls in the life of every human being and of their cumulative, systemic effects in society and culture. And humanity's constant falling away is not a descent from some primordial state of integrity but a failure to live up to a divinely posed ideal. "For all have sinned and fall short of the glory of God" (Rom. 3:23).

To put the issue in these terms is not to blame God for human sin. As Karl Giberson puts it,

> By these lights, God did not "build" sin into the natural order. Rather, God endowed the natural order with the freedom to "become," and the result was an interesting, morally complex, spiritually rich, but ultimately selfish species we call *Homo sapiens*.[52]

We must trust that God created the kind of world that he did because an evolutionary process involving selfishness, suffering, and death was the only way to bring about such creaturely values as novelty, complexity, and freedom. "For God has consigned all to disobedience so that he may show mercy to all. O the depth of the riches and wisdom and knowledge of God! How unsearchable are his judgments and how inscrutable his ways!" (Rom. 11:32–33).

Once the doctrine of original sin is reformulated, the doctrine of the atonement may likewise be deepened. But the new understanding of sin requires that we now favor theories of the atonement like the *Christus victor* model or the moral influence theory, instead of the theory of a ransom paid to the Devil or a satisfaction paid to God's honor. Better, to privilege Paul's soteriology, we must elevate the truth of a new humanity inaugurated in Jesus Christ, whom God sent into the world in suffering solidarity with a groaning creation—to be the vanguard of a new creation full of new creatures destined to be transformed and drawn up into the life and fellowship of the triune God (e.g., Rom. 8:18–32; 1 Cor. 15:28; 2 Cor. 3:18; 5:17; Eph. 1:10; 2:15; Col. 1:20).

For Christianity to remain intellectually credible and culturally relevant, it must be willing to revise—and thereby enrich—its formulation of classic doctrines if the secure findings of science call for revision. The task of Christian theology in every generation is not simply to repeat or paraphrase the tradition but to re-present it in fresh ways so that it can continue to speak meaningfully. Doctrines invite revisiting and possible reformulation when the church is confronted with new interpretations of Scripture and new understandings of the theological tradition, with new insights from the creation itself, and with new challenges from contemporary intellectual culture. For this very reason, the church needs more evangelical and Reformed scholars to enter the field of evolutionary theology, a field in which Roman Catholic and Anglican thinkers have excelled.[53] And Catholics and Protestants alike would benefit from turning to the rich exegetical and theological resources of the Orthodox tradition, which provides ways of understanding Genesis and Paul from a non-Augustinian and non-Reformation perspective. I urge this not because I think Augustinian and Reformed theology are of no value, but because to read Scripture aright, we need all the help we can get.[54] ◈

Notes

[1]For a brief review of the evidence, see Ralph F. Stearley, "Assessing Evidences for the Evolution of a Human Cognitive Platform for 'Soulish Behaviors,'" *Perspectives on Science and Christian Faith* 61, no. 3 (September 2009): 152–74, esp. 154–6. Probably the most authoritative recent synthesis of the evidence is the impressively illustrated volume by Donald Johanson and Blake Edgar, *From Lucy to Language,* rev. ed. (New York: Simon and Schuster, 2006). Even this work is now out-of-date, given the discovery in August 2009 by paleoanthropologist Lee Berger of two partial hominid skeletons (dubbed *Australopithecus sediba*) in South Africa dating to between 1.78 and 1.95 million years.

[2]See, for example, Davis Young, "The Antiquity of the Human Race Revisited," *Christian Scholar's Review* 24, no. 4 (May 1995): 380–96; James P. Hurd, "Hominids in the Garden?" in *Perspectives on an Evolving Creation,* ed. Keith B. Miller (Grand Rapids, MI: Eerdmans, 2003), 208–33.

[3]The landmark study here is Rebecca L. Cann, Mark Stoneking, and Allan C. Wilson, "Mitochondrial DNA and Human Evolution," *Nature* 325 (1987): 31–6. See further Allan C. Wilson and Rebecca L. Cann, "The Recent African Genesis of Humans," *Scientific American* 266 (April 1992): 68–73; S. Horai et al., "Recent African Origin of Modern Humans Revealed by Complete Sequences of Hominoid Mitochondrial DNAs," *Proceedings of the National Academy of Sciences of the USA* 92 (1995): 532–6; Max Ingman et al., "Mitochondrial Genome Variation and the Origin of Modern Humans," *Nature* 408 (2000): 708–13. For a review of the evidence and a theological assessment, see David Wilcox, "Finding Adam: The Genetics of Human Origins," in *Perspectives on an Evolving Creation,* ed. Miller, 234–53.

[4]For a sample of such misinformation on a popular Christian website, see www.gotquestions.org/Chromosomal-Adam-Mitochondial-Eve.html.

[5]See Francisco J. Ayala, "The Myth of Eve: Molecular Biology and Human Origins," *Science* 270 (1995): 1930–6. See also the essay by Dennis R. Venema in this issue of *PSCF*, in particular, his section on "What about Mitochondrial Eve and Y-Chromosomal Adam?" 175–6.

[6]See Peter A. Underhill et al., "Y-Chromosome Sequence Variation and the History of Human Populations," *Nature Genetics* 26, no. 3 (2000): 358–61; J. K. Pritchard et al., "Recent Common Ancestry of Human Y Chromosomes: Evidence from DNA Sequence Data," *Proceedings of the National Academy of Sciences of the USA* 97 (2000): 7360–5. For a popular but authoritative treatment, see Spencer Wells, *The Journey of Man: A Genetic Odyssey* (New York: Random House, 2004), chaps. 2–3 (pp. 14–60).

[7]Among the more notable studies in primatology are Sarah Hrdy, *The Langurs of Abu: Female and Male Strategies of Reproduction* (Cambridge, MA: Harvard University Press, 1977); Dian Fossey, *Gorillas in the Mist* (Boston, MA: Houghton Mifflin, 1983); Jane Goodall, *The Chimpanzees of Gombe: Patterns of Behavior* (Cambridge, MA: Harvard University Press, Belknap Press, 1986); Craig Packer, *Into Africa* (Chicago: University of Chicago Press, 1994); Frans de Waal, *Chimpanzee Politics: Power and Sex among Apes* (New York: Harper and Row, 1982); Frans de Waal, *Good Natured: The Origins of Right and Wrong in Humans and Other Animals* (Cambridge, MA: Harvard University Press, 1996). The most influential work in the field of sociobiology remains E. O. Wilson, *Sociobiology: The New Synthesis,* Twenty-Fifth Anniversary Edition (Cambridge, MA: Belknap Press, 2000). For important studies in recent phylogenetics, see A.-H. Salem et al., "*Alu* Elements and Hominid Phylogenetics," *Proceedings of the National Academy of Sciences of the USA* 100 (2003): 2787–91; M. Uddin et al., "Sister Groupings of Chimpanzees and Humans as Revealed by Genome-Wide Phylogenetic Analysis of Brain Gene Expression Profiles," *Proceedings of the National Academy of Sciences of the USA* 101 (2004): 2957–62. For a readable synthesis, see Daniel J. Fairbanks, *Relics of Eden: The Powerful Evidence of Evolution in Human DNA* (New York: Prometheus Books, 2007).

[8]The trend in recent theology has been to understand the "image of God" in terms of *relationship* with God and fellow creatures and *stewardship* over creation, attributes that do not require a specially created species but that are fully compatible with one created by God through evolutionary means. See, e.g., Keith B. Miller, "Theological Implications of an Evolving Creation," *Perspectives on Science and Christian Faith* 45 (1993): 150–60; Graeme Finlay, "*Homo Divinus:* The Ape That Bears God's Image," *Science and Christian Belief* 15 (2003): 17–40; J. Wentzel van Huyssteen, *Alone in the World? Human Uniqueness in Science and Theology* (Grand Rapids, MI: Eerdmans, 2006).

[9]For discussion of the first three scenarios and the problems they raise, see Young, "Antiquity of the Human Race Revisited"; for discussion of all five, see Deborah B. Haarsma and Loren D. Haarsma, *Origins: A Reformed Look at Creation, Design, and Evolution* (Grand Rapids, MI: Faith Alive Christian Resources, 2007), 197, 215–32.

[10]To be specific: astronomy, atmospheric science, and evolutionary biology (Genesis 1); genetics, paleoanthropology, and cultural anthropology (Genesis 2–5); biogeography and geology (Genesis 6–9); paleoethnography and linguistics (Genesis 10–11).

[11]For an engaging account of one of the major discoveries, see David Damrosch, *The Buried Book: The Loss and Rediscovery of the Great Epic of Gilgamesh* (New York: Henry Holt, 2006).

[12]For an illuminating study, see Richard J. Clifford, *Creation Accounts in the Near East and in the Bible* (Washington, DC: Catholic Biblical Association, 1994). See also Richard S. Hess and David Toshio Tsumura, eds., *"I Studied Inscriptions from before the Flood": Ancient Near Eastern, Literary, and Linguistic Approaches to Genesis 1–11* (Winona Lake, IN: Eisenbrauns, 1994); and Kenton L. Sparks, *Ancient Texts for the Study of the Hebrew Bible: A Guide to the Background Literature* (Peabody, MA: Hendrickson, 2005), chap. 10, esp. pp. 305–22. On Genesis 1–11 as "ideology critique," see J. Richard Middleton, *The Liberating Image: The Imago Dei in Genesis 1* (Grand Rapids, MI: Brazos, 2005), 185–231.

[13]James B. Pritchard, ed., *Ancient Near Eastern Texts*, 3d ed. (Princeton, NJ: Princeton University Press, 1969), 38. See further Samuel Noah Kramer and John Maier, *Myths of Enki, the Crafty God* (Oxford: Oxford University Press, 1989), 12–13, 22–30.

[14]The *Gilgamesh Epic* exists in two ancient versions, an old Babylonian one dating to the early second millennium BCE and the fuller, standard version from the Assyrian library of Assurbanipal at Nineveh, dating to the first half of the seventh century BCE. A magnificent edition of the Akkadian text is now available: Andrew R. George, *The Babylonian Gilgamesh Epic: Introduction, Critical Edition and Cuneiform Texts,* 2 vols. (Oxford: Oxford University Press, 2003). Reliable English translations with introductions are also available in Andrew George, *The Epic of Gilgamesh* (London: Penguin Classics, 1999); Stephanie Dalley, *Myths from Mesopotamia,* 2d ed. (Oxford: Oxford World's Classics, 2000), 39–153; and Benjamin R. Foster, *The Epic of Gilgamesh: A New Translation, Analogues, Criticism* (New York: Norton, 2001).

[15]The fragmentary tablets of *Adapa* from Tell el-Amarna in Egypt date to the fourteenth century BCE; those from Asshur, to the seventh century. For the correspondences with Genesis 2–3, see Bernard F. Batto, *Slaying the Dragon: Mythmaking in the Biblical Tradition* (Louisville, KY: Westminster/John Knox, 1992), note 23 on pp. 194–5.

[16]In other Akkadian versions of the flood myth, the name of the hero is Atrahasis ("Super-wise"); in Sumerian versions of the story, it is Ziusudra ("Long-lived"), and in Hittite recensions, it is Ulu.

[17]Table 2 adapts the table in Batto, *Slaying the Dragon*, 51–2. The Old Babylonian version of the *Atrahasis Epic* dates to ca. 1700 BCE. See further, W. G. Lambert and A. R. Millard, *Atra-hasis: The Babylonian Story of the Flood* (reprint; Winona Lake, IN: Eisenbrauns, 1999); Tykva Frymer-Kinsky, "The Atrahasis Epic and Its Significance for Our Understanding of Genesis 1–9," *Biblical Archaeologist* 40 (1977): 147–55; Robert Oden Jr., "Divine Aspirations in Atrahasis and Genesis 1–11," *Zeitschrift für die Neutestamentliche Wissenschaft* 93 (1981): 197–216; David Toshio Tsumura, "Genesis and Ancient Near Eastern Stories of Creation and Flood: An Introduction," in *"I Studied Inscriptions from before the Flood,"* 27–57.

[18]On this point, see Conrad Hyers, *The Meaning of Creation: Genesis and Modern Science* (Atlanta, GA: John Knox Press, 1984), 129. Hyers not only mentions the prevalence of flood stories in many cultures but also cites a striking parallel to Genesis 2–3 in the mythology of the Luba people of Africa: Mvidi Mukulu ("God") created a fruitful grove to meet the needs of the first human beings, demanding only that they not eat of the banana trees in the middle of the grove. But the humans went ahead and ate of the bananas and so were punished by Mvidi Mukulu, who decreed that they would have to work for their food and be buried in the earth.

[19]So, e.g., Gordon J. Wenham, *Genesis 1–15,* Word Biblical Commentary (Waco, TX: Word, 1987), 52–5; Peter Enns, *Inspiration and Incarnation: Evangelicals and the Problem of the Old Testament* (Grand Rapids, MI: Baker Academic, 2005), 23–70; and Kenton L. Sparks, *God's Word in Human Words:*

An Evangelical Appropriation of Critical Biblical Scholarship (Grand Rapids, MI: Baker, 2008), esp. 97–9, 172–8. This was also the view of the great Reformed theologian Karl Barth; see his *Church Dogmatics,* 4 vols. in 12, ed. G. W. Bromiley and T. F. Torrance, trans. G. T. Thomson et al. (Edinburgh: T&T Clark, 1936–1977), 3.1.83–92; for a discussion, see Garrett Green, "Myth, History, and Imagination: The Creation Narratives in Bible and Theology," *Horizons in Biblical Theology* 12 (1990): 19–38.

[20]Philo, *De Opificio Mundi,* 134–5; cf. related passages in Philo's *Legum Allegoriarum* 1.31–2 and *Quaestiones et Solutiones in Genesim* 1.4. A Middle Platonist, Philo took the account in Genesis 1 to depict the creation of the realm of intelligible forms; and the one in Genesis 2, to portray the creation of the world of sense perception. See Thomas H. Tobin, *The Creation of Man: Philo and the History of Interpretation* (Washington, DC: Catholic Biblical Association of America, 1983); David T. Runia, *Philo of Alexandria. On the Creation of the Cosmos according to Moses: Introduction, Translation and Commentary* (Leiden: Brill, 2001).

[21]Ephrem, *Commentary on Genesis;* see Edward G. Mathews Jr. and Joseph P. Amar, trans., *St. Ephrem the Syrian: Selected Prose Works* in *Fathers of the Church* 91, ed. Kathleen McVey (Washington, DC: Catholic University of America Press, 1994), 69. Of course for Ephrem, Moses was the author and editor of Genesis.

[22]Some other notable examples of ancient critical perspectives on the Bible: in the second century, the church father Origen of Alexandria recognized that not everything in the Gospel of John could be purely historical; in the third century, the Neoplatonist philosopher Porphyry discerned that the book of Daniel contains "prophecies" written after the fact; and in the twelfth century, the rabbinic scholar Abraham Ibn Ezra realized that anachronisms in the Pentateuch make Mosaic authorship of the entire Torah impossible, and that the book of Isaiah contains the oracles of more than one prophet from more than one time period. Representative of the lopsided view that historical criticism is necessarily bound up with a faulty Enlightenment epistemology are conservative Old Testament scholars like Kenneth Kitchen, V. Philips Long, and Iain Provan, and the philosopher Alvin Plantinga. For a trenchant critique, see Sparks, *God's Word in Human Words,* 140–4.

[23]See further Daniel C. Harlow, "Creation according to Genesis: Literary Genre, Cultural Context, Theological Truth," *Christian Scholar's Review* 37, no. 2 (2008): 163–98, esp. 182–9.

[24]So, e.g., Wenham, *Genesis 1–15,* 91.

[25]Various modern English versions of the Bible have "Adam" instead of "the man" in Gen. 2:20b; 3:17, 21; 4:1, 25. Nevertheless, "the man" is the best translation contextually before 5:1–5, even when the (often faulty) vowel-pointing of the Masoretic Text suggests the proper name.

[26]"And the man and his wife were both *'ărûmmîm* (nude) … and the serpent was more *'arûm* (shrewd) than any other wild animal that the LORD God had made" (Gen. 2:25–3:1).

[27]The earliest Jewish texts to make the identification, *Sirach* and *Jubilees,* date to the second century BCE. The *Wisdom of Solomon,* a Jewish work written in Greek at the turn of the era and now included along with *Sirach* in the Catholic canon and the Protestant Apocrypha, says that death entered the world "through the envy of the Devil" (Wis. 2:24). The earliest Christian text to make the identification, allusively, is Rev. 12:9, "that ancient serpent, who is called the Devil and Satan." See further John R. Levison, *Portraits of Adam in Early Judaism: From Sirach to Second Baruch* (Sheffield, UK: Sheffield Academic Press, 1988).

[28]Leon R. Kass, *The Beginning of Wisdom: Reading Genesis* (New York: Free Press, 2003), 82.

[29]Cain's founding of the first city after murdering his brother Abel is paralleled in ancient Roman folklore in the story of Romulus founding the city of Rome after murdering his brother Remus.

[30]For a reliable discussion, see Sparks, *God's Word in Human Words*, 69–72, 79–82, 216–8; Sparks, *Ancient Texts for the Study of the Hebrew Bible*, 344–60, esp. 357–9.

[31]See the brief treatment in Harlow, "Creation according to Genesis," 192–6; for lengthier discussions, see Lloyd R. Bailey, *Genesis, Creation, and Creationism* (Mahwah, NJ: Paulist Press, 1993), 53–89; Dwight W. Young, "On the Application of Numbers from Babylonian Mathematics to the Biblical Life Spans and Epochs," *Zeitschrift für die Alttestamentliche Wissenschaft* 160 (1998): 33–61; Carol A. Hill, "Making Sense of the Numbers of Genesis," *Perspectives on Science and Christian Faith* 55, no. 4 (December 2003): 239–52.

[32]As Sparks maintains, critical scholarship on these and other passages has "exposed more clearly the generic character of the Bible, revealing that many of Scripture's so-called errors are illusions created by our errant readings of Scripture. In this and in other respects, historical criticism has made the Bible's ancient discourse easier to understand. We could even say without blushing that historical criticism has performed invaluable theological services for the church" (Sparks, *God's Word in Human Words,* 230).

[33]James Barr, *The Garden of Eden and the Hope of Immortality* (Minneapolis, MN: Fortress, 1993), 9. Similarly Terence E. Fretheim, *God and World in the Old Testament: A Relational Theology of Creation* (Nashville, TN: Abingdon, 2005), 76–7.

[34]See Peter C. Bouteneff, *Beginnings: Ancient Christian Readings of the Biblical Creation Narratives* (Grand Rapids, MI: Baker Academic, 2006). Bouteneff studies pre-Augustinian readings from the Greek fathers.

[35]Theophilus of Antioch, *To Autolycus,* 2.25; Irenaeus of Lyons, *Demonstration of the Apostolic Preaching,* 12, 14; cf. Irenaeus of Lyons, *Against the Heresies,* 4.38.1. Clement of Alexandria made similar observations. See the discussion in Bouteneff, *Beginnings,* 55–87.

[36]Bouteneff, *Beginnings,* 6, emphasis his.

[37]This point has been made more than once in commentaries on Genesis; see, for example, Walter Brueggemann, *Genesis* (Atlanta, GA: John Knox, 1982), 41; Claus Westermann, *Genesis 1–11*, trans. John Scullion (Minneapolis, MN: Fortress, 1984), 276; Wenham, *Genesis 1–15,* 90–1.

[38]See Barr, *Garden of Eden,* esp. 1–20.

[39]As Kass, *Beginning of Wisdom,* 94–5, observes,

> The "punishment" for trying to rise above childishness and animality is to be forced to live like a human being … human beings instead of self-sufficiency receive estrangement, dependence, division, and rule … the so-called punishment is not really a newly instituted condition introduced by a willful God against the human grain. It is rather a making clear of just *what it means* to have chosen enlightenment

and freedom, just what it means to be a *rational* being. (Emphasis original)

[40]Outside of Genesis 2–5, the only other Old Testament passage to mention Adam is the genealogical note in 1 Chron. 1:1, which depends on Genesis 5. The *place* name (not personal name) "Adam" appears in Joshua 3:16 and Hosea 6:7. Eve is never mentioned in the rest of the Old Testament.

[41]See Marshall D. Johnson, *The Purpose of the Biblical Genealogies with Special Reference to the Setting of the Genealogies of Jesus* (Cambridge: Cambridge University Press, 1969); Joseph A. Fitzmyer, *The Gospel according to Luke I–IX: Introduction, Translation, and Notes,* Anchor Bible (Garden City, NY: Doubleday, 1981), 488–505.

[42]Also relevant (though less so because it does not set up a typology of Adam and Christ) is 1 Tim. 2:13–14, "For Adam was formed first, then Eve, and Adam was not deceived, but the woman was deceived and became a transgressor." Most New Testament scholars believe that 1 Timothy and the other Pastoral Epistles (2 Timothy and Titus) were not written by Paul but by one or more Pauline Christians of a later generation. Be that as it may, the passage appeals to Adam and Eve as figures well known from Genesis 2–3. This literary appeal to figures of tradition, though, cannot establish the historicity of Adam and Eve for us, even if the author probably regarded them as historical figures.

[43]James D. G. Dunn, *Romans 1–8,* Word Biblical Commentary 38A (Dallas, TX: Word, 1988), 289.

[44]For a good discussion of this point, see Robin Collins, "Evolution and Original Sin," in *Perspectives on an Evolving Creation,* ed. Miller, 475–82.

[45]I think this is a valid statement even in the face of Rom. 5:19, "For just as through *(dia)* one man's disobedience the many were made *(katestathesin)* sinners, so through *(dia)* the one man's obedience the many will be made *(katastathesontai)* righteous." As Dunn comments on the verb *kathistemi,* "Although 'make' is the simplest translation, the causal connection indicated thereby is non-specific and can be very loose, so that the passive can function simply as equivalent to *ginomai* ['become']" (Dunn, *Romans 1–8,* 284).

[46]So, as Bouteneff observes, "Although Adam may be the protosinner, Justin makes plain that subsequent sin is a matter entirely of human free choice, not of destiny or the influence of some bacillus of original sin" (Bouteneff, *Beginnings,* 62).

[47]See further David Weaver, "From Paul to Augustine: Romans 5:12 in Early Christian Exegesis," *St. Vladimir's Theological Quarterly* 27 (1983): 187–206.

[48]So, e.g., Douglas Moo, *The Epistle to the Romans* (Grand Rapids, MI: Eerdmans, 1996), 320.

[49]This is one of the main points in the now classic study of E. P. Sanders, *Paul and Palestinian Judaism: A Comparison of Patterns of Religion* (Philadelphia, PA: Fortress, 1977).

[50]Bouteneff, *Beginnings,* 45. For New Testament references to Christ as the image of God, see 2 Cor. 4:4; Col. 1:15; Heb. 1:4.

[51]Daryl P. Domning, with foreword and commentary by Monika K. Hellwig, *Original Selfishness: Original Sin and Evil in the Light of Evolution* (Aldershot, England: Ashgate, 2006); a précis may be found in Domning, "Evolution, Evil and Original Sin," *America* (November 12, 2001), available online at www.americamagazine.org/content/article .cfm?article_id=1205; Jerry D. Korsmeyer, *Evolution and Eden: Balancing Original Sin and Contemporary Science* (New York: Paulist Press, 1998); George L. Murphy, "Christology, Evolution, and the Cross," in *Perspectives on an Evolving Creation,* ed. Miller, 370–89; George L. Murphy, "Roads to Paradise and Perdition: Christ, Evolution, and Original Sin," *Perspectives on Science and Christian Faith* 58, no. 2 (June 2006): 109–18. See also the (regrettably strident) study of Patricia A. Williams, *Doing without Adam and Eve: Sociobiology and Original Sin* (Minneapolis, MN: Fortress, 2001). For web-based papers in dialogue, see "Evolution and Original Sin: A Weblog Series Published on 'An Evangelical Dialogue on Evolution,'" ed. Steve Martin, with contributions by George Murphy, Terry Gray, Denis Lamoureux, and David Congdon (www.scribd.com/doc/13459608/Evolution-and-Original-Sin). For a historical survey, see Tatha Wiley, *Original Sin: Origins, Developments, Contemporary Meanings* (New York: Paulist Press, 2002).

[52]Karl W. Giberson, *Saving Darwin: How to Be a Christian and Believe in Evolution* (New York: HarperOne, 2008), 13.

[53]Among prominent Catholic and Anglican scholars, the names Francisco Ayala, Denis Edwards, John Haught, Kenneth R. Miller, Arthur Peacocke, John Polkinghorne, and Christopher Southgate come to mind. A handful of otherwise good books on evolution by evangelical scientists have appeared in the past few years, but most of them hedge on the question of Adam and Eve and/or succumb to concordism. Representative of this tendency are Darrel R. Falk, *Coming to Peace with Science: Bridging the Worlds between Faith and Biology* (Downers Grove, IL: InterVarsity Press, 2004), 198–201, 218–21; Francis S. Collins, *The Language of God: A Scientist Presents Evidence for Belief* (New York: Free Press, 2006), 206–10; Deborah B. Haarsma and Loren D. Haarsma, *Origins: A Reformed Look at Creation, Design, and Evolution* (Grand Rapids, MI: Faith Alive Christian Resources, 2007), 215–30; and Denis Alexander, *Creation or Evolution: Do We Have to Choose?* (Oxford: Monarch Books, 2008), 237. A welcome exception is Denis O. Lamoureux, *Evolutionary Creation: A Christian Approach to Evolution* (Eugene, OR: Wipf and Stock, 2008); ———, *I Love Jesus & I Accept Evolution* (Eugene, OR: Wipf and Stock, 2009). Sadly, American Evangelicalism still has a tendency to devour its young, as the recent "release" of Peter Enns from Westminster Seminary and that of Bruce Waltke from Reformed Seminary show.

[54]As a Christian in the Reformed tradition, I look to the *Heidelberg Catechism* and *Belgic Confession* for valuable guidance in grasping the essential truths of Scripture. Both of these documents forthrightly affirm an Augustinian-Calvinist understanding of the Fall and original sin, and both assume the historicity of Adam and Eve (esp. *Heidelberg Catechism*, Lord's Day 3; *Belgic Confession*, Articles 14, 15). In this article, my purpose has not been to undermine the Reformed confessions. Taking them seriously but not uncritically requires engagement with literary, historical, and scientific issues that were unknown to their framers.

John R. Schneider

Article

Recent Genetic Science and Christian Theology on Human Origins: An "Aesthetic Supralapsarianism"

John R. Schneider

Recent genomic science strongly supports the theory of common ancestry. To classical Protestants, particularly, this theory seems incompatible with Scripture, most especially with the "historical Fall," which Protestants presume to be manifestly biblical and so have cemented it securely into their confessions and theology as a whole. Nevertheless, John Schneider proposes that it is important for traditional Protestants to consider alternatives to this essentially "Augustinian" view. He invites readers to examine Eastern thinking (mainly in Irenaeus of Lyon) together with a minority of Protestants (such as Karl Barth and supralapsarian Calvinists), for whom the Incarnation and Atonement are the purpose of creation from the beginning. Their understanding differs from the execution of divine "Plan B," as implied by the Augustinian western version of an unintended "fall" from utopian first conditions. Schneider appeals to a fresh reading of the book of Job in support of an "aesthetic supralapsarianism," which sustains Protestant virtues of biblical authority, divine sovereignty, and grace, while opening avenues to compatibility with evolutionary science.

Evolutionary Science and Protestant Hermeneutics

In the last century, theologians of major Christian denominations (Eastern Orthodoxy, Roman Catholicism, and mainline Protestantism) have managed (not without effort) to find ways of formulating Christian theology to make it compatible with the theories of modern evolutionary science.[1] However, scholars in conservative Protestant (evangelical and otherwise classical confessional) churches (especially in the United States) are still unsure how they could affirm the Grand Evolutionary Hypothesis (as Alvin Plantinga has named it) without compromising the biblical and confessional core of their distinct traditions.[2] In this article, I choose to focus on the most fundamental source of difficulty, namely, that evolutionary science seems to be in conflict with the doctrines comprised by classical Protestant teaching on the historical Fall. These doctrines are firmly embedded in major denominational confessions, and they are master threads in the logical fabric of Protestant theology as a whole. So it is difficult for faithful conservative Protestants to see how to change them

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very much at all, much less how to reformulate them in ways that would resolve conflicts with science.

The immediate occasion for writing this article is the emergence of recent *genomic* science (following the dramatic success of geneticists in mapping the human genome). When this new science becomes better known, as it soon will be, it is bound to pose even greater challenges to traditional Christian ecclesiastical and educational institutions than the ones they face already. Many genetic experts judge that the genomic evidence dramatically strengthens the theory of ancestral evolution.[3] The new evidence will make it harder than it has ever been to justify the stances that now prevail among conservative Protestant churches; in addition; those religions (worldwide), which cannot at least articulate themselves plausibly as compatible with evolutionary science, may be in serious danger of losing whatever currency they have with people of science (or with people who are simply literate in science).

In this article, I explore avenues that I believe traditional Protestant Christians could take without violating the core of distinctly Protestant principles, such as commitment to the supreme authority of Scripture and the sovereignty of divine grace. However, taking these prescribed avenues will be hard for some to do, for they will have (in some instances) to abandon belief in the verbal inerrancy of Scripture, and (in all instances) they will seriously have to consider reformulations of confessional teaching on human origins, and particularly on the historical Fall. This, in turn, will demand rethinking a connected cluster of traditional Protestant teachings logically linked with other doctrines that constitute the confessional core of their institutional identities.

The warrants for my proposals in this article do not come primarily from evidence of science, even though science provides important reasons to explore them. In good Protestant fashion, the appeals in my arguments are primarily biblical, so that Protestant readers who are initially skeptical may at least entertain them, on the principle of *reformata et semper reformandum*. I would like to think that the authority of Scripture prevails overall in my interpretations and conclusions. Moreover, readers should consider these proposals as exploratory. The question they purport to answer is, what sort of genuinely Protestant theology could be compatible with the narrative of human evolution?

One source of the difficulty is that very many conservative Protestants in America have committed themselves to a distinctly Protestant kind of concordism when facing apparent conflict between the Bible and science.[4] Concordism, generically, stands on belief in the inerrancy of the Bible: belief that every assertion of fact in the Bible is necessarily true, because every assertion originates with God, via divine inspiration. On this understanding, every human assertion in Scripture is at the same time the "incarnation" of God's assertion.[5] And on this understanding of divine revelation as mediated by inspiration and inerrancy, it follows that for any true assertion in science (or for any true assertion at all), no logical conflict *can* exist between it and *any* assertion of Scripture. In other words, it is necessarily true that positive concord exists between all true statements of science and all statements in Scripture, rightly understood—hence the term, "concordism."

For concordists, then, in the event that conflict between science and Scripture *seems* to exist, it follows that at least one of the two—the *science*, or the *reading* of Scripture—is mistaken. Now, this logic poses a first-rate problem for Protestant Christians in engaging *theoretical* science. In the instance of a theory of science that is still by definition "unproven," but has presumed currency in science, and also is in conflict with the presumed reading of Scripture, there is no sure-fire rule for knowing where the default probability lies for either the science or the reading. It becomes a matter of evidence, and that becomes a matter of expertise in both science and the relevant text. Even so, disputes are bound to break out over assessments of the evidence.[6] How Christians go about deciding which end of the epistemic and hermeneutical "stick" to pick up in such instances, exposes very deep theological dispositions that are notoriously hard to assess as mere matters of evidence. Catholic and Protestant scholars display considerably different deep epistemic and hermeneutical values and habits that lead to quite different initial epistemic judgments, assessments, and formulations of conclusions.

Both Catholic and Protestant scholars faced exactly this problem during the midphase of the Copernican controversy. It is instructive to see how their subtly different epistemic and hermeneutical values and dispositions (especially on interrelationships between Scripture, tradition, and reason) eventually led to similar conclusions, and yet left them in quite differ-

ent positions for engaging the Darwinian controversy that was to come.[7] I think it may be instructive to consider this point in more detail before going to the main body of this article.

For Catholic scholars, concordism had been the unofficial rule for facing apparent conflicts between Scripture and natural science since the time of Augustine (354–430) and afterwards. In his great commentary on the "literal sense" of Genesis (*Genesis Taken Literally*), Augustine established (contrary to the majority of eastern theologians) the teaching that the *literal* human propositions of Scripture were all products of verbal divine revelation, and therefore literally true.[8] In saying this, though, he was greatly concerned to avoid intellectually embarrassing and ignorant applications, such as the "flat-earth creationism" that had apparently become something of a popular movement among the unlettered Christian populace. These "flat-earth" (or, if you wish, "solid-ceiling") creationists apparently read Genesis simply and (so they believed) literally to teach that the earth is a flat disk resting on an ocean and covered by a solid ceiling, or dome, that protects it from a second ocean up above. (We will notice the irony of this "ignorance" in a moment.) They used the Bible (mainly Gen. 1:6–8) to proclaim the superiority of *revealed* cosmology over *pagan* Greek teaching, which was that the earth was a sphere, and that the heavens could not be an ordinary solid, as the Bible said. Augustine knew that the Greek theory was almost certainly right, and he judged that these Christians were unwittingly conferring their own ignorance on sacred Scripture, and bringing disgrace to the Gospel itself.[9]

The situation Augustine faced stands in almost direct parallel with our own contemporary promoters of "young-earth creationism," which is the most extreme kind of Protestant concordism in its assignment of default probabilities to their simple reading of Scripture and the offending evidence of science. Both Christian scientists and biblical scholars have very ably and thoroughly discredited young-earth creationism in its approach to science, on the one hand, and Scripture (mainly Genesis), on the other.[10] So despite its immense popular influence, I choose not to engage young-earth creationism in detail in this article.[11]

As for Augustine, he pleaded for a more learned and sophisticated approach to both Genesis and to science—so far as I can tell his was the first formulation of a "rule" for concordism that has endured for centuries in the West.

> When they are able, from reliable evidence, to prove some fact of physical science, we shall show that it is not contrary to our Scripture. But when they produce from any of their books a theory contrary to Scripture, and therefore contrary to the Catholic faith, either we shall have some ability to demonstrate that it is absolutely false, or at least we ourselves will hold it so without any shadow of a doubt.[12]

This was, in essence, the "rule" that Catholics took with them into the great debates over Copernican science a thousand years later.

The main trouble for Catholic authorities at the highest levels of science and theology was not a too-simple hermeneutical biblicism, or a scientific skepticism, as it was for some notable Protestants (such as Martin Luther himself, and perhaps also John Calvin).[13] The source of trouble, rather, was what had become by then an overwhelming traditionalism that was integrated with an extremely high (Augustinian) respect for reason as embodied in human science. It was almost unthinkable to most of the leading Catholic authorities that the entire *consensus patrum*, going back through Aquinas to Augustine, and taken together with the great Aristotle, should turn out to be *completely* mistaken on a subject of such magnitude as cosmology. The setting was, of course, framed by enormous concern with challenges to tradition on all sorts of things by Protestants, and so the old church mainly dug in—for them, the timing of Copernicus was about as bad as it could be.[14] The Roman Church naturally had huge investments in both this rendering of the faith and that articulation of human reason as the synthetic context for asserting authoritative teaching in both theology and science. Of course, the accumulation of evidence eventually left them with no choice but to abandon Aristotle's geocentric science, to wipe the egg off their faces (which took awhile), and then to adopt the phenomenological reading of Scripture on cosmology (as Galileo had, for a long time, recommended that they do).[15]

The good news for Catholicism was (is) that they emerged from the controversy with their traditionalism properly chastened, and with a better sense of the fragility of particular traditions; at the same time,

the historic high regard for reason and respect for science endured, but in a more hermeneutically guarded form than in previous, more triumphal synthetic renderings. It took time, of course, but Catholicism eventually used these hermeneutical resources to achieve two things that have been crucial to their impressive intellectual and cultural success in engaging evolutionary science this past century. First, they were finally able (especially after Vatican II) to embrace discoveries of historical criticism which revealed the *antiquity* of the "science" contained in Scripture (another irony: the flat-earth creationists had been right, and Augustine had been wrong about the literal sense of the Genesis text).[16] Second, in that light, they were able to maneuver hermeneutically to soften the implications of inerrancy and papal infallibility, and thereby to become more flexible than they had been (especially after the Council of Trent) in rethinking certain interpretive traditions (so as not to repeat mistakes made in the past), such as readings of Genesis 1–3. Currently, as we shall see, Catholic scholars are now helping to lead the way to rethinking the doctrines of a historical Fall and original sin in the light of recent genomic science.

In contrast, Protestantism was very young when Copernicus published his theory in 1543, and Protestants had no investment in the *consensus patrum;* in fact, they had a vested interest in seeing it fail. However, they did have nascent hermeneutical ground principles that disposed some influential leaders (such as Luther) to scoff at Copernican theory: *sola scriptura* was coupled with the intuitive principle of biblical *perspicuitas*, or "perspicuity," which naturally encouraged the simpler geocentric reading of texts, and discouraged confidence in the new science.[17] Nevertheless, some leading Protestant theologians knew their science (notably, Philip Melanchthon) and from early on in their universities, they supported the work of fellow Protestant astronomers (such as Caspar Peucer at Wittenberg and Johannes Kepler at Tübingen).[18] It was not a very difficult thing for them to keep their principles of concordism and distinctive Protestant hermeneutics intact while taking the key texts in question as phenomenological rather than as literally factual.

The hermeneutical tables, however, have now turned. This distinctively Protestant concordism and its hermeneutical intuitions led all the Protestant churches quite quickly to enshrine the Augustinian reading of Genesis in their confessions, as if it were simply and perspicuously read from Scripture, and not a matter of interpretation and tradition. The bold motto of the young Reformation was *reformata et semper reformanda*, and that slogan could be a valuable source of flexibility in making changes today; however, distinctly Protestant practice has cemented the historical Fall into the foundations of confessional doctrine and theology, so that it has become a sort of Protestant *consensus patrum*, and it is very hard for faithful Protestants to imagine that it could be significantly wrong. This instinctive judgment, also, naturally lowers the default degrees of probability that they are disposed to assign to the evidence for human evolution (presumed to be in glaring conflict with the default reading of Genesis on human origins).[19]

Especially when reinforced by a doctrine of biblical inerrancy, distinctly Protestant hermeneutical principles of *sola scriptura* and biblical *perspicuitas* combine (under the nearly unconscious influence of Augustinian authority in the West) to make it seem obvious that our classical (western) reading and theology of Genesis 1–3 is as securely biblical as it can be, and the tendency to put the issue beyond dispute is very strong. Meanwhile, since there is no lock-grip proof for the theory of ancestral human evolution, fence-sitting, or even outright skepticism, seems warranted. Of course, in this instance, the closer the evidence comes to the level of confirmation, or demonstration, in the minds of scientists, the nearer conservative Protestantism comes to the brink of crisis—very similar to the one Catholicism faced in the 1600s. We must wonder whether traditional Protestantism emerged from the Copernican controversy with the intellectual resources necessary for meeting the challenge as well as Catholic theologians have done.

In the West, the Augustinian legacy of presumed biblical inerrancy led naturally to establishing a doctrine of the historical Fall on the basis of Genesis 2–3, as understood in the light of (mainly) Romans 5, and to teaching a doctrine of original sin. When I use the phrase "historical Fall," it will henceforth be shorthand for the doctrine that affirms this account of human origins, or something like it: that God originally created a first pair of human beings, positioned them in idyllic spiritual and moral conditions, so that when deliberately subjected to temptation, they were genuinely free to obey God or not. They freely chose not to obey God, and as a consequence, they

"fell" from these utopian beginnings, so that they and all their descendants, by heredity, became mortal, and enslaved from birth to a natural desire to embrace their disobedience (sin). Finally, somehow, their disobedience brought about a "Fall" for the cosmos and nature, too. We may refer to this account, as Milton famously did, as the story of a "Paradise Lost." On this understanding of beginnings, redemption through Christ entails "Paradise Regained."

All conservative Protestant denominations have enshrined the historical Fall, officially or unofficially, in their confessions, catechisms, and dogmatic expositions of the faith. The doctrine seems to them as securely biblical as it could be (even if we allow for symbolic representation of the facts in the Genesis story, as many do). On inerrancy, which many conservative Protestants apply to the doctrine, all avenues leading to a critique of the biblical story seem closed off, and on perspicuity, no alternative reading of the story (and the relevant other texts on Adam and Eve) seems plausible. The elementary facts of the Genesis story narrate a historical Fall.[20] Within these constraints, Protestant scholars have labored in good faith to find ways of rendering the Genesis text compatible with the science of an ancient cosmos and Earth, with a very long history of species and human race, and with a variety of things that seem to be in conflict with science (daylight prior to the sun, predation, labor pains, and thistles, all following the human Fall).[21]

One may take these efforts to be too labored, to the point of being tortured and strained, but at least they manage to respect the most certain evidence of science while maintaining the core teachings of Protestantism. However, it is very hard to see how similar techniques can render classical Protestant faith compatible with ancestral evolution (especially as framed by the new genomic science, as we shall soon see), since it seems to discredit the essential facts of a historical Fall.

Furthermore, the Genesis story has another extremely important role to play, not only in Protestant theology, but also in western Christian theology: it frames Christian "theodicy," or defense of God against the charge that God is the responsible cause of evil. In the Augustinian version of the historical Fall, the purpose is to exonerate God from this charge, and to pin all the blame on creatures—demonic and human. As we will see, the narrative of human evolution makes it very hard, if not impossible, to maintain this position and its approach to theodicy. For it seems, on this science, that not just *natural* evils, such as animal suffering and violent episodes in nature, but also the disposition for human *moral* evils, are practically part of God's original design.

Evolutionary Science and the Hermeneutics of Scripture

The newest genomic research creates some new points of conflict with Scripture, as enshrined in conservative Protestant tradition, and it amplifies some old and familiar ones.[22] For supporters of biblical inerrancy, the recent genomic mathematical calculations of Francisco Ayala pose a conspicuous problem. In his reckoning, the genetic diversity in the existing population of human beings could not have been the legacy of descent from a single human pair, even allowing for 100,000–200,000 years. The computation requires between 1,000 pairs at a minimum, and probably more like 20,000 "bottle-necked" first human ancestors, showing up in northern parts of Africa. In other words, "polygenism" (we have many first human ancestors) has displaced "monogenism" (the idea that we have just one pair of ancestors) in recent genetics studies of human origins.[23]

Obviously, this new science intensifies the Christian hermeneutical debate over the biblical story of Adam and Eve. This point of conflict can be readily resolved, however, by making use of the rich resources supplied by historical criticism that enable us to place the text of Genesis pretty ably in its own historical context and to read it in its own ancient terms. We may think that the writer of Genesis deliberately used Adam and Eve as literary types that represented the first human beings symbolically, in which instance, we can simply stretch the symbolism to include the original colonies of our ancestors, to be compatible with polygenism. This hermeneutical strategy will probably require giving up concordism and its principled inerrancy, however, because it seems unlikely that Paul (or Luke) in the New Testament understood biblical Adam in this symbolic way.

Jack Collins provides an extremely thorough exegetical case for supposing that this last suspicion is correct.[24] Unfortunately (in my opinion), he does not infer from this the invalidation of concordism and

inerrancy, but instead resists historical-critical strategies and implies, at least, that this science must be false. In contrast, Daniel Harlow provides a superb explanation of how this historical-critical strategy might be executed faithfully by Christians who affirm the divine inspiration of Scripture.[25] The mere fact that Paul thought Adam, like Abraham, was a specific person by that name does not necessarily mean that we should have that belief (widely held by first-century Jews) now.

A second historical-critical strategy for resolving the conflict with polygenism is somewhat more critical (and, for conservative Protestants, controversial). It is to think that the writer of Genesis has created the figures of Adam and Eve by logical and imaginary extrapolation, or by a sort of "first-cause" fictional-historical deduction, that he placed them quite naturally in his own geographical location (where, so far as he knew, history began), that he gave them typological names, and that he then used these imagined historical figures to promote his distinctly Hebrew and anti-Babylonian theology. Denis Lamoureux recommends something similar to this explanation, and I strongly suspect that it is right, but I choose not to defend that suspicion at any length for now.[26]

I wish, rather, to focus here, and in the rest of this article, on matters of conflict between genomic evolutionary science and Christianity's standard western teaching on origins that cannot be resolved *hermeneutically*, but can only be resolved *theologically*, i.e., by revising what has become the quasi-orthodox Augustinian *theology* of origins as enshrined in Protestant confessions, as embedded in Protestant systematic theology, and as employed at crucial points in important Christian theodicy. At the core of this theology of origins is the doctrine of a historical Fall, as just defined.

Evolutionary Science and Christian Theology

One part of this conflict between evolutionary science and the Christian doctrine of a historical Fall is old hat by now, and the new genomic science merely intensifies the problem at a microgenetic level. It is that Genesis and premodern Christian tradition attribute quite a list of unpleasant and peculiar things in *nature* to the occurrence of a historical Fall of human beings. The trouble is that paleoscience overwhelmingly proves that labor pains, the locomotion of snakes, predation, deadly diseases, mass extinction, thorn plants and weeds, and violent natural events existed for millennia before the existence of the first humans. Thus, they cannot be the consequence of a "curse" that God placed on the creation as punishment for human sin. Furthermore, the genomic sequence-data expose a fascinating, if otherwise grim, history of viruses that have left "scars" in human and animal DNA.[27]

Concordists have never been able to resolve this conflict between the Bible and science on the order of nature with their hermeneutics of inerrancy. Young-earth creationists, of course, defiantly refuse to embrace the overwhelming evidence of the science supporting an ancient cosmos with this history. Progressive creationists (particularly the inerrantists among them) selectively accept the science, but have to wonder how to make it compatible with the sequence of events in Genesis.[28] At any rate, it seems that they somewhat artificially separate the problem of *natural* disorder from the more theologically essential matter of human *moral* disorder and human sin, leading to human death. Ken Ham, who is the leading figure now in young-earth creationism, correctly observes that there is something disintegrated in abandoning the Genesis "cosmic Fall" on evidence of science, but then resisting science on human origins on evidence of Genesis.[29] The situation calls for a better-integrated approach that (unlike Ken Ham's) can stand serious scrutiny on all the scientific and biblical evidence.

As for the genetic "maps," Dennis Venema provides a clear summary of mathematical lines of evidence, all of which strongly support the theory of common ancestry.[30] Meanwhile, together with these new genetic computations, recent studies of animal behavior present startling new discoveries of animal "moral" behavior. Among other things, these studies show that "practically all of the overt acts regarded as 'sinful' in humans are part of the normal, natural repertoire of behavior in other species."[31] We cannot go very far into Daryl Domning's fascinating summary of research by Jane Goodall, S. B. Hrdy, Craig Packer, and others on primates and other animal species, without noting the unexpected extent of the similarities between the "immoral" actions of animals and humans. Animals engage in deception, murder (even serial killings), infanticide, bullying, and so forth. Insects come into play, too. It seems

that even ants—widely known for their cooperation as colonies—on closer inspection, also engage in a litany of antisocial actions: family quarrels, theft, street muggings, premeditated murder, and slavery, to name a selected few.[32]

The main point is that recent phylogenetic or cladistic analysis convinces many genetic experts that these detailed similarities of self-serving behaviors can hardly be coincidental—they look like a genetic legacy that has been passed on from one species to the next, including to our own. Domning endorses this as, by far, the best explanation: "The selfish acts of humans are *homologous*; that is, similar because derived from a common source."[33] And in any event (so we add, lest one resist that explanation), the traits are *genetically* common to every individual in all animal species. As members of a species, we are programmed, as it were, or powerfully disposed, to engage in our own genetic self-interest and advantage. We need not endorse the theory of common ancestry in order to respect the force of all this evidence and to begin pondering its implications for theology.

It should be noted that geneticists observe, too, that we also share with animals "virtuous" traits involving love, genuine sympathy, and care. If this is selfishness, it proves that selfishness is the source of not only vice, but also virtue. If animals engage in genuinely unselfish acts—disinterested in the general survival of their own germinal DNA—then that is extremely interesting, to be sure.[34] It is nevertheless clear that many animal "virtues" show self-interest in a manner that benefits other nonmembers of the species, too. Domning calls this behavior "amoral selfishness."[35] As for deliberative human altruism (if there really is such a thing), it requires, writes Domning, "an intellect and will of a caliber that does not and cannot exist in the simplest life forms."[36] The clear implication of the science is that, at the dawn of human consciousness and its moral awareness and capacities for such virtue, altruism was the challenge for humanity in the future, not the original primal condition of human beings in the past.

The bottom line is that if the first human beings evolved genetically this way, then it is very hard to see how they could have originated in conditions of original righteousness, as required by Augustinian theology, for they would have inherited powerful natural dispositions toward selfish actions. Moral freedom and the will to resist or redirect those dispositions toward unselfish actions surely presupposes time for cultivating a nascent moral awareness, and for building character through a history of personal and social discipline. Even if we assume that we are talking about *Homo sapiens* and not some other hominid species with "soulish behaviors" (as Ralph Stearley has called them), even considering their superior cranial capacity and commensurate moral awareness and freedom from mere animal biology, the first modern humans would have faced extremely difficult internal and external moral circumstances, to say the least.[37] And even if we imagine that God strangely broke his policy of nonintervention and interrupted the moral voice of nature with an explicit command, what sort of command could that have been? The immature, biologically driven, intellectually naive and confused creatures (still trying to figure out the most basic realities of the world—who they were, what the world was about, what the meaning of life and moral experience was) would have had quite a time making sense of divine moral discourse and conforming immediately to all its unnatural demands. It would seem that the Creator had deliberately stacked the moral deck against them. Did God then expect these beginners at the moral game to play a winning hand, and bet the entire future of the creation that they would win, as Augustinian theology on the Fall would have us believe? Surely God knew better.

In Western tradition, in order to make the story morally plausible, some medieval theologians inflated Adam into a sort of spiritual and moral *Übermensch*; at any rate, all classical Protestant confessions stress that the first parents were created perfectly upright, leaving their act of disobedience without excuse.[38] In that light, influential contemporary Protestant writers presume that the world that came about in consequence of the original sin is "not the way it's supposed to be."[39] Entire Protestant college curricula are built uncritically upon these questionable Augustinian foundations.[40]

Major eastern theologians, however, read the Genesis story quite differently than Augustine did and western theologians have mostly done. And even in western Protestantism, there are notable exceptions, as we will see. The great Irenaeus of Lyon (d. c. 200 CE), for instance, apparently did not think it plausible that the Fall was the outcome of

an experiment that might well have gone the other way, and which foiled God's original plan, forcing God to adopt an inferior "Plan B," including the Incarnation and death of Christ. It seemed entirely implausible to Irenaeus that God could fail that way in the first place, or that in the fullness of his knowledge, power, and love, that God did not *always* plan to create the best world possible in and through the saving triumph of Jesus Christ. For Irenaeus and other eastern theologians, then and now, the Incarnation and the Cross together compose the purpose of creation from the beginning.[41]

This understanding, of course, entails that the Fall was not an accident of human libertarian history, but was part of "Plan A" in the foreknowledge and purpose of God to begin with. Irenaeus read the Genesis text theologically, rather than just literally, on this matter: Adam and Eve were juvenile innocents, no match for the seductions of the serpent (as God well knew when he chose to leave them alone with it—to what end?). Their pity would be the world's loss, but greater gain, as in the strange irony of the Latin Easter Vigil, "O happy fault, that merited so great a Redeemer!"[42]

In Protestantism, certain Calvinists known as "supralapsarians" (more on this term in the last section) pondered these mysteries in the context of divine sovereignty and predestination, and they read many New Testament texts to mean that election in Christ logically preceded creation and the Fall.[43] More recently, the great Karl Barth gave impressive Christological form to this otherwise strained Calvinistic notion—that God decreed the election of *some* human beings prior to creation, implying that the only divine purpose for creating all the others was to afflict them with eternal damnation. Barth stressed that God elected the *world* in Jesus Christ from "the foundation of the world" (Rev. 13:8). In Christ, and especially on the cross, the hidden will of God is revealed: God is the "electing God," who justly takes the sins of the world upon himself, and (justly) mercifully extends grace to all creatures and persons. It is fitting, is it not, for the God who subjected all human beings to sin in the first place, to extend mercy to all human beings in that self-sacrificial way (Rom. 11:32).

On the cosmic level, an advantage of this Christological understanding is that it also provides a framework for integrating science and theology on the origins and history of unpleasant, destructive, painful, and deadly disorders in nature. These natural conditions fit with the presumed divine purpose, which is to *bring* human beings and the entire creation into maturity and perfection, via triumph—not just to make them that way at the beginning. A world forged on the anvil of difficulties and through triumph is better than a world that merely flourishes in unbroken bliss. George Murphy, who is an Episcopalian theologian of science, writing in support of this teleological-Christological approach to creation in the context of science, puts the matter eloquently:

> 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.[44]

What of Eden, then? In Barth's understanding, Eden (which means "delight") is an almost necessary element of any origin myth—the lost Golden Age—that cannot serve our purposes in modern paleology, and, for sound Irenaean reasons of theology, cannot be a literal description of how things really were in the primal human past. Eden reveals the beginning of God's vision for the world, and for human beings, as to be consummated not in Adam, but in still-superior form through re-creation in the image of Jesus Christ (Eph. 4:11–16). Christ is to biblical Adam what the "new heaven and new earth" will be to biblical Eden.

This subject leads naturally to our last one: Christian theodicy. But before going ahead, I would like to make two very brief points on the implications of evolutionary science for theology on the doctrine of the Fall.

One of them is in response to the objection that, without a historical Fall, the need for a savior disappears. As George Murphy observes, this argument fails, simply because the need for a savior arises from the reality that all people are in need of redemption from a nature of sin and the conditions of sin and death.[45] If recent theories of evolution confirm any element of Christian theology, it is that all

human beings are disposed by nature to be excessively self-serving, and while we can improve our moral condition through deliberate discipline, our efforts to be set free from powers of selfish desire are futile. Domning devotes the main argument of his book to making just this point, which, by the way, is a fresh way of helping to prevent Christianity from committing new forms of the Pelagian heresy that are reappearing in some modern formulations of original sin. Domning's doctrine of "original selfishness" guarantees that all human beings are disposed to commit sin from birth, and they begin to deal subjectively and morally with it at the dawn of self-awareness. In self-awareness, human beings begin facing and making moral decisions, but never in the context of complete moral freedom, or perfection. By locating the disposition to sin in human nature, he preserves the essential intuition of original sin much more securely than do Monika Hellwig or Piet Schoonenberg with their "semi-Pelagian" sorts of environmental and cultural explanations.[46]

The second point is about divine grace, atonement, forgiveness, and reconciliation of the world with God through Christ. As suggested above, in this Christological and teleological understanding of creation, one does not depict God as a sort of unwitting, overly optimistic experimenter, whose greatest and best creature unexpectedly and disastrously goes bad (a sort of Frankenstein story, only with Noah there to save the day). In the alternative account, God's creatures are more like pitiful sheep that have gone astray, in the way that sheep do, as every good shepherd knows. Or we are more like juveniles who cannot but misbehave, as all good mothers and fathers know their growing children will. Wise parents are not taken aback by these misdoings. If they love their children, they will take offenses with due gravity, they will exact reparation when necessary, and they will demand and encourage correction and so forth. But all these actions are framed by a love that diffuses blame into grace for fragile beings—we can only imagine the love and grace of God for his own fragile creatures. I do not at all mean to remove human responsibility and blame, but the Irenaean sort of picture shifts the burden in a manner commensurate with the grace God extends on the Cross (taking it all upon himself) and with Jesus' promise that his "yoke is light." These intuitions about grace have very important implications for Christian thinking on the matter of eternal damnation, which is very hard to integrate well into theology as integrated with evolutionary science, and is also very difficult, if not impossible, to sustain within successful Christian theodicy.

Evolutionary Science and Christian Theodicy

The doctrine of a historical Fall is not just a master thread in the fabric of western Christian theology, as observed in the first section; this doctrine also provides the crucial metaphysical framework for important versions of Christian theodicy, notably the free will defense made famous by Alvin Plantinga, and also employed by many writers going back at least to Augustine.[47] In the last few years, the list of publications on the implications of evolutionary science for Christian theodicy has become fairly long, and it is growing still.[48] The problem that evolutionary science forces to the surface for theodicy of the free will defense kind is that this science makes God the deliberate and responsible agent of some natural and human moral evils (even adjusting the agency and moral responsibility to whatever degree of genuine moral freedom and responsibility that human creatures may variously have). For instance, C. S. Lewis made the argument that natural disorder was fitting for the larger purpose of preserving human freedom, so that people would not be coddled into belief, but challenged to exert saving faith.[49] On the evolutionary view (and on Irenaeus's and Barth's Christological view), this scenario seems implausible: does God deliberately leave immature, vulnerable creatures to contend with confusing, terrifying, and deadly things in order to encourage trust that God cares deeply about them?

In any event, if that were the plan, it failed—the experience of nature almost universally produced polytheism and rituals to allay fears and to influence divine powers, frequently in the extreme practice of human sacrifice. When Paul writes in Romans that virtually the entire pagan world from the very beginning of creation refused the true God and exchanged true religion for idolatry (Romans 1), one may justly wonder why the true God did not change course and amplify the "voice" of God's glory that nature supposedly declares (Psalm 19). And evolutionary science intensifies (Eastern) objections just raised about the theology of Genesis taken literally: God

inexplicably wanders off, purposely leaving moral novices alone in Eden with a master con artist who was out to wreck them and everything else God cared about, and then God wanders back only to seem shocked at what they had done, giving a good scolding, cursing the earth, taking away the serpents' larynx and legs, and eventually wringing his hands in regret that he had made humans, and (literally) drowning his sorrows by washing most of them away.

The subject of evolution, natural evils (especially animal pain), and Christian theodicy has grown into a fairly advanced, wide-ranging discussion and disputation, and we cannot possibly explore its various angles and complexities in this article.[50] The core of the question is how to think about biblical texts that seem to depict the cosmos as somehow fallen, and one day to be redeemed. Genesis 3 and Romans 8 are the primary points of reference. The Genesis text pretty clearly attributes an index of things deemed evils or disorders to the disobedience of the first creatures. The Romans text does not explicitly identify the cause, although it does name God as the one who "subjected" creation to the curse, and stresses that through Christ's true humanity, creation will be set free. In the book of Revelation, the writer takes up the vision of a new creation from the late Isaiah, and depicts this "new heaven and new earth" as continuous with the old creation and yet brought to completion and perfection.

In the last section of this article, I wish to use the book of Job as a means of thinking biblically about the creation as fallen and redeemed in a manner compatible more with Eastern theology and evolutionary science than with Augustinian western tradition. It seems to me that Job (and Wisdom teaching generally) purposefully corrects the simplistic theodicy of Genesis 2–3, or at least forces a more complex "literal" reading of that story than the one Augustine and many others since have given. As Barth has shown, there is some justification for seeing the original creation of Genesis 1, and even also Eden in Genesis 2–3, as unperfected work, and this may well disclose the artistry of a later hand in the last composition by someone who was made uncomfortable by the crude theology of the original, and so may have changed it in ways more compatible with the theology of Wisdom.[51] In this light, the simple theodicy at the end is made ambiguous at best, by riddles planted in the last version of the text (the lingering dark, the seas, the serpent as God's strange "crafty" creature in the Garden, for instance).

In *Original Selfishness*, Domning turns to the book of Job to see if it might answer our evolutionary question in some fashion, but he concludes that it does not. In Domning's view, Job exemplifies ancient humanity's vexation at the experience of morally inexplicable suffering (the subject of Job). He accepts the widespread reading of Job, which is that at the end, God shows up—finally—and bawls Job out for impudence. Who does Job think he is to challenge the great and powerful God? Job rightly grasps that the only explanation for *these* evils is that *God* deliberately caused them, but the ending of the book proves that no answer was forthcoming except that "God is God." Evolutionary science has at last answered Job's (and our) question: "God stands revealed, not as an arbitrary tyrant, but as a solicitous and empathetic parent who acknowledges, however regretfully, that children cannot be entirely spared the pains of life."[52] In Domning's scientific "theodicy," these disorders are simply "inherent in the existence of a physical and moral universe."[53] The theodicy is that to create a real physical universe, these sorts of sufferings were inevitable, even for God.[54]

For now, I choose to ignore the questions that this assertion raises, such as the "options" that would be available to an omniscient and omnipotent being, and how the "new heaven and earth," lacking these sufferings, is eventually possible. Instead, I wish to focus on the theology of God and evil in Job, and provide an interpretation quite opposed to Domning's and others' on God's supposed authoritarian nonanswer. I do not think that evolutionary science corrects Job, but that the book contains a generally neglected theology that can help Christians engage evolutionary science constructively. If so, Protestant intuitions about the authority and modern relevance of Scripture endure in a way that they do not in Domning's (Catholic) rendering, in which scientific reason mainly (not only) controls articulation of the faith.

I assume (with most scholars) that the book of Job belongs with Israel's Wisdom Literature, and that it enshrines very late—most probably post-exilic—views that had developed over time, and which in important respects stood (and still stand) to correct oversimplification in the metaphysics of earlier

Hebrew teaching in the so-called Deuteronomic era. I do not think that my argument depends in any crucial way on this assumption, however.[55] My proposal generally is that Job enshrines very serious corrections of the simpler, more cut-and-dried theodicy that Genesis 2–3 seems to convey—explaining every disorder (including pain in childbirth, weeds, sweat in toil, and the weird locomotion of snakes) in God's interest as "not the way it's supposed to be." In Job, this explanation is exposed (ironically) as imputing weakness and perhaps incompetence to God (omnipotence is one thing Job never budges from), and (ironically) damaging, or even destroying the grounds of faith for people whose sufferings are genuinely unjust, and so cannot be extricated from the sovereign agency of God. The truth of Job is terrifying, to be sure, but a great deal more worthy of hope than any of its denials (voiced by Job's "friends"). My comments abbreviate a longer published essay of mine on Job and the problem of God and evil.[56]

As everyone involved in Job studies knows, the poetic speeches of God at the end are the keys to understanding the book as a whole. Recent scholarship proves that the poetry takes up a very old symbolic tradition in its theology about God's victory (in creation and exodus) and mastery (via the Law) over the enigmatic sea monsters of chaos—Behemoth and Leviathan. The poet of Job, however, does something that is unexpected and remarkably new in the context of that theology and its symbolism. In a masterly discussion, Carol Newsom shows convincingly that the speeches of Job do not merely reclaim this tradition and throw it back at people with Job's question. This would make God say something hardly worth saying: "Who are you to question me? I have everything under control, and I know how to bring everything into control in the end. Your job isn't to question or challenge me, but to have faith. So forget the question, and believe." This, of course, is exactly what many commentators on Job (including Domning) believe that God, in essence, did say.[57]

On Job 38:11 and the imagery of the sea as a realm of hostility and chaos, Newsom agrees that it does portray the sea traditionally as "aggressive, 'bursting out,' and threatening to exceed its place."[58] But then she comments,

> This pericope radically departs from traditional imagery, however, in that it does not cast the sea as God's opponent in battle (cf. Ps. 74:13–14; 89:10–14; Isa. 51:9–10; *Enuma Elish IV*), but instead represents God as midwife who births the sea and wraps it in the swaddling bands of darkness and cloud.[59]

The change is remarkable: "Here the chaotic waters of the sea are represented not only as the object of divine limitation *but also care.*"[60] The same is true of the imagery that follows: animals weird and wild now become subjects of beauty and ugly horror together, such as the vultures cleaning up human corpses on a field of battle—God's way of enabling them to provide food for their nestlings.[61]

Here is the point: the poetic technique "seems unnervingly to place God in considerable sympathy with the emblems of the chaotic."[62] The poetry shatters the quaintly clean theodicy of earlier times, as conveyed by Genesis 1–3 and by the older Deuteronomic tradition of divine triumph over these powers via the Law—a sort of old Hebrew version of the modern prosperity gospel: get right with God, and God will get right with you—no room for chaos in *God's* world.

The last speeches on the great monsters Behemoth and Leviathan remove all doubt that the poet indeed braves blasphemy. Newsom deserves wholehearted agreement on the meaning of these monsters:

> Although they are unquestionably creatures of God (40:15; 41:25–26; cf. Ps. 104:26), they partake of the primordial (Behemoth, 40:15) and the mythical (Leviathan, 41:10–17) … More emphatically, than the wild animals of chapters 38 and 39, they manifest the alien Other, with the terror of the chaotic present in their very being.[63]

Good reasons exist for linking them together with the chaos dragon of myth in the Ancient Near East now converted by Israel into a sort of "demonology."[64] By the end of the book, Newsom writes, "Three characters dominate the scene: Job, God, and Leviathan. The crucial hermeneutical task posed by the images is to discern the relationships among them."[65]

The temptation is to read the chapters as God reading Job "the riot act," by reminding him none too gently of the old "victory tradition," in which God has wrecked the monster, killed it, cut it into pieces, and locked it up in the sea. This reading would support a common interpretation of Job: God asserts his power over everything and Job is

put in his place. But "things are not so simple."[66] In context, it is shocking that God speaks of these creatures not so much as enemies, but "with evident admiration."[67] God even identifies with them in their wild, undomesticated (except by God) qualities and powers. What theology is this, then, that even the winds and seas *obey* him, we might ask?

There is not space to consider Newsom's own provocative proposals on the theology of Job as tragic, and so, as a breaking down almost entirely of Israel's tradition of unmixed divine triumph over evil.[68] In my view, the old theology of divine victory remains, but in a fresh form—one that has implications for our doctrines of creation, the Fall, original sin, and the nature of redemption on just about every level.

The essence of the theology in Job on God and theodicy is this: a great many things that people previously believed came about through human sin, did not come about that way. They came about by the creative-destructive will of God. The disorder of the world—even grotesque injustice—exists because, in a sense that only poets dare describe, while God does not approve the injustice that exists, God strangely does approve the world in which, as a matter of *fact*, the injustice exists, and in the way of liberating that world, God sometimes mysteriously does cause injustices to occur. In other words, Job has been right all along: it is *God* who slays him, and ultimately none other.[69]

It is deliberate and important that the Job poet brings God into the scene in the vortex of a violent wind storm—it is not a harmless "whirlwind," as the old translations say. It is a tornado—the most powerful and intensely unpredictable, violent, terrifying, and destructive force of weather on Earth. God speaks from within (and not against) that chaotic force. God is completely calm in the storm. God is master of Leviathan and the storm.

In my view, this is what Job "sees," and this is what causes him to withdraw his question and to repent in "dust and ashes." Job does not get (nor do we get) an explanation for *why* God has done these unfair things to him.[70] He also gets no explanation as to *how* God might put these evils right, "defeat" them, as it were, by integrating them in all their disorder and ugliness into a perfectly ordered and beautiful plan (although this eventual victory of God is still embedded in the tradition the poet shapes).[71] What Job does "see" is that God is in complete command and mastery—he sees in a "second-person" sense what cannot be explained to him in "third-person" terms, apparently.[72] He is able to see now with his own eyes (as it were) that God has "rightfully," or "justly," and not immorally or amorally, decided to make and to shape the world (and in microcosm, his own life) in this unexpected, undeserved, and painful way, including inexplicably great violence, disorder, suffering, and injustice. He sees in this nondidactic way that God is the sort of Being who knows exactly what he is doing and why, and that despite appearances, God is completely in control of the otherwise uncontrollable, chaotic situation. Seeing things thus, Job requires no further explanation, he "repents," and withdraws his bitter accusations, satisfied that they have been resolved.

There is a great deal more to be said here, but I will finish with these brief comments on the logic of Job as it bears on the fresh findings of genetic science.

It seems to me that Job conveys intuitions very similar to the ones in later Isaiah, where the prophet (while admitting the sins of the people) writes the agonized words: "O Lord, why do *you* make us err from your ways and harden our heart, so that we do not fear you?" (Isa. 63:17). He appeals pitifully to God as the "potter," to the sympathy he hopes God has for fragile clay/human beings: "We are the clay," and "we are the work of thy hands" (Isa. 64:8). This "clay," this "work" of God's hands, is nothing to boast about. It is ugly and apparently ruined—deliberately so—why?

The Apostle Paul may very well have had this situation and this text in mind when he seized the same metaphor for help in his own comparable circumstances. Paul has come to the troubling conclusion that Israel's rejection of their very own "Christ" was not accidental (no free will defenses here). On the contrary, Paul judges that rejection of the Christ was part of God's plan, and that God is the ultimate subject of the Israelites' actions. God has mysteriously hardened his own people, in much the same way as God hardened Pharaoh in the past, in order to save them (Rom. 11:7–11). Paul judges that God has *rightfully* done so, since God is the "potter," and the people of Israel are God's "clay" (Rom. 9:21). God may "harden" whomever he chooses to harden (Rom. 9:18). To be very clear, though, Paul was not

endorsing a doctrine of "double predestination," as Calvin thought he was in this passage, depicting God monstrously as creating some human beings for salvation, but all the others deliberately for eternal damnation. Rather, Paul was endorsing the prerogative of God, the Artist, to execute his perfectly just purposes in a manner that seemed unjust in the extreme—in fact, was unjust in the short term—unimaginably cruel and unfair to the people involved, treating them as mere objects of wrath and destruction (Rom. 9:22) for the sake of other people, the objects of mercy, in this instance, the Gentiles worldwide (Rom. 9:23). The challenge is to trust that God is not "trans-moral" in that sense, despite appearances, but that the plan, in all its often unjust parts, works perfectly together for good. In Rom. 11:32, Paul sums up the whole of his thinking better than anywhere else: "God has subjected everyone to sin, in order to have mercy on everyone."

Whatever all this comes to, it cannot very well be captured by the metaphysics embedded in the phrase, "not the way it's supposed to be." When all is said and done, our experience of God and the world is not "Plan B," or "Plan C," or some amended bureaucratic form of a botched original plan. Our experience of God and the world is *on the whole* exactly what God planned from the beginning. "Blessed is the Lamb, slain from the very foundations of the world" (Rev. 13:8).[73] In a carefully guarded sense, we might venture to say that human history is a work of divine art reminiscent of the Joseph story and its ironic ending: "Even though you meant to do harm to me, God meant it for good, in order to preserve a numerous people" (Gen. 50:20). In that light, Joseph weeps, and Joseph forgives.

Paul offers no logical explanation of God's actions. Instead, even if somewhat obscurely (Paul was no poet), Paul, like Isaiah (whose poetic instincts were better), turns instinctively to aesthetics and to the nature of art. God's actions in history are better understood in the analogy of artistic or *aesthetic* preferences than in analogies of logical perfection (pace Leibniz) and the moral utility of a "best possible world." In Paul's terms, they are choices that simply *pleased* God. They pleased God in a manner compatible with perfect moral goodness, understood as universal grace to be extended to everyone. The statement in Rom. 11:32 makes this truth as clear as can be, I think. But at least for the time being, the precise sense of that compatibility is entirely elusive and left to mystery—Rom. 11:33–36 keeps the aesthetic freedom and inscrutability of the Potter's will intact, even while keeping it connected to moral grounds of character that we need in order to sustain faith, hope, and (most of all) love of God.[74] Perhaps one should hope for a resolution of the world that is also better pictured in aesthetic terms than purely logical ones—as in recent treatments of the "morally sufficient reason" God must have for permitting some evil or other.[75] The precious few visions of God's kingdom that we have in Scripture—later Isaiah (chap. 65) and the book of Revelation (chaps. 21–22)—are certainly rich with encouragement of just that view: resolution by means of incorrigibly triumphant beauty as the medium of perfect goodness, cashing out in pure joy (rather than studied nods of heads at the successful logic of explanations).

At the end, this view comes to be a sort of new "supralapsarianism," not the old decretal sort of Calvinism, but an "aesthetic supralapsarianism." This view of creation, the Fall, and redemption through Christ in history is unusual, but not unprecedented in either ancient or modern formulations of Christian tradition. And it happens to have the advantage of being positively compatible with the intuitions of genetic science about our human origins and the existential condition in the world. This science sharpens the ancient question we are inclined to put to the Potter: "Why have you made me (us) thus?" At most, the proposals of this article help us to see better how to ask that question in the right way, how to answer it, and how not to answer it at the same time. Or at least, my proposals show that warrant exists in Scripture and theology for embracing what genetic science seems to be teaching us about ourselves. ◈

Notes

[1]Debate exists among Eastern Orthodox theologians over the compatibility between evolution and Christian faith. For an example of a constructive view of Orthodoxy and evolution, see Fr. George Nicozisin, "Creationism Versus Evolutionism," www.orthodoxresearchinstitute.org (last accessed June 24, 2010). No official prohibitions exist in Eastern Orthodoxy against affirming the compatibility of evolution with the faith.

Roman Catholic teaching approves compatibility between evolutionary science and the Christian faith. The most recent papal writings affirm the strength of evidence supporting evolutionary theory. See especially John Paul II, "Message to the Pontifical Academy of Science" (1996),

commenting on *Humani Generis* by Pius XII (1950), which approved academic freedom to teach the theory. John Paul II went further: "New findings lead us toward the conclusion that evolution is more than a hypothesis." The modern Catholic catechism, Catholic schools and universities, and many unofficial Catholic organizations explore the compatibility of evolution with Catholic faith, and the list of Roman Catholic scholars writing on the subject is quite long by now.

Four hundred fifty Protestant churches from various denominational and nondenominational communities celebrated Evolution Sunday on February 13, 2006, commemorating Charles Darwin's 197th birthday. Denominations represented included Episcopalian, Lutheran, Presbyterian, Methodist, United Church of Christ, Baptist, and many community churches, www.ekklesia.co.uk (last accessed June 24, 2010). See the Episcopal *Catechism of Creation Part II: Creation and Science*, www.episcopalchurch.org (last accessed June 24, 2010). Also see *The Book of Discipline of the United Methodist Church* (Nashville, TN: Abington Press, 2008). In this article, we shall refer to leading mainline Protestant scholars who are exploring evolutionary science in the context of Christian hermeneutics, theology, and theodicy.

[2]Numerous denominations explicitly disavow the theory of evolution. For example, "The Doctrine of Creation" was adopted by the Assemblies of God General Presbytery, August 15–17, 1977, http://ag.org (last accessed June 24, 2010). See also, the Southern Baptist Convention, "Resolution on Scientific Creationism," www.sbc.net (last accessed June 24, 2010). Others include the Lutheran Church-Missouri Synod, the Evangelical Presbyterian Church, Seventh-Day Adventist Church, and Oneness Pentecostal Denominations.

The Christian Reformed Church (CRC) of North America (my own denomination) has a more complex position: it prohibits "espousal of theories that posit the reality of evolutionary forebears of human beings," as "ruled out by Scripture and the Reformed confessions," yet oddly does not intend this prohibition to "limit further investigation and discussion on the topic," www.crcna.org (last accessed June 24, 2010). This applies to all institutions of the CRC, including Calvin College. Wheaton College (the "Harvard of Christian schools") has also gone through a furor recently over administrative attempts to require denial of ancestral human evolution as a condition of employment. Andrew Chignell, "Whither Wheaton?" SOMA (The Society of Mutual Autopsy), www.somareview.com (last accessed June 24, 2010).

Alvin Plantinga coined the phrase Grand Evolutionary Hypothesis in his article, "When Faith and Reason Clash: Evolution and the Bible," *Christian Scholar's Review* 21 (September 1991): 15.

[3]Dennis R. Venema lays out the diverse lines of genomic evidence for common ancestry in "Genesis and the Genome: Genomics Evidence for Human-Ape Common Ancestry and Ancestral Hominid Population Sizes," *Perspectives on Science and Christian Faith* 62, no. 3 (2010): 166–78.

[4]For a lucid mapping out of the various concordist positions, see Deborah B. Haarsma and Loren D. Haarsma, *Origins: A Reformed Look at Creation, Design, and Evolution* (Grand Rapids, MI: Faith Alive Christian Resources, 2007), 82–4; also Denis O. Lamoureux, *I Love Jesus and I Accept Evolution* (Eugene, OR: Wipf and Stock, 2009), 15–8.

[5]Lamoureux, 17–8.

[6]See Plantinga, "When Faith and Reason Clash," for a fine analysis of the complexity, esp. 9–15.

[7]For a superb study of Catholic and Protestant responses to Copernican theory, see Kenneth J. Howell, *God's Two Books: Copernican Cosmology and Biblical Interpretation in Early Modern Science* (Notre Dame, IN: University of Notre Dame Press, 2002).

[8]St. Augustine, *The Literal Meaning of Genesis*, vol. 1, books 1–6, trans. and ed. John Hammond Taylor, S.J. (New York: Newman Press, 1982).

[9]In *The Literal Meaning of Genesis*, Book One, chapter 19, 38, pp. 42–3, Augustine says,

> Usually a non-Christian knows something about the earth, the heavens, and the other elements of this world, about the motion of the stars, and even their size and relative positions, about the predictable eclipses of the sun and moon, the cycles of the years and the seasons, about the kinds of animals, shrubs, stones, and so forth, and this knowledge he holds to as being certain from reason and experience. Now it is a disgraceful and dangerous thing for an unbeliever to hear a Christian presumably giving the meaning of Holy Scripture, talking nonsense on these topics; and we should take all means to prevent such an embarrassing situation, in which people show up vast ignorance in a Christian and laugh it to scorn … for when they find a Christian mistaken in a field which they themselves know well and hear him maintaining his foolish opinions about our sacred books, how are they going to believe those books in matters concerning the resurrection of the dead, the hope of eternal life, and the kingdom of heaven?

[10]For a nearly total discrediting of the approach to geology by contemporary young-earth creationists, and for support of the parallel just alleged, I recommend the book by Davis A. Young and Ralph F. Stearley, *The Bible, Rocks, and Time: Geological Evidence for the Age of the Earth* (Downers Grove, IL: InterVarsity Press, 2008). As for biblical scholarship on Genesis, and for similar support, see Daniel C. Harlow, "Creation According to Genesis: Literary Genre, Cultural Context, Theological Truth," *Christian Scholar's Review* 37, no. 2 (2008): 163–98.

[11]According to studies, about 90% of evangelical Christians in America affirm young-earth creationism as correct. See Lamoureux, *I Love Jesus and I Accept Evolution,* 15.

[12]St. Augustine, *The Literal Meaning of Genesis*, Book One, chapter 21, 41, p. 45.

[13]Luther disparaged Copernicus in a loose remark in 1539 (four years before Copernicus published his theory) on the grounds that Joshua clearly stopped the sun. Martin Luther, *Table Talk* 54, ed. and trans. Theodore C. Tappert (Philadelphia, PA: Fortress Press, 1967), 53–4. John Calvin never commented explicitly on Copernicus (a statement attributed to him by historians did not, in fact, appear in Calvin's works), but he clearly affirmed geocentric cosmology in his sermons and commentaries. Edward Rosen, "Calvin's

Attitude toward Copernicus," *Journal of the History of Ideas* 21, no. 3 (July 1960): 431–5. Also Matthew F. Dowd, "Calvin and the Astronomical Revolution," www.nd.edu/~mdowd1/postings/CalvinAstroRev.html (last accessed July 24, 2010).

[14]Howell, *God's Two Books*, at length, and on 25–6.

[15]Ibid., esp. 209–26.

[16]See the superb statement on divine revelation and Scripture in *Verbum Dei: Dogmatic Constitution on Divine Revelation, Second Vatican Council*. Source: www.vatican.va/archiv/hist_councils/ii_vatican_council/documents/vat-ii_const_19651118_dei-verbum_en.html (last accessed July 24, 2010).

[17]For an insightful discussion of *sola scriptura* and its link with the principle of the Bible's *perspicuitas*, see Kenton L. Sparks, *God's Words in Human Words: An Evangelical Appropriation of Critical Biblical Scholarship* (Grand Rapids, MI: Baker Academic, 2008), esp. 31–2.

[18]Howell discusses the Protestant figures at length in *God's Two Books*, 39–181.

[19]Consider the editorial synopsis of Herman Bavinck's understanding of human evolution as incompatible with Reformed (biblical) Christianity.

> The arguments against Darwinism in general are weighty, with the problem of human origins and transitions from one species to another particularly insoluble. The theory of evolution also clashes with Scripture in regard to the age, the unity, and the original abode of humanity. Above all, it is essential to maintain the fundamental unity of the human race; this conviction is the presupposition of religion and morality. The solidarity of the human race, original sin, the atonement in Christ, the universality of the kingdom of God, the catholicity of the church, and the love of neighbor are all grounded in it.

Herman Bavinck, *In the Beginning: Foundations of Christian Theology*, ed. John Bolt and trans. John Vriend (Grand Rapids, MI: Baker Books, 1999). The original publication was somewhere between 1895–1901; see editor's explanation, 19.

[20]See the *Heidelberg Catechism*, Lord's Day 3.

> Q: Did God create people wicked and perverse?
>
> A: No. God created them good and in his own image, that is, in true righteousness and holiness.

Lord's Day 4,

> Q: Then where does this corrupt human nature come from?
>
> A: From the Fall and disobedience of our first parents, Adam and Eve, in Paradise.

Also the *Belgic Confession*, Article 14:

> We believe that God created man from the dust of the earth and formed him in his image and likeness—good, just, and holy; able by his own will to conform in all things to the will of God … But he subjected himself willingly to sin and consequently to death and the curse, lending his ear to the word of the devil.

Similar commitment to a historical Fall is enshrined in the *Augsburg Confession*, Article II, and the *Formula of Concord*, Article I.

[21]See Lamoureux, *I Love Jesus and I Accept Evolution*, 23–6. Also Bernard Ramm, *The Christian View of Science and Scripture* (Grand Rapids, MI: William B. Eerdmans Publishing Company, 1955), esp. 32–7.

[22]For my understanding of the evidence that pertains directly to Scripture and theology, I rely mainly on three sources: Daryl P. Domning, with foreword and commentary by Monika Hellwig, *Original Selfishness: Original Sin and Evil in the Light of Evolution* (Aldershot: Ashgate, 2006); Haarsma and Haarsma, *Origins: A Reformed Look at Creation, Design, and Evolution*, esp. 196–203; and Dennis Venema, "Human Genomics: Vestiges of Eden or Skeletons in the Closet?" (paper presented at the American Scientific Affiliation Annual Meeting, Baylor University, Waco, TX, August 2, 2009). A version of this paper titled "Genesis and the Genome: Genomics Evidence for Human-Ape Common Ancestry and Ancestral Hominid Population Sizes" appears on pages 166–78 of this issue.

[23]Domning, *Original Selfishness*, on Ayala's work, 71–2.

[24]C. John Collins, "Adam and Eve as Historical People, and Why It Matters," *Perspectives on Science and Christian Faith* 62, no. 3 (2010): 147–65.

[25]Daniel C. Harlow, "After Adam: Reading Genesis in an Age of Evolutionary Science," *Perspectives on Science and Christian Faith* 62, no. 3 (2010): 179–95.

[26]See Lamoureux, *I Love Jesus and I Accept Evolution*, 77–80.

[27]Domning, *Original Selfishness*, 73–82.

[28]For instance, Rodney J. Whitefield presented a paper seeking to show via possible verb tenses that God "had" created the sun and moon *before* the fourth day. "The Fourth Creative 'Day' of Genesis: Answering the Questions about the Sun and the Moon" (paper presented at the American Scientific Affiliation Annual Meeting, Baylor University, Waco, TX, August 1, 2009). Also, William Dembski presented a paper to contend that the various unpleasant and disordered things named just above might be "retroactive effects of the Fall." "The Retroactive Effects of the Fall," (paper presented at the American Scientific Affiliation Annual Meeting, Baylor University, Waco, TX, August 3, 2009).

[29]See Ken Ham in debate with Hugh Ross on the John Ankerberg Show, ten three-part shows, www.answersincreation.org (last accessed June 24, 2010). Ham repeatedly accuses Ross and other old-earth creationists of inconsistency in taking part of the Genesis sequence literally (Adam and Eve cause human death) and part not literally (animal suffering and thorns before human sin).

[30]Venema, "Genesis and the Genome," 167–70.

[31]Domning, *Original Selfishness*, 102.

[32]Ibid., 104–5.

[33]Ibid., 105.

[34]See the essay volume, Philip Clayton and Jeffrey Schloss, eds., *Evolution and Ethics: Human Morality in Biological and Religious Perspective* (Grand Rapids, MI: William B. Eerdmans Publishing Company, 2004). Several of the essays in this collection deal with the subject of evolution and (ostensible) moral altruism.

[35]Domning, *Original Selfishness*, 106.

[36]Ibid., 107.

[37]Ralph F. Stearley, "Assessing Evidences for the Evolution of a Human Cognitive Platform for 'Soulish Behaviors,'"

Perspectives on Science and Christian Faith 61, no. 3 (2009): 152–74.

[38]See previous references to the *Heidelberg Catechism* and the *Belgic Confession*, among others, endnote 20.

[39]The title and the theological formulation of origins are the same in the award-winning book by Cornelius Plantinga Jr., *Not the Way It's Supposed to Be: A Breviary of Sin* (Grand Rapids, MI: William B. Eerdmans Publishing Co., 1995), *Christianity Today*'s selection as 1996 Book of the Year.

[40]Calvin College requires all students to take a course initiating them into the main themes of the Reformed tradition, understood as creation, fall, and redemption, formulated in Augustinian terms by Cornelius Plantinga Jr. in *Engaging God's World: A Reformed Vision of Faith, Learning, and Living* (Grand Rapids, MI: William B. Eerdmans Publishing Co., 2002).

[41]Both George Murphy and Domning independently it seems, use this metaphor of "Plan A" versus "Plan B." Citing Eastern theology and Irenaeus, Domning in *Original Selfishness* observes, "Far from being 'Plan B' the Incarnation and Redemption were part of the plan from the very outset" (152–3).

[42]The phrase *"O felix culpa, quae talem et tantum meruit habere redemptorem"* occurs in the *Exsultet* of the Roman Easter Vigil and is used in many Western churches. T. F. Kelly, *The Exultet in Southern Italy* (New York: Oxford University Press, 1996).

[43]Edwin Van Driel, *Incarnation Anyway: Arguments for Supralapsarian Christology* (New York: Oxford University Press, 2008).

[44]George L. Murphy, "Roads to Paradise and Perdition: Christ, Evolution, and Original Sin," *Perspectives on Science and Christian Faith* 58, no. 2 (2006): 110.

[45]Ibid., 111.

[46]Notably the Reformed theologian and president of Calvin Theological Seminary, Cornelius Plantinga Jr., seems to adopt a cultural rather than an ontological explanation of original sin in *Engaging God's World*, 54–62. He explains "original sin" as "wrong tendencies, habits, practices, and patterns" that we now absorb from a corrupted human culture.

[47]The Augustinian understanding of the Fall is *ipso facto* a "free will defense" of God, and is necessary in order to make philosophical defenses of this kind seem theologically plausible. Alvin Plantinga's original version of the argument from freedom is in *God, Freedom and Evil* (Grand Rapids, MI: William B. Eerdmans Publishing Company, 1977). It is intriguing to see that Plantinga's most recent treatment of the problem of evil is very much in line with the one that I am defending here: "Supralapsarianism, or '*O Felix Culpa*'" in Peter van Inwagen, ed., *Christian Faith and the Problem of Evil* (Grand Rapids, MI: William B. Eerdmans Publishing Company, 2004), 1–25. Plantinga contends that for all we know, the value of the Incarnation and Atonement is so great that (when finally understood) their existence will vastly override the evils. See esp. 25–6.

[48]For a very thorough and useful summary of recent work in Christian theodicy on natural evils, see Christopher Southgate and Andrew Robinson, "Varieties of Theodicy: An Exploration of Responses to the Problem of Evil Based on a Typology of Good-Harm Analyses," *Physics and Cosmology: Scientific Perspectives on the Problem of Natural Evil* 1, ed. Nancey Murphy, Robert John Russell, and William R. Stoeger S.J. (Berkeley, CA: Center for Theology and the Natural Sciences, 2007), 67–90.

[49]C. S. Lewis, *The Problem of Pain* (New York: Macmillan, 1943). Lewis called pain, including pain in nature, "God's megaphone to rouse a deaf world," 93. Peter van Inwagen has proposed a similar version of the free will defense in "The Argument from Evil," *Christian Faith and the Problem of Evil*, 55–73.

[50]I refer again to Murphy, Russell, and Stoeger, eds., *Physics and Cosmology*, especially part II, "Scientific and Philosophical Responses," 91–294.

[51]Karl Barth, *Church Dogmatics* 3.1, ed. G. W. Bromiley and T. F. Torrance (Edinburgh: T. & T. Clark, 1958), esp. 250–88 on Eden.

[52]Domning, *Original Selfishness*, 169.

[53]Ibid., 162–3.

[54]So we see in Christ a God "who hates suffering, who would not tolerate it *if there were any alternative*, but the facts in front of us prove that there was no other way available for God." So "God needs no defense," for "banishing evil from an autonomous world involves a contradiction, and is therefore impossible, even for God." So Domning, *Original Selfishness*, 167. I should think that omnipotence entails favoring the existence of alternatives.

[55]Dating the composition of Job with certainty seems impossible. See Brevard S. Childs, *Introduction to the Old Testament as Scripture* (Philadelphia, PA: Fortress Press, 1979), 528–33. I do believe, however, that recent studies (to be cited in due course) encourage thinking that Job's canonical function was, in part, to correct earlier tradition and, in part, to construct a fresh formulation of spirituality, ethics, and expectations in the context of suffering. My judgment that Job was written during or even after the exile of Israel is an extrapolation from its theology of God and evil, as I understand it. Since this theology seems to be in deliberate conflict with aspects of so-called Deuteronomic tradition (which says that righteousness leads causally to flourishing, and only unrighteousness brings impoverishment), it seems likely that Job is later and represents the experience of oversimplification in earlier tradition.

[56]John R. Schneider, "Seeing God Where the Wild Things Are: An Essay on the Defeat of Horrendous Evil," in Peter van Inwagen, ed., *Christian Faith and the Problem of Evil* 226–62.

[57]See references in Schneider, "Seeing God Where the Wild Things Are," 239–44.

[58]Carol A. Newsom, *The Book of Job: A Contest of Moral Imaginations* (New York: Oxford University Press, 2003), 244.

[59]Ibid. "Whether this imagery represents an innovation of the Job poet or the use of an otherwise known tradition cannot be determined."

[60]Ibid. These are my italics.

[61]Ibid., 245–7.

[62]Ibid., 247.

[63]Ibid., 248.

[64]Norman Whybray points out that certain aspects of the descriptions are those of the fire-breathing dragon of myth and legend. The LXX translates it literally as a dragon

(*drakon*). Whybray, *Job* (Sheffield: Sheffield Academic Press, 1998), 41.

Whybray explains that German form-critical scholars were vexed by the beasts' identities and place in the poem, to be sure, and had some misguided things to say about their being ordinary animals that historical-literary study corrects by relating them to Ancient Near Eastern myths.

Perhaps the most remarkable reading is by Ken Ham, executive president of Answers in Genesis, who contends that Behemoth and Leviathan in Job refer to dinosaurs that coexisted with human beings in the ancient world (for a brief while) after the Flood. "Contrary to what we may think, what we know now as dinosaurs get more mention in the Scriptures than most animals!" Ham goes on to claim that evidence of encounters with dragons in the "history" books of various peoples is "overwhelming evidence" that "dragons were real beasts" and that dinosaurs coexisted with human beings. He then explains that they died off quickly because the global flood changed the environment so as to render them (and almost all the other kinds of animals God intended to *save* on the ark) extinct. Ham does not say what we should think about the massive failure of God's plan. Ken Ham, "Dinosaurs and the Bible," www.answersingenesis.org (last accessed June 24, 2010). Hence my earlier appeal to the parallel between young-earth creationists now and the flat-earth creationists whom Augustine derided as an unfortunate embarrassment to Christianity.

[65]Newsom, *The Book of Job*, 252.

[66]Ibid., 249.

[67]Ibid.

[68]Ibid., 250–7. See my discussion and critique, in Schneider, "Seeing God Where the Wild Things Are," 253–6.

[69]By chapter 7, God has become the direct agent of the evils that have happened to Job, e.g., Job 7:20; 9:17–22; 10:1–22. In chapter 16, Job cries that God has "shriveled," "torn," "gnashed," "seized," "slashed," and violently attacked and all but destroyed him, deliberately, and why?

[70]Nor does the reader get an explanation. The prelude to the drama is either extremely bad theology, or it is a deliberate farce designed to keep the enigma of what God does infuriatingly intact during the drama to the end. Readers get nothing like an answer to their questions: where did this miscreant come from, how and why does it exist, and what conceivable reason could God have for taking up its bet (knowing the outcome in advance, we suppose) and ruining the life and family of a good man in the bargain? Nor does the writer return to the wager at the end, which is either abysmally bad plot resolution or it is deliberately elusive to retain the riddle—why this elemental force of chaos, now embodied in the more monstrous character of Leviathan? Leviathan and "the Satan" cash out to the same thing—creatures of God, as it were, which do nothing but destroy in the cosmic order, even as God masters and "uses" them in producing a cosmos that is perfectly good.

[71]Job gets his health back, he gets his property back, but he does not get his original children back. The ending of the book is like the beginning: it is either very bad moral theology or it deliberately admits low-key sarcasm that prevents satisfaction for the reader.

[72]Eleanore Stump discusses Job's experience of God as a "second-person" experience, which is an encounter with the reality of the person himself or herself, rather than simply hearing or reading about the person. "Second-Person Accounts and the Problem of Evil," *Faith and the Problem of Evil: The Stob Lectures, 1998–99* (Grand Rapids, MI: Calvin College, 1999), 1–44.

[73]Once again, we stand on the ancient footings secured by Irenaeus, and eloquently built upon by Karl Barth and Christological supralapsarians.

[74]For an intriguing defense of an "aesthetic" defense against arguments from evil, see Marilyn McCord Adams, *Horrendous Evils and the Goodness of God* (Ithaca, NY: Cornell University Press, 1999). This "aesthetic" view fits well with Alvin Plantinga's recent version of the argument from supralapsarian metaphysics.

[75]On the rule of "morally sufficient reason," see William L. Rowe, "The Problem of Evil and Some Varieties of Atheism," in *The Evidential Argument from Evil*, ed. David Howard-Snyder (Bloomington, IN: Indiana University Press, 1996), 1–11.

In short form, the generally agreed upon rule on both sides of the dispute is that God (omnipotent, omniscient, and perfectly good) would prevent the occurrence of any intense suffering (animal or human) unless thereby causing some greater evil, or losing some indispensably greater good. So, for any such suffering, there exists a morally sufficient reason for its occurrence, such that by preventing it God would have done something worse than the evil involved in permitting it. This seems to mean that there is some specific reason for every occurrence of such evil, and that God would give that explanation, at last, to the people who participated in them. In my version of the "aesthetic" defense, particular evils are absorbed into the great beauty of the whole life of the person, in the context of the great whole of creation in its perfected form. Particular explanations may be superfluous in that case. The evils are "defeated" by virtue of the glory that now obtains.

Michael N. Keas

Essay Review

Collins and Dembski Offer Their Views of Theodicy and God's Creative Plan

Michael N. Keas

GENESIS 1–4: A Linguistic, Literary, and Theological Commentary *by C. John Collins. Phillipsburg, NJ: P&R Publishing, 2006. 318 pages. Paperback; $17.99. ISBN: 9780875526195.*

THE END OF CHRISTIANITY: Finding a Good God in an Evil World *by William A. Dembski. Nashville, TN: Broadman and Holman, 2009. 254 pages. Hardcover; $22.99. ISBN: 9780805427431.*

C. John (Jack) Collins and William Dembski have offered exegetical and conceptual tools to build a theodicy embedded within a view of origins that is responsive to both biblical and scientific studies. Each author spoke at the 2009 ASA Annual Meeting, but they did not present their views comparatively as I shall here. Collins, a leading Old Testament scholar, has developed a sophisticated literary and discourse analysis of the early chapters of Genesis. Dembski illuminates Genesis 1–3 by distinguishing between God's logical ordering of creation (*kairos*) and its implementation in natural history (*chronos*), and by applying to Genesis the delightfully simple notion of double creation (conception and realization). Taken together, with a few revisions that I shall suggest, Collins and Dembski give us a clearer vision of the divine plan of creating a good world in which humans would freely sin with painful cosmic consequences. Individually their books are quite valuable, but each is significantly incomplete without the other.

Collins shows us how to cooperate closely with the divine-human authorial intention of the early chapters of Genesis. Particular Hebrew verb tenses distinguish between story background and main storyline. Genesis 1:1–2 provides the preface ("created" is *bara'* in the perfect tense) to the main creation week account, which begins with "And God said"—the first verb in the *wayyiqtol,* or main narrative tense. Formulaic beginnings ("and God said") and endings ("and there was evening and there was morning"), a climactic peak ("so God created man in his own image"), and other linguistic and literary devices give structure to the first biblical story (pericope).

Collins proposes an analogical workweek model for understanding the seven days of Genesis that is consistent with the linguistic and literary structure of the text. God's creative workweek is the analogical counterpart to our workweek. Because the "week" format is part of the analogy, Collins concludes that at least some of the sequential events in

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the passage may reflect logical, rather than chronological, order. Collins' analogical interpretation of the creation week resembles the "literary framework" view (though he critiques this), which can be traced back to the Middle Ages. Dembski further develops a partially nonchronological interpretation, as we shall see.

Judging from Collins' linguistic and literary observations (p. 101), the Bible's second (Gen. 2:4–25) and third (chap. 3) pericopes are more closely allied to each other than either is to the (first) creation week story. In Gen. 2:4b, midway through a unified chiastic (mirror image) literary structure (Gen. 2:4) that introduces the second pericope, the Creator reveals himself as *yhwh elohim* (LORD God)—a composite divine name that extends through chapter 3, but that is otherwise rare in the Hebrew Bible. The Garden of Eden provides the common setting for Gen. 2:4–3:24, which unfolds a series of events that Collins identifies as normal prose narrative, in contrast to the exalted prose narrative of the first pericope. The exalted narrative character of the first pericope is generated by expressions such as "the greater light" and "the lesser light"—instead of the ordinary Hebrew words for sun and moon. The creation week comes to us neither as poetry, nor as ordinary prose narrative. It is fashioned as a rare biblical genre that, Collins cautions, requires special interpretive care.

Collins and Dembski disagree about the meaning of "good" in Gen. 1:1–2:3, and they also part ways regarding the precise consequences of humanity's fall. God, the only actor in the first pericope, creates a universe, which includes the millions of years of animal suffering and death prior to human existence, that Collins argues is "good," in the sense of *fulfilling God's purposes*. More details about human origins appear in the second pericope, and humanity's fall from grace is narrated in the third pericope. Human sin is the reason for human (not animal) suffering and death, Collins maintains. Many evangelical scientists have embraced this sort of theodicy. Is there a better way to reconcile God's goodness and omnipotence with a suffering world?

Dembski provides one of the best book-length arguments for the traditional Christian view that human sin is the reason for *all* natural evil in the cosmos, including animal suffering before human existence. He refurbishes a nineteenth-century "old-earth creationist" view that Adam's fall is the reason for all natural evil, backward and forward in time. This view had acquired much of its justification from the parallel truth that Christ's atonement is efficacious for all believing humans, both before and after his substitutionary work on the cross. Dembski offers additional reasons to accept this theological parallel between the acts of Adam and Jesus.

Dembski develops some important conceptual tools to solve the puzzle of the chronological appearance of natural evil *before* human sin (here he assumes, for the sake of discussion, the standard cosmological-geological assessment of natural history). First, he theorizes that Genesis teaches a double creation: conception and realization. In its original conception in the divine mind, creation is completely good—it entails neither natural evil (suffering and death among creatures capable of experiencing pain) nor personal evil (human or angelic sin). However, in its realization in *this* cosmos (with the exception of the pre-Fall Garden of Eden), creation contains evil (both natural and personal) due to the tragic, but divinely foreknown, decision of humans to rebel against God. Angelic sin plays only a subsidiary role in Dembski's theodicy (for plausible reasons that he outlines). The Creator's original plan was even "very good" in view of its crowning achievement: sinless humans crafted in God's image. This very good creative act (divinely conceptualized in Gen. 1:1–2:3) turned bitter in its realization due to human rebellion against God. For this reason, God rewrote the originally "good" script of history, both backward and forward relative to the foreknown chronological moment of human sin. The resulting world (with the exception of the pre-Fall Garden of Eden)—one appropriate for our fallen condition—would be dominated by suffering, death, and extinction on a colossal scale. For the sake of his plan to redeem humanity, God preemptively judged the cosmos *chronologically prior* (but *logically subsequent*) to human sin.

In addition to double creation (conception-realization), Dembski also develops a parallel *kairos-chronos* distinction that has a strategic function within his theodicy. While Collins takes the creation week to constitute an analogy between God's creative work and our weekly work, Dembski urges a primarily kairological reading of the text—one that rejects "literary device" in favor of "actual (literal) episodes in the divine creative activity" (p. 142). Putting aside whether or not "literal" textual messages

are communicated primarily *by means of* "literary devices" inherent within a text (here I lean toward Collins' affirmative answer over Dembski's apparent negation), I think Dembski's *kairos-chronos* distinction helps us understand the early chapters of Genesis. The creation week narrative primarily reveals the unfolding of God's intentional-semantic logic (Greek, *kairos*), rather than the ordinary chronological sequence (Greek, *chronos*) of his creative acts. However, like Collins, Dembski sees *some* broadly chronological teaching in Genesis 1, and even more so in recent reflections (see the statement from Dembski in David Allen, "A Reply to Tom Nettles' Review of Dembski's *End of Christianity*," February 2010, www.baptisttheology.org/papers.cfm).

Dembski outlines the main kairological units of God's creative work (p. 144):

- Day 1: Creation of light. "With all matter and energy ultimately convertible to and from light, day one describes the beginning of physical reality."
- Days 2 and 3: God orders an earthly environment suitable for animal and human life.
- Day 4: "God situates the earth in a wider cosmic context."
- Day 5: Creation of animals that inhabit sea and sky.
- Day 6: Creation of animals that inhabit dry land; creation of humans.

Drawing from Collins' linguistic-literary analysis of Genesis, one would conclude that Gen. 1:1, not day one, communicates the truth that God is the cause of all physical reality (the cosmos). Genesis 1:1, along with 1:2, which describes the earth's initial inhospitable condition, together function as the preface for the main story of God's Earth-focused creation week. I speculate that day one may simply mean that God is the Creator of light (in contrast to darkness), which is one of the most basic logical distinctions (or "separations" as the text expresses it) that humans, functioning according to God's design, are inclined to make in slicing up reality, using phenomenological (observational, nontheoretical) terms. Look everywhere at the world and know that God made it, Genesis affirms. Even the light by which we observe the world is God's creature, the text declares. Days two and three make similar nontheoretical logical divisions in the order of creation. Here God declares the separation of water above (rain clouds) from water below (water on Earth's surface), and then the separation of dry land from land covered by water.

Dembski argues that *kairos* and *chronos* intersected in the Garden of Eden. Here we encounter an evil-free paradise (a perfectly good realization of God's conceptual creation) surrounded by a preemptively set judgmental and redemptive fire (natural evil). Firefighters today operate similarly when they deliberately set backfires in an effort to contain a raging fire. Although humans initially experienced no evil or suffering in the Garden of Eden (there is no mention of such experience in the text of Genesis), Adam and Eve were able to *conceive of* the death penalty that God set as the punishment for ignoring his single moral imperative (God's words connect human minds to reality). Furthermore, the need for God to plant a garden in which to place the newly formed innocent man suggests that the rest of the globe was *not* a suitable testing ground for the exercise of human free will. Put otherwise, Genesis allows for the possibility that the earth was not the global paradise envisioned by young-earth creationists. The local paradise in Eden, which was a perfect instantiation of the originally intended kairological order of creation, was temporarily demarcated (with minimal intersection) from the ordinary domain of natural history (*chronos*). God may have expelled humans from the Garden of Eden for the *dual* purpose of denying them access to the tree of life and fully integrating them into the mainstream chronological flow of natural history, with its millions of suffering animal cries echoing through cosmic time.

Collins' account of the tree of life as a nonmagical sacrament fits well within Dembski's understanding of the Garden of Eden as the fleeting point of intersection between *kairos* and *chronos*. Access to this tree's fruit "would confirm the man in his moral condition: hence the need to gain (or retain) access to it by obedience." Collins continues: "This is why God does not want him to have it after his sin (Gen. 3:22): he would then be confirmed in his sinfulness forever, and this is horrible" (p. 115). If we accept the suggestions of Collins and Dembski, humans were expelled into an evil world for their own ultimate good.

Genesis 2:19 gives a retrospective glance at the earlier creation of animals, which the English Standard Version 2006 text edition, under Collins' editorial guidance, renders as, "Now out of the ground the LORD God *had* formed every beast of the field." Genesis makes no mention of prior animal suffering here because such suffering is logically (in the divine intentional-semantic sense) downstream from human

sin, if we accept Dembski's argument. Furthermore, the animals located in the Garden of Eden would have behaved in a nonpredatory manner chronologically prior to human sin (perhaps similar to animal behavior on Noah's ark). Genesis 2:4 might initiate what Dembski calls the second creation account, which is the chronological realization of key aspects of what was conceived in a particular logical order in God's mind (1:1–2:3). Collins' distinction between the exalted prose narrative of 1:1–2:3 and the normal prose narrative that begins in 2:4 is compatible with Dembski's *kairos-chronos* and conception-realization distinctions. Other scholars need to join this conversation and tease out additional details. There is interesting work to be done.

The creation week is divided into seven episodes (days), each of which ends with "there was evening and there was morning, the nth day," except for the seventh day. The absence of this formulaic ending to day seven (along with other exegetical arguments in Collins' book) suggests that day seven of God's creation week is the *analogical* (or *logical* in Dembski's intentional-semantic sense) container for the rest of history since the creation of humans. This understanding of the text is an alternative to the young-earth creationist scenario, namely, that God restructured the cosmos in the brief moments after human sin to create immune systems, predation, and other features associated with a fallen world. Such divine activity would seem to contradict God's creational Sabbath, which several New Testament passages view as continuing into the present (Collins' arguments here are worth noting). While Collins detects *analogy* between God's creative workweek and our repeating workweeks, Dembski offers a compatible *kairos-chronos* relationship. These two views are more plausible when held together, than either is in isolation.

We can fruitfully compare Collins' and Dembski's views of creation in other respects. Collins writes concerning the creation week: "The days are … of unspecified length; but since this sequence is part of the analogy, it is possible that … events on a particular day may be grouped for logical rather than chronological reasons." Dembski argues that the creation-week narrative emphasizes the intentional-semantic logic of God's creative work, rather than a chronological story of God's successive acts in the ordinary time experienced by humans. Collins thinks that the Bible's first pericope provides a broadly chronological creation account, with only some room for nonchronological (logical) sequencing. Collins and Dembski agree (echoing many earlier theologians) that the most decisive evidence for the (at least partially) nonchronological character of the creation week is found in day four, in which the text addresses celestial lights: sun, moon, and stars. Both scholars agree that day four was not intended to teach us about the timing of the origin of these celestial bodies, though they differ in their reasons for this assessment. Collins shows that day four more likely refers to God's *declaration* of the *function* of these luminous heavenly bodies, rather than a statement of their origin or their first visibility on Earth (many old-earth and young-earth creationists have advocated the latter). Collins' exegetical argument is compatible with Dembski's case for the intentional-semantic logical emphasis of the Bible's opening story.

Other valuable points of comparison between Collins and Dembski surface in Collins' review of John H. Walton's *The Lost World of Genesis One* (Downers Grove, IL: InterVarsity, 2009), despite the fact that Collins was not mindful of Dembski in this somewhat devastating, but respectfully toned, review (reformedacademic.blogspot.com, Nov. 26, 2009). Collins and Dembski agree (in contrast to Walton) that the main point of Genesis is to introduce a *different* origins account than comparable ancient stories (differences overshadow similarities). "Moses sought to *shape* the worldview of Israel, not to *echo* it," Collins notes. Collins and Walton, in contrast to Dembski, declare the utmost interpretive importance of paying attention to the *literary* conventions of the ancient authors and audiences (although the two Old Testament scholars reach drastically different conclusions as to the meaning of Gen. 1:1–2:3). Dembski and Collins end up defending similar (or often complementary) viewpoints, but arrive at their conclusions by means of different disciplinary procedures.

My essay review aims to facilitate fruitful exchange in science and religion studies among scholars in neighboring disciplines. Theologians, like Collins, and philosopher-mathematicians, like Dembski, each benefit from such conversation. Do we not all benefit from such cross-fertilization when we ponder science and religion issues from multiple disciplinary vantage points? Future theodicy studies will need to include an integrated reading of Collins and Dembski. ◈

Book Reviews

ENGINEERING

TRUTH, LIES, AND O-RINGS: Inside the Space Shuttle Challenger Disaster by Allan J. McDonald and James R. Hansen. Gainesville, FL: University Press of Florida, 2009. 627 pages. Hardcover; $39.95. ISBN: 9780813033266.

Truth, Lies, and O-Rings is a first-rate explorative history of what unfolded the fateful morning of January 26, 1986. Surely after twenty-four years, the facts have been unveiled, and any mysteries behind this tragedy have been revealed, but actually Allan McDonald, the former director of the Space Shuttle Solid Rocket Motor Project for Morton Thiokol, Inc., and James Hansen, a former NASA historian who is currently a history professor at Auburn University, have composed a major contribution in describing from the inside one of NASA's darkest moments. *Truth, Lies, and O-Rings* is also a heartbreaking tale of how this disaster might have been prevented.

McDonald's coverage of the Challenger accident is a firsthand account by a person who was involved in the decision to launch the spacecraft. A skillful engineer and executive at the time, McDonald relives the tragedy from where he stood at the Launch Control Center. McDonald is one of the few insiders who never signed a confidentiality agreement. Following the disaster, a distraught McDonald led the corrections of the solid rocket deficiencies so that the future Space Shuttles could operate successfully. With the help of Hansen, McDonald's first book provides a balanced narrative that is cogent, clearly presented, and based on not just memories now twenty years old, but also on 1,400 pages of detailed, handwritten notes he made at the time of these events.

While working as an engineer and manager for Morton Thiokol's space shuttle solid rocket booster (SRB) program, McDonald was heavily involved during the ramp-up of production after the shuttle's first test flights. Ironically, it was his participation in the accident investigation of an explosion at one of the SRB propellant casting facilities that brought him into the shuttle SRB program in the first place. He became a program manager for the Filament Wound Casing SRBs being tested and built for shuttle launches from Vandenberg Air Force base, a program that was cancelled after Challenger. He also became the chairman of the Senior Materials Review Board for the Solid Rocket Motors. This board was assigned the task of tracking all the discrepancies found in the SRB hardware both before, during, and after use, and McDonald had to sign off on the recommendations to accept or reject hardware for use. So his credentials are impeccable, and his knowledge of the engineering aspects of the rocket booster technologies is above reproach.

The book fast forwards to January 27, 1986, with the very unusual meeting between NASA SRB program managers and Morton Thiokol managers, concerning the topic of launching in cold temperatures and how the cold might have affected the performance of the O-rings in the Solid Rocket Booster field joints. McDonald was there and gave his input courageously by vocally expressing both his concerns and doubts. He had refused to sign off that the shuttle was ready for launch under those conditions. McDonald states that "some NASA officials at the Marshall Space Flight Center in Huntsville, Alabama, and several members of Morton Thiokol senior management were in collusion and were clearly trying to cover up this bad decision to launch, and I had just pulled the cork out of the bottle." The entire Challenger affair caused McDonald to be labeled a "whistleblower," and while it affected his career thereafter, he continued to work and much later retired at the top of his game as an executive.

For those that do not have a formal education in engineering, the book can drag a little at the beginning. However, the book is compartmentalized smartly so that what is written in the early chapters has direct bearing on what comes later. Once you get past the early few chapters, it is hard to put the book down as the crescendo of *how* what is known to have happened unfolds.

I recommend this book to anyone who has an interest in the space and shuttle programs, or complex engineering projects. Studying the failures and accidents in the space program are just as important as studying the successes; otherwise, we could be doomed to repeat them or have similar failures. This book should also be required reading for engineering and business students, for there are key lessons in ethics and decision making under pressure.

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HEALTH & MEDICINE

BUILDING HEALTHY COMMUNITIES THROUGH MEDICAL-RELIGIOUS PARTNERSHIPS by Richard G. Bennett and W. Daniel Hale. 2d ed. Baltimore, MD: The Johns Hopkins University Press, 2009. 228 pages, index. Paperback; $25.00. ISBN: 9780801892936.

This book has been published in a timely manner since United States health care reform has been forced to the forefront of the national conversation. Medical costs for the average American are daunting. For example, most recent Medicare spending has been shown to average $3,469 for healthy individuals while averaging $21,064 for individuals with poor health. There are obvious and published disparities in medical spending based on ethnicity and age, as well.[1]

Bennett and Hale are faculty at the Johns Hopkins University School of Medicine and have experience researching chronic disease and managing health-care organizations. The premise of their book is that prevention is essential to good health (and to decrease long-term morbidity and mortality associated with chronic disease complications) and that encouraging churches to start congregational health education programs will fill a much-needed niche for prevention. Their idea is an excellent one since congregations attract large numbers of people who are open to hearing messages associated with improving themselves and their loved ones.

The book opens with an actual-case scenario of a pastor diagnosed with non-insulin-dependent diabetes mellitus

("adult onset" diabetes) through a health ministry at his church. The authors then describe what a typical medical-religious partnership should look like, especially in the setting of various types of preventative medicine. The majority of the book expands on specific chronic diseases as well as disease risk factors that can be addressed in a congregational setting. Such topics include coronary artery disease, hypertension, cancer, diabetes mellitus, dementia, depression, influenza and associated pneumonia, advanced directives, ways to communicate to health-care providers, modification of lifestyle risk factors, medication management, and accidents and falls. Every chapter follows the same general outline. A description of each topic is written in such a manner that a layperson can understand the underlying pathophysiology, symptoms, testing, and treatment options. These descriptions are followed by specific suggestions regarding how to set up a congregational program for the discussed disease or medical issue. Each chapter ends with real-world examples of churches that have had successful programs with these topics as well as pertinent information resources (such as the American Heart Association and the Centers for Disease Control and Prevention).

The last two chapters of the book provide examples of successful medical-religious partnerships and a descriptive listing of resources available to congregations from around the country. I was particularly impressed with the appendix section, which provides succinct handouts and forms for churches to use.

In summary, this is a very good and instructive book. It is difficult to study medical-religious partnerships in a prospective manner which would involve a large number of congregations. Including such information might be beneficial, but it would slow down a reader's ability to complete each chapter. Also, as a biased reviewer, it would have been helpful for the authors to include pediatric issues such as childhood obesity and child abuse. However, the book is an extremely effective resource for two groups of people. It will help those congregations that wish to begin prevention programs in their church, as the book provides a good outline of topics that are easy to follow. It will also help physicians, nurses, and other members of the health care community who are asked to participate in such programs.

[1]J. M. Sutherland, E. S. Fisher, and J. S. Skinner, "Getting Past Denial—The High Cost of Health Care in the United States," *New England Journal of Medicine* 361 (2009): 1227–30.

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HISTORY OF SCIENCE

SAVING CREATION: Nature and Faith in the Life of Holmes Rolston III by Christopher J. Preston. San Antonio, TX: Trinity University Press, 2009. 256 pages, pictures, index. Hardcover; $25.95. ISBN: 9781595340504.

Rachel Carson is often called "the mother of the environmental movement" and Holmes Rolston III "the father of environmental ethics." It is fitting then to read Christopher Preston's biography of Rolston so soon after Mark Lytle's 2007 biography of Carson, *The Gentle Subversive: Rachel Carson, Silent Spring, and the Rise of the Environmental Movement*. While Carson protested against the use of toxic insecticides such as DDT, Rolston was developing philosophical and theological arguments for protecting the environment. Advocating the idea of nature's intrinsic value, Rolston pioneered the discipline of environmental ethics, which eventually led to his award of the Templeton Prize in 2003.

Preston illuminates Rolston's work in a life context of nature exploration, studies in the natural sciences, graduate work in Scotland, and Presbyterian pastorates. The Shenandoah Valley of Virginia and the Alabama Black Belt are rich natural lands where his family lived for many years, and where his grandfather taught him basic environmental ethics: "Take care of the land and it will take care of you." Although he has become an acclaimed scholar in his field, his life was not without challenges. The honest accounts of Rolston's struggles are to be appreciated by every reader: he had to endure the rejection of the parishioners to whom he was ministering; despite his outstanding academic background and achievements, he had difficulty finding a teaching position; and even after gaining recognition as an environmentalist, his environmental ethics further developed through painful criticisms.

This biography is also an intellectual history. It highlights the development of critical issues and questions in environmental ethics. Some of these include the following: Should the ecosystem be sustained by human intervention or should it be left untouched? Should not the beauty of nature require human maintenance? Tougher questions may include, "How do we balance human interests with environmental obligations?" (p. 179) and "How far [does] this obligation to protect nature go?" (p. 180). Answers to these questions concern consideration in many areas, for example, cultural, economic, political, spiritual, and aesthetic, as well as ecological claims and interests. Readers who wish to gain insight into how the discipline of environmental ethics developed will benefit greatly from learning how Rolston wrestled with these questions.

By choosing the title *Saving Creation*, instead of *Saving the Earth*, Preston underlines Rolston's identity as a Christian scholar. Rolston attempts to reconcile his faith and environmental concerns; this problem brings theology and ecology into dialogue. Although Rolston started with a naturalistic articulation of nature's value, he came to the conclusion that science itself could not explain the process of evolution that is so contrary to overall entropy. Rolston appeals to the Calvinist emphasis on "God's ongoing grace" that sustains the order of nature. However, acknowledging the reality of novelty in the natural world, Rolston cannot approve the idea that God scripts everything ahead of time. Rolston finds an Irenaean view of creation most convincing, and explains that the evolutionary process moves forward progressively and redemptively *because of* sufferings and challenges. Rolston calls this process "cruciform." These arguments touch a wide range of studies. Having co-edited *Nature, Value, Duty: Life on Earth with Holmes Rolston III*, the biographer is able to describe Rolston's arguments succinctly and intelligently.

However, there are places in the book where descriptions may need clarification or correction. For instance, Preston refers to Karl Barth's rejection of natural theology as "a rejection of nature" (p. 78). Anti-natural theology and anti-nature are two different issues. Further, it is said that in his *Institutes* [I.13.14], Calvin refers to "[a common] grace as 'spirit'" (p. 79). However, it is not grace or "spirit," but the Person of the Holy Spirit, of which Calvin speaks in this particular passage. It is not clear in the text whether such descriptions portray Rolston's misunderstanding or, more likely, Preston's misunderstanding of Rolston.

Preston's writing is concise yet flowing. Though this biography may be of greatest interest to environmentalists, it is also a good introduction to environmental ethics. Rolston's life is an intriguing story; it challenges us to prepare for an eco-crisis in the coming century.

Reviewed by Shigemi Tomita, McMaster University Divinity College, Hamilton, ON L8S 4K1.

GALILEO GOES TO JAIL AND OTHER MYTHS ABOUT SCIENCE AND RELIGION by Ronald L. Numbers, ed. Cambridge, MA: Harvard University Press, 2009. xi + 302 pages, including notes and index. Hardcover; $27.95. ISBN: 9780674033276.

You may have seen ads for this helpful, entertaining, and long-overdue volume in places such as *The New York Review of Books*, the Harvard University Press website, Facebook, Twitter, and YouTube. "25 Myths Debunked" is the heading; then comes the list, in all its boldfaced numbered glory [lack of punctuation after the myth statements in the original], that causes the antennae of history-of-faith-and-science types to twitch with anticipation:

Myth 1. That the Rise of Christianity Was Responsible for the Demise of Ancient Science

Myth 2. That the Medieval Christian Church Suppressed the Growth of Science

Myth 3. That Medieval Christians Taught That the Earth Was Flat

Myth 4. That Medieval Islamic Culture Was Inhospitable to Science

Myth 5. That the Medieval Church Prohibited Human Dissection

Myth 6. That the Copernican System Demoted Humans from the Center of the Cosmos

Myth 7. That Giordano Bruno Was the First Martyr of Modern Science

Myth 8. That Galileo Was Imprisoned and Tortured for Advocating Copernicanism

Myth 9. That Christianity Gave Birth to Modern Science

Myth 10. That the Scientific Revolution Liberated Science from Religion

Myth 11. That Catholics Did Not Contribute to the Scientific Revolution

Myth 12. That René Descartes Originated the Mind-Body Distinction

Myth 13. That Isaac Newton's Mechanistic Cosmology Eliminated the Need for God

Myth 14. That the Church Denounced Anesthesia in Childbirth on Biblical Grounds

Myth 15. That the Theory of Organic Evolution is Based on Circular Reasoning

Myth 16. That Evolution Destroyed Charles Darwin's Faith in Christianity—Until He Reconverted on His Deathbed

Myth 17. That Huxley Defeated Wilberforce in Their Debate over Evolution and Religion

Myth 18. That Darwin Destroyed Natural Theology

Myth 19. That Darwin and Haeckel Were Complicit in Nazi Biology

Myth 20. That the Scopes Trial Ended in Defeat for Anti-evolutionism

Myth 21. That Einstein Believed in a Personal God

Myth 22. That Quantum Physics Demonstrated the Doctrine of Free Will

Myth 23. That "Intelligent Design" Represents a Scientific Challenge to Evolution

Myth 24. That Creationism is a Uniquely American Phenomenon

Myth 25. That Modern Science Has Secularized Western Culture

How many of us must wish we had written—or at least contributed to—this book! How handy it would have been to have had this text to use in our teaching, or to send to teachers, preachers, journalists, magazine and textbook writers, documentary filmmakers (among others), who have expressed strong but dubious views on these subjects without knowing either the primary sources (in English translation, if necessary) or the last forty years of scholarship in history and theology. Here, in concise chapters supported with bibliographically thickened endnotes, are introductory revisionist discussions by such established scholars as John Hedley Brooke (Myth 25), ASA Fellow Edward B. Davis (13), Maurice A. Finocchiaro (8), David C. Lindberg (1), David N. Livingstone (17), ASA member James Moore (16), and Ron Numbers himself (24).

The chapters are written by specialists who offer, for the general reader, popular, provocative summaries of recent research—much of it done by the authors themselves—concerning specific dubious claims. The term "myth" is used in the sense of misinformation that is pervasive and pernicious, with both legs *and* momentum.

There is a nice selection of topics, from ancient to modern. Some misconceptions, I would have thought, had been cleared up decades ago. Has anyone in living memory really believed that "Medieval Christians Taught That the Earth Was Flat," that "Copernicus Demoted Humans from the Center of the Cosmos," or that "Giordano Bruno Was a Martyr of Science"? Does anybody still believe the anti-Christian, Victorian fantasies of Draper and White concerning anti-scientific Catholics or unbiblical childbirth anesthesia? Surely the corrected version of the Huxley-Wilberforce "debate" and Jim Moore's deconstruction of Darwin's legendary deathbed conversion have sunk in

by now? Historians have long known—simply on huge bibliographic grounds—that Darwin did not "destroy" natural theology. And whoever said that Einstein, whose pantheism recalls Spinoza's, "Believed in a Personal God"? These chapters do not beat dead horses, however. I have seen too much recent first-hand evidence that too many scholars, journalists, and bloggers write about (in)famous episodes in "the history of science and religion" without having read the relevant literature produced by historians of science, church historians, and theologians.

Some chapters strike me as conjuring straw figures for easy demolition. That Christianity *alone* "Gave Birth to Modern Science" or that quantum physics *demonstrates* free will are, as simplistic propositions, rather over-the-top in their lack of nuance. And "That Darwin and Haeckel Were Complicit in Nazi Biology" seems anachronistically misstated. The evolutionists were not Nazis, but their work did provide imagery, language, evidence, and authority—among other cultural resources—that Nazis, including Hitler, could appropriate for their own purposes. Neither Darwin nor Haeckel were ideologically pure. Darwinism is not free of "social Darwinism." And insofar as the Nazis were eugenicists and militarists, their ideology was a species of social Darwinism.

Having taught many courses on various aspects of the history of faith and science, I have wanted to write this book for a very long time. "Myths" in this field are alive and thriving in popular culture, many churches, and the academy, even in the twenty-first century. This book is desperately needed, and timely. After you have read it, you will wish you had written it too.

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Origins & Cosmology

I LOVE JESUS AND I ACCEPT EVOLUTION by Denis Lamoureux. Eugene, OR: Wipf and Stock Publishers, 2009. xvii + 184 pages. Paperback; $22.00. ISBN: 1556358865.

If you struggle to connect with young-earth creationists beyond agreement that "it's not *how* God created, it's *that* he created," fear no more. In *I Love Jesus and I Accept Evolution,* ASA Fellow Denis Lamoureux is on a mission to engage anti-evolutionists in the process of coming to terms with evolution, his main premise being "God created the universe and life through evolution, and this fact has no impact whatsoever on the foundational beliefs of Christianity" (p. 149). Lamoureux is the right man for the job: who better to meet these readers where they are than someone who, twenty-five years ago, left a professional career to become a creation scientist "with the intention of declaring war on everyone who accepted evolution!" (p. 2).

Lamoureux is associate professor of science and religion at St. Joseph's College in the University of Alberta and holds PhDs in theology and biology. This book is a short and highly readable version of his comprehensive *Evolutionary Creation: A Christian Approach to Evolution* (2008). Lamoureux's young-earth creationist background, a position he "ferociously defended" (p.22), has gifted him with an empathy and genuineness that will undoubtedly help to create reader trust. Lamoureux just may be successful in his mission—with anti-evolutionists who are contemplating evolution and seeking a better understanding of Scripture. Unfortunately, those who most need to read the book will likely walk away from it.

The book has seven chapters, each building on those preceding, and short enough to easily maintain focus. There are also an astonishing fifty-eight figures and a three-page glossary to help the reader understand main concepts. The chapters are titled "Terms and Definitions," "The Spectrum of Origins Positions," "Ancient Science in the Bible," "The Biblical Accounts of Origins," "Evidence for an Old Earth and Evolution," "Human Evolution," and "Putting Origins in Perspective." Lamoureux limits his definitions to evolution, creation, intelligent design (he dismisses the ID movement in a footnote), and scientific concordism. He explores ancient science in the biblical three-tier universe, and the ancient origins account (using ancient poetry and sources) in the first three chapters of Genesis, to demonstrate the role of an incidental ancient vessel in delivering life-changing messages of faith. He cautions against conflating the two, and emphasizes the principle of accommodation.

After a brief look at the evidence for human evolution, Lamoureux outlines three models for the manifestation of the image of God and sin. Then he deals with the greatest challenge for evolutionary creation: the sin-death problem, or biblical passages that present a connection between human sin and physical death. It is here that the need for his prior warning, namely, that readers will find some of his statements distressing, is most strongly confirmed. Lamoureux ardently holds to the manifestation of the image of God and sin as a mysterious part of the evolutionary process, but he rejects a historical Adam—not a popular view considering that most evangelicals still believe in Adam. In the final chapter, he directly addresses questions he often receives. His answer to why God may have created through evolution—"because an evolutionary world is the perfect stage upon which to develop a genuine relationship with him" (p. 153)—points to the possibility of a much bigger view of God, upon coming to terms with evolution.

Lamoureux ends with the origins paradox of irrelevance and relevance: knowing how God created is not essential to being a Christian, but people ask questions about origins and can "stumble and lose their faith over this issue" (p. 168). I hope this work helps anti-evolutionists gain awareness of the stumbling blocks to faith they create, and begin to consider if they can truly engage the Word of God while discounting major developments in understanding Scripture. *I Love Jesus and I Accept Evolution* is most valuable as a practical guide on "how to talk with your young-earth creationist friends about evolution." But beyond this, Lamoureux's work is admirable in how it seeks to unite Christians in foundational beliefs; challenges Christians who accept evolution to reflect on how they follow the first and second commandments when talking (or refusing to talk) with anti-evolutionists;

and builds real appreciation for the faith of young-earth creationists, reminding us that we all think we understand better than we actually do.

Reviewed by Callee Soltys, Regent College, Vancouver, BC V6R 2G6.

THE DEEP STRUCTURE OF BIOLOGY: Is Convergence Sufficiently Ubiquitous to Give a Directional Signal? by Simon Conway Morris, ed. West Conshohocken, PA: Templeton Foundation Press, 2008. vii–232 pages (includes list of contributors, bibliography, and index). Paperback: $29.95. ISBN: 9781599471389.

Since the 1940s, the Darwinian theory of evolution is generally taken to have been superseded by the neo-Darwinian or synthetic theory of evolution. It was called synthetic because it integrated heredity and evolution. But it was not really synthetic because the study of embryonic development was left out. It took more than half a century of learning about the genetic control of embryonic development before that gap could begin to be addressed. Developmental biologists are now proposing explanations for the development of the overall animal body pattern, which are being integrated into evolutionary theory. The book to be reviewed is an edited collection of studies of convergence from this integrated perspective.

Convergence is the phenomenon that problems of adaptation have similar solutions in different organisms (pp. 13, 30). The solutions may be molecular, genetic, morphological, mental, and social. The thesis of the book is that there are "aspects of evolution that appear to be constrained, if not predictable" (p. vii). The ground for this thesis is the independent convergence of evolutionary paths on the same evolutionary solutions. The classical example of such a solution is the camera eye which occurs in jellyfish, snails, octopi, and whales. Their common ancestor lived before the first appearance of the camera eye. Hence it must have developed independently several times over, and this is taken as a hint, but no more than a hint, that there may be an undiscovered deeper order of life. Further, convergence requires natural selection in order to eliminate divergent evolutionary trajectories. The contributors describe examples of convergence and explore possible metaphysical implications of an ordering of evolutionary processes beyond what is accepted within the neo-Darwinian paradigm. The editor hopes that convergence points to a theory of biological organization that succeeds where the synthetic theory of evolution fails. This is not the first time that the explanation of the organization and the evolution of organisms are seen as mutually exclusive. Georges Cuvier (1769–1832) held this view, and the introduction appropriately places the book in that historical context.

Since this is an edited volume, I highlight common themes that run throughout the chapters. Richard Lenski opens with the question of how one might include directionality in an evolutionary process that is characterized by the interplay of randomness and necessity (chap. 1). He sees this interplay between the randomness of mutation and the necessity of natural selection as well as between the contingency of events in the history of life and the repeatability of convergence. Random events are directed by necessary ones. Empirical approaches to testing such interplay are possible, Lenski argues, and he reviews an example from his own research. George McGhee argues that it is possible to predict existing as well as nonexisting morphologies, given known constraints imposed by the laws of physics and geometry as well as by the biological requirements of organisms (chap. 2). Karl Niklas describes convergent directionality in plant evolution resulting from extrinsic and intrinsic constraints. Among extrinsic constraints, the law of diffusion governs the relation between body volume and surface area across prokaryotes as well as unicellular and multicellular eukaryotes. Likewise, the laws of mechanics govern the relation between girth and height in trees with a certain tissue type. Intrinsic constraints come with the demands of photosynthesis and immobility on plant structure. Engineering theory allows only a few plant body plans that satisfy both intrinsic and extrinsic requirements, and these "solutions" are the ones repeated independently in phylogeny (chap. 3). In chapter 4, Simon Conway Morris notes that directionality as such does not allow one to make specific predictions about the outcome of evolution. How could one predict the outcome of one evolutionary pathway when experiments show that the same outcome can be reached via different pathways? How might one predict which solution to the problem of oxygen transport obtains when there are three options (hemoglobin, hemocyanin, and hemerythrin)?

Three chapters are devoted to the evolution of intelligence in plants (chap. 5), insects (chap. 6), and crows and primates (chap. 7). Each author argues that intelligence evolved multiple times independently. Ironically, the three chapters together implicitly invalidate this argument because each defines intelligence differently. Convergence, however, presupposes similarity, much of which is lost when intelligence is variously defined as controlled flow of information in a network of interacting constituents (chap. 5, p. 79), the ability to solve problems (chap. 6, p. 112), and the ability to think, reason, and solve novel problems (chap. 7, p. 128). Hal Whitehead (chap. 8) proposes that convergence of heritable social attributes in whales, elephants, and humans are caused by social learning and group selection. This is in line with the general pattern of explanation for similarity as the result of similar environmental demands, rather than of common ancestry.

The last four chapters deal with the question of purpose in evolution. As is well known, Ernst Mayr believed that one could acknowledge the existence of purpose in organisms objectively in science without getting nervous about its possible metaphysical implications. He called it "teleonomy," as distinct from teleology. Yet Foley insists in chap. 9 on purpose being illusory. Clearly, this is a metaphysical, if not religious, position, masquerading under the guise of science. As John Haught observes in chap. 12, "… the naturalistic enshrinement of either chance or necessity can survive only in an illusory and imaginative world of ideas quite cut off from the actual narrative flow of nature and of life itself" (p. 230). Michael Ruse (chap. 10) sees no trouble for the Darwinian who acknowledges purpose in organisms. But, he emphasizes, "one cannot read God's intentions from them. As a Christian, one should interpret them in terms of God's intentions, but this is another matter." As a scientist, one

strives, methodologically, "to be an atheist, even if he or she accepts a fuller and more meaningful metaphysical picture of ultimate reality" (p. 183). Celia Deane-Drummond argues (chap. 11) "that the concept of natural law provides one way of understanding in theological terms what evolutionary science is hinting at through notions of convergence and evolutionary 'purpose'" (p. 214). One wishes she had placed this thesis at the beginning rather than at the end of her chapter, which suffers from a lack of focus and unsupported assertions. John Haught has the final chapter. He defines purpose as an overall aim to bring about a goal that is self-evidently worthwhile or good. This applies to the actions of people, but, he asks, is there purpose in the wider universe? Following Teilhard de Chardin, Haught proposes that subjectivity and purpose are cosmic realities. Scientists may exclude subjectivity *methodologically*, "as long as they remain aware that they have left something real off of their maps of nature for the sake of focusing on certain objectifiable and quantifiable aspects."

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PHILOSOPHY & THEOLOGY

A CASE FOR THE EXISTENCE OF GOD by Dean L. Overman. New York: Rowman & Littlefield Publishers, 2009. 229 pages. Hardcover; $24.95. ISBN: 978074256312.

In *A Case for the Existence of God*, Dean L. Overman sets out to provide "a cumulative case for the proposition that the existence of God is a rational, plausible belief" (p. xxvi). He identifies, first, a range of issues concerning the physical universe itself that God's existence makes explicable. There is the sheer existence of a radically contingent universe. Drawing extensively on the work of Mortimer Adler, Overman devotes a considerable amount of space to distinguishing the contingency of things *inside* the universe from the contingency of the universe itself. Contingent objects within the universe merely pass from one form to another, as a fallen tree might decompose and become rich loam. In contrast, the universe itself, were it to go out of existence, would simply cease to exist altogether; it would not merely change its form. It is this latter contingency, what Overman calls "radical contingency," that demands an explanation only God's intentional action could provide.

Overman then draws attention to other characteristics of the physical universe that demand explanation: the intelligibility of the universe, its susceptibility to scientific, particularly mathematical, description, and the fine-tuning necessary for life that can be explained in no other way than by an intentional act of God. Particularly helpful here is his discussion of the inadequacy of suggested competing scientific theories such as evolution. Overman points out, rightly, that scientific theories are theories about the *components* of the universe, not the universe itself. If an explanation for the universe and its characteristics is to be had at all, it has to involve something outside the universe, not a component of one.

In a fascinating chapter that serves as a transition to discussing nonscientific evidence, Overman suggests that quantum mechanics is inconsistent with a strict reductive materialism. Quantum mechanics, in order to work, requires the existence of "knowers" located outside the physical system that the theory is intended to describe. If this is true, Overman asserts, reality cannot be merely physical reality. Because quantum mechanics implies the existence of non-physical reality, Overman suggests it is more compatible with a theistic worldview, rather than with a materialist worldview that reduces all reality to some configuration of physical matter. (Overman's discussion on this topic is quite wide-ranging and complex. In addition to the main chapter on this topic, he includes in an appendix an extended quotation from Henry Stapp's *Mindful Universe* to augment his argument.)

The shift away from the physical universe leads to evidence for God's existence that is more peculiarly personal in nature. For instance, quantum mechanics introduces the possibility of persons with free will and a moral sense. Overman argues that the capacity to distinguish between moral right and wrong points to the existence of an absolute moral standard. Such an absolute standard cannot be accounted for by materialism alone. Hence, the existence of moral absolutes supports theism in a way that materialism cannot.

At various places in the book, drawing upon the work of, among others, Michael Polanyi, Overman affirms the significance of nonscientifically based knowledge. Rational knowledge results from the use of reason in scientific and/or philosophical endeavors. Personal knowledge, on the other hand, results from relationships with other persons. Persons cannot be the object of inspection and inference, but must be known in relationship with others. Such knowledge is not always easily described propositionally, but is manifest in the manner of one's life.

Utilizing this conception of personal knowledge in his argument, Overman discusses at length what one would expect if one were to encounter a personal God. Crucially, personal knowledge of God inevitably brings transformation of life and character. Though Overman concedes that one can fully understand this only from the inside, the similarities among reports of such encounters with God lend support to the conclusion that God is the source of the experience. Overman then provides nine very diverse examples of those who attest to a personal, transformative experience with God.

In this review, I have described the broad outlines of Overman's argument. There is much I have not covered. He is at his best when he engages science. In support of affirming God's existence, he highlights questions that science cannot answer at all, e.g., why is there something rather than nothing, and he also identifies questions raised within science that point to the existence of God, e.g., scientific theories that lead to a beginning of the universe with a "Big Bang," or the incompatibility of quantum mechanics with reductive materialism.

In all of his analyses, Overman demonstrates an impressive erudition regarding both scientific and philosophical literature. He interweaves the two disciplines in an engaging and interesting way, all the while recognizing

the limitations of each sort of analysis. He responds to classical philosophical objections to natural theology from Hume and Kant, in part by noting that their epistemologies are completely incompatible with modern science. On the other hand, he utilizes some of the best contemporary philosophy of religion to argue that science is not competent to answer all questions, for example, William Lane Craig's argument for a beginning of the universe and Alvin Plantinga's argument against naturalism.

Has Overman succeeded in his task? I believe this book makes a genuine contribution to contemporary apologetics, particularly with his emphasis on science. Nonetheless, its appeal will be limited. Much of his discussion requires more background in science than will be found in a general reader. For that reason, I expect that the primary audience of this book will be scientists and lay persons who have an interest in the intersection of philosophy and science.

Other problems detract further from the effectiveness of his case. Let me give two illustrations. According to Overman, God is not "logically necessary," but is "conditionally necessary," one that is not dependent upon anything else for his existence. Because no logical contradiction occurs in saying that a conditionally necessary God does not exist, Overman believes this understanding of necessity allows him to sidestep traditional Humean and Kantian criticisms of the cosmological argument.

A problem arises because Overman uses logical necessity to demonstrate that the universe is radically contingent. He argues: "The universe is radically contingent because it is one among many *logically* possible universes" (p. 28, emphasis in original). On his account, God, though conditionally necessary, is also *logically* contingent. Thus, any argument for God's "conditional necessity" would also show that the universe is "conditionally necessary"; or any argument for the radical contingency of the universe would also be an argument for the radical contingency of God. In either case, the value of God's existence for explaining the physical universe would be zero.

A second illustration arises from his discussion of morality and his use of quantum mechanics. Overman argues that the capacity to distinguish between good and evil points to the existence of an absolute. Indeed, he asserts that, if God does not exist, "a serial killer and a benevolent charity are ultimately of equal value. (Actually there is no moral value if there is no God.)" (p. 89, parenthetical remarks in original). While this argument has an old and venerable history, Overman's use of it is so brief and conclusory that it raises more questions than it answers. It is certainly not obvious that the existence of moral value requires the existence of God, though Overman gives no argument at all for his assertion.

A similar problem arises with Overman's use of quantum mechanics. As this is not my area of expertise, I consulted physicists on Overman's particular interpretation of quantum mechanics. My sources told me that his interpretation is indeed possible; however, it is very controversial and is not accepted by most physicists. In any case, Overman's use of quantum mechanics, as well as his discussion of morality, seems to explain the controversial by invoking the more controversial. That does not make for a good explanatory argument.

I have noted two philosophically problematic areas in Overman's argument. To be sure, however, my criticism goes to particular components of his argument. On identifying affirmative evidence for which theism gives a cogent explanation, and conversely, on identifying the problem areas for alternative, nontheistic worldviews, he is spot on.

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DIVINE GRACE AND EMERGING CREATION: Wesleyan Forays in Science and Theology of Creation by Thomas J. Oord, ed. Eugene, OR: Pickwick Publications, 2009. 229 pages. Paperback; $27.00. ISBN: 9781606082874.

THE SPIRIT RENEWS THE FACE OF THE EARTH: Pentecostal Forays in Science and Theology of Creation by Amos Yong, ed. Eugene, OR: Pickwick Publications, 2009. 246 pages. Paperback; $30.00. ISBN: 9781606081969.

Nearly every paper in these twin volumes emerged from the joint meeting (2008) of the *Wesleyan Theological Society* and the *Society for Pentecostal Studies*. Themed "Sighs, Signs, and Significance: Pentecostal and Wesleyan Explorations of Science and Creation," the conference was held at Duke University and was co-chaired by the editors Thomas Oord and Amos Yong. Each volume is the first of its kind, and deserves to be evaluated individually for the degree to which it constructively contributes to the intellectual and spiritual enrichment of church, academy, and society. Yet in light of their common origin, it also makes sense to assess the books side-by-side. This review provides a summary and appraisal of the works, considered both separately and together.

We begin with the Oord volume. The ten papers are varied in aim and scope, treating at various points history, philosophy, ecology, hermeneutics, archeology, evolutionary theory, intelligent design, psychoanalytic theory, and neuroscience. In chapter 1, Randy L. Maddox states that the overarching goal of his own essay is to "increase our awareness of the range of options available" for relating theology and science (p. 16). This well-articulated objective may be translated into an overarching evaluative query for the entire volume: How exactly does a distinctively Wesleyan perspective "increase our awareness of the range of options available" for theology-and-science undertakings? We may point to two distinct "options" for theology-and-science engagement that the essays (taken on the whole) appear to signal.

The first option concerns the manner in which transdisciplinary ventures develop. Many of the authors highlight the fact that Wesley, in his own significant engagement with the natural philosophies of his day, stands apart from many eighteenth-century English Christian intellectuals in his espousal of a markedly nonincendiary tone and agenda. As Laura Bartels Felleman carefully shows, Wesley, in his *Survey of the Wisdom of God in Creation* (1763), intentionally distances himself from those Christian intellectuals who suffused their natural philosophies with rancorous apologetic language directed at atheists. A Wesleyan approach to science would appear

to tend toward rhetorical modesty and epistemic nuance, rather than polemical posturing and apologetically motivated antagonism toward non-Christians.

The second option concerns the underlying objectives and ultimate goals of transdisciplinary work. In their essay "Mystery and Humility in John Wesley's Narrative Ecology," Marc Otto and Michael Lodahl convincingly demonstrate that Wesley's overall goal in his *Survey* was more evocative than it was provocative; Wesley tried to invite readers to worship God, as they consider the littleness of human knowledge and the unfathomable excess of divine wisdom and providential care as seen in nature. A Wesleyan lens seems to raise the question of the potential liturgical value in theology-and-science endeavors.

Thus the book succeeds in beginning to limn the contours of a uniquely Wesleyan approach to contemporary theology-and-science dialogues. In addition to this overall accomplishment, several chapters deserve to be highlighted for the strength or uniqueness of their contribution. Jürgen Moltmann—though not coming from a specifically Wesleyan viewpoint—offers a tantalizing (if undeveloped) "hermeneutics of nature," in which nature's "inner meaning" is interpreted theologically in light of the fullness of God's arrived and arriving Kingdom. In chapter 8, ASA Fellow Rebecca J. Flietstra—professor of mammalian physiology at Point Loma Nazarene University—outlines the five basic components of Darwinian evolutionary theory and argues that all of them may be considered consonant with a Christian understanding of divine grace in creation. Finally, ASA member W. Christopher Stewart thematizes the goals of the intelligent design (ID) movement; implicitly questions the secular legitimacy of those goals by showing ways in which science and philosophy can relatively easily "give them [ID theorists] what they want" in accordance with those goals; and explicitly questions the theological legitimacy of said goals by showing ways in which they fail to resonate with core Wesleyan intuitions regarding the nature of faith and the transformation of society.

We turn next to the Yong volume. In the Introduction, Yong helpfully contextualizes the project by situating it within the undeveloped, yet steadily bourgeoning, world of Pentecostal scholarship. He makes clear that while the book's primary intended audience is Pentecostals seeking a "more integrated theological world- and life-view that includes the sciences," it is also hoped that the text may prove illuminative for scholars involved in broader religion-and-science conversations (xxii).

On the whole, the twelve essays in the book (which cover biblical, historical, theological, and contextual/applicational themes) succeed in compellingly addressing the primary audience, but have little to offer the secondary audience. As only a few of the essays engage science directly (and many not at all), Yong's summative comment that "the essays in this volume represent nascent efforts of Pentecostal scholars to come to grips with science, and much of this is grappled with at the level of theology of creation rather than at the level of science specifically" rings quite true, implying that the book is perhaps best used as a ground-clearing tool for future, more substantive, Pentecostal transdisciplinary forays.

In a number of the essays, this preparation consists of the message that if Pentecostal theology is to enter into serious dialogue with the sciences, it must first radically re-envision some of its most foundational theological categories. Eschatology, for example, stands out as a category especially in need of bold and creative re-imagining. Here we may point to Robby Waddell's essay that seeks to show that the current Pentecostal notion of heaven as the "wild blue yonder" is based largely on scriptural misunderstandings of John's Apocalypse and an outdated cosmology. On exegetical grounds, Waddell argues for a view of the new creation as relational, dynamic, and renewed, rather than obliterated at the eschaton. Additionally, in their similarly provocative and nuanced essays on Pentecostal theology and the environment, Shane Clifton and Matthew Tallman each critically question premillennial Pentecostal eschatological paradigms in which, at the end of the age, the saints are raptured and the earth is destroyed. For all three of these authors, a more faithful, transformative, and pneumatologically robust Pentecostal theology of creation necessitates an eschatological vision in which our hopeful anticipation of future renewed life is worked out through our *present* participation in the Spirit's transformative work. Such a re-imagined eschatology opens the way for a deeper engagement with the ecological sciences, and a more responsible "earthkeeping praxis" (Clifton).

The volume also points to the need to move beyond anthropocentric models of salvation and healing, in which the Spirit's transformative work is more or less limited to redeeming individual human souls and righting individual human bodies. In his essay "Created for Shalom," R. Jerome Boone concludes, "The transforming work of the Spirit enables people to return to the role of God's partner in the maintenance of well-being in the world. The task is to recover shalom for all things" (p. 29). For Shane Clifton—whose overall goal is to reinterpret Pentecostal symbols in light of environmental concerns—salvation means that Jesus is liberator and renewer of all humanity and creation; Spirit-baptism includes empowerment to participate "with the Spirit in breathing life to the earth" (p. 131); and the church's healing ministry is extended to encompass "healing of the sick and dying environment" (p. 131).

While some of the essays in the Yong volume help prepare the way for further transdisciplinary work in Pentecostal theology-and-science, others fail to do so because they lack clarity, logic, and/or relevance. Perhaps it goes without saying that a paper published in an edited volume in the humanities ought to have, minimally, (1) a clear, substantive, concisely-stated thesis; (2) a coherent argument that spells out the thesis; and (3) some attempt to relate the argument to the overall question that orients the collection. Disappointingly, a number of essays in the Yong volume do not meet these minimal standards; thus, the value of the work is diminished due to that poor quality of writing and argumentation.

Together, the Oord and Yong volumes represent a significant step forward on the part of conservative Protestants in their attempt to grapple theologically with the natural sciences. To date, much of the interaction between conservative-leaning Protestant Christians and the scientific establishment has been framed by rancorous creation-

versus-evolution debates. These volumes provide new conceptual and attitudinal frameworks for the dialogue by (1) opening up more hermeneutically nuanced and scientifically amenable readings of the Genesis creation accounts (in Oord's words, "The Bible tells us how to find abundant life, not the details of how life became abundant"); (2) presenting expanded views of creation's meaning (e.g., as ongoing); (3) offering some resourceful, imaginative, and practical options for reconciling Christian theologies of creation with Darwinian evolutionary theory.

On the downside, the volumes reflect the disproportionately male-dominated worlds of both theological scholarship and the natural sciences. There are only three female authors in the Oord volume, and in the Yong volume there are none. This imbalance perhaps contributes to some substantial scholarly negligence. For instance, while many essays in both volumes call for nondualistic and nonanthropocentric theological frameworks, there is barely any reference made to the vast body of feminist and ecofeminist theological literature, which, for approximately thirty years, has led the way in these two interrelated calls for doctrinal reform.

While the volumes are to be applauded for being unique and valuable contributions to Wesleyan and Pentecostal Christian thought and practice, they have limited usefulness beyond the bounds of those (or similarly minded) churches and seminaries. On the whole, the essays in the Oord volume intimate that theological engagement with science is for the purpose of strengthening Christian faith, and the essays in the Yong volume hew closely to Pentecostal theological concerns, barely touching science at all. If, as David Tracy argues, theologians have a responsibility to engage in authentically "public" discourse at the level of the broader society, then it is incumbent upon conservative Protestant theologians to find ways to break through in-group insularism without falling into out-group polemicism. Indeed, this remains a challenge not only for Oord, Yong, and their contributors, but for all Christian theologians seeking to interpret the implications of science for the Gospel and of the Gospel for science.

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DEEPEST DIFFERENCES: A Christian-Atheist Dialogue by James W. Sire and Carl Peraino. Downers Grove, IL: InterVarsity Press, 2009. 203 pages. Paperback; $15.00. ISBN: 9780830833580.

Deepest Differences: A Christian-Atheist Dialogue is a collected email dialogue on matters of faith and truth between a noted Christian thinker and an atheist scientist. And, sadly, the atheist eats the Christian for lunch.

This surprised me. The book is published by InterVarsity Press, a respected evangelical publisher. And one of the authors is ASA member Jim Sire, of *The Universe Next Door*, a comparative study on world views that helped frame the intellects of thousands of undergraduates in Christian universities over the past thirty years. So as I picked up this volume, I assumed that if Sire and InterVarsity have attached their names to this volume, then the debate between Sire and Carl Peraino would move the conversation forward in a positive direction. It does not.

And so much the pity, because such conversations are indeed needed at this time, with a resurgent atheism in the USA and with expressions of religious fervor worldwide increasingly identified with fundamentalist rhetoric and violence. There is opportunity in this climate to present a different kind of apologetic. The authors are obviously good men and deep thinkers, who have pondered these topics long and hard and who are obviously trying their best to engage in a meaningful, even courteous, dialogue. But the frustrations surface easily and quickly, as they talk past each other, as they make generalized assumptions about the other's positions, as they conclude early on that no one's mind will be changed, and then as they quit the dialogue in some exasperation over the futility of it all.

Both men seem tied to the epistemologies and biases of their generation; they are having roughly the same debate in 2009 that they would have had in 1979, had they encountered each other then. But the arguments from rationality used by believers in the modernist era, never terribly persuasive to begin with, have lost most of their sticking power. Conversely, the arguments advanced by Peraino for atheism are also rather dated (his favorite authority is Bertrand Russell), and probably persuasive only to those already inclined to be persuaded.

Sire's initial and primary argument concerns the basis for morality. He keeps revisiting this one throughout the exchange of letters and is frustrated that it is entirely without effect. In an afterword, he reveals,

> This is one of the great puzzles of our discourse. Why can't Carl see that explaining why we have moral notions is far from explaining what it means to have them? I say they need a foundation of something outside human opinion or human desire. He says no … The notion of a transcendent foundation for both morality and rationality is so central to the Christian faith that without the one, we can scarcely have the other. (P. 177)

Sire keeps making the argument that, without such transcendence, there is no ultimate moral foundation and that such subjectivism will eventually collapse into either a Nietzschean will to power (a Spenserian survival of the fittest) or an amoral horror. I happen to agree with him. But it is a difficult premise on which to base an argument for the existence of God.

There are at least two problems with this argument for a transcendent moral foundation for apologetics. First, it is interpreted by Peraino as an argument for the moral superiority of believers, which he finds offensive, as other atheist writers of this decade have been wont to do (see, particularly, Christopher Hitchens' *God is Not Great*) and is thus, in response, fairly ruthless in his indictment of Christians for sins past and present. A second reason that the argument does not work well is that the God who emerges from it functions primarily as a cosmic police officer. One does not encounter in such an argument the God of grace who freely and joyfully loves his creation,

who enters into that creation and becomes incarnate within it, who gives of himself at great cost for its eternal redemption.

From this discussion of morality and theodicy, the authors veer into what appears to be safer territory: intelligent design. Unfortunately, they are in over their heads on this debate, although both are familiar with the major names and some of the ideas. Sire, a theologian, finds himself in the unenviable position of trying to persuade a distinguished biochemist that the scientific community is, or should be, keeping the debate open. Peraino will have none of it, and is fairly dismissive of Behe, Dembski, and Johnson and what he regards as their pretensions to scientific authority.

In the final section of the book, Sire finally takes the offensive by making an epistemological argument: pure rationalism is not sufficient for understanding truth. Peraino responds that he is advocating for the scientific method, which he perceives as a neutral, free of values, faith, or preconceived notions of truth. Sire demonstrates pretty convincingly that such a neutral notion of the scientific method is no longer intellectually viable. This, Peraino refuses to see or acknowledge, as he is wedded to that old ideal of the value-neutral "fact" that exists as an entity on its own until appropriated by a value-free mind.

At the end, both agree to simply stop it. Peraino writes plaintively near the end, "Are you sure you want to continue these exchanges? I'm sure what I've said is as alien to you as what you've said is to me. When you talk about nonmaterial ways of understanding reality, we might as well be in different universes" (p. 171). The metaphor of "different universes" is ironic here, addressed as it is to the author of *The Universe Next Door*. Jim Sire, the expert on world views, is in dialogue with one "next door," and finds it incomprehensible. And the representative of that viewpoint finds him equally so. And so, sadly, those of us who care about such matters should best read another book.

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Religion & Biblical Studies

THE LOST WORLD OF GENESIS ONE: Ancient Cosmology and the Origins Debate by John H. Walton. Downers Grove, IL: IVP Academic, 2009. 192 pages. Paperback; $16.00. ISBN: 0830837043.

The writings of Josephus are ubiquitous on clergy bookshelves because a thorough understanding of the culture of New Testament times can enlighten our interpretation of Scripture. Cultural awareness is also crucial to hermeneutics for the creation narrative (Gen. 1:1–2:3) in the Old Testament. ASA members are likely to be familiar with the works of Paul Seely, Carol Hill, Dick Fischer, and others who have written on this topic and even recently presented papers at the annual ASA meeting at Baylor University; they have worked tirelessly to try to incorporate a cultural understanding of the times into interpreting the early chapters of Genesis. With his recent work, *The Lost World of Genesis One,* John H. Walton (professor of Old Testament at Wheaton College) adds his scholarly voice to this choir, bringing a fresh perspective that enlightens, enriches, and honors the biblical text.

This is actually Walton's second book on the topic. His first book, *Ancient Near Eastern Thought and the Old Testament* (Grand Rapids, MI: Baker Academic, 2006), is intended for a scholarly audience, packed with references, factoids, and tending to be a bit dry to read. This new book, while still well documented, should appeal to a wide audience with its approachable writing style and appealing format. *Lost World* is divided into eighteen short segments (propositions) that allow the reader to absorb, pause, and reflect on what Walton is presenting. Indeed, it will be paradigm shifting for many. The writing is solid, easy-going, and suitable for individual study or group discussion.

The first ten propositions describe what Walton refers to as the "cosmic temple inauguration view" of the Genesis One creation narrative. He begins with a short discussion of one of the most difficult of all translation issues: translating the culture. Simply put, ancient cultures viewed the world through eyes different from ours, eyes that perceived the whole world as a supernatural place where the relationship of the deities to people was of the utmost importance. Given such a view, the ancient peoples were less interested in material issues (how, when, and of what was it made) and more interested in how the world functioned in relationship to deity (questions of purpose and authority). Next, Walton rigorously examines each use of the Hebrew verb *bara'* (translated, "to create") in the Old Testament and concludes: "[N]o clear example occurs that demands a material perspective for the verb, though many are ambiguous. In contrast, a large percentage of the contexts require a functional understanding." His case is made stronger by further scholarship as he notes, "It has long been observed that in the contexts of *bara'* no materials for the creative act are ever mentioned, and an investigation of all the passages mentioned above substantiate that claim." Each day in the first creation narrative is then re-evaluated in light of a functional—rather than material—orientation. His discussion sheds considerable light upon the well-known parallel-triad literary structure of the first six days.[1]

The first portion of the book concludes with a discussion of the importance of day seven in the narrative. Throughout the Old Testament, the earth is repeatedly referred to as the Lord's temple. Again, cultural differences between our time and the ancient peoples obscure the deep meaning of the text. Walton tells us: "The difference is the piece of information that everyone knew in the ancient world and to which most modern readers are totally oblivious: Deity rests in a temple, and only in a temple. This is what the temples were built for." Ancient readers would not have perceived God to have suddenly gone into autopilot or to have taken a well-deserved respite at the conclusion of the first six days. Instead, they would have interpreted day seven as follows: "When the deity rests in the temple it means that he is taking command, that he is mounting to his throne to assume his

rightful place and his proper role." To put it in theatrical analogy: the stage is set and the drama can now unfold. Walton further concludes that the first creation narrative is, in fact, a text of inauguration because, to the ancient peoples, temples required an inauguration ceremony in order to become fully functional under the deity's direction; the Genesis text begins with a narrative celebrating God's indwelling of, and ongoing sovereignty over, creation.

The remaining propositions in the book explore the implications of a functional, rather than material, view of this creation narrative. The topics covered are varied; here are a few: taking a "literal" view of the narrative, theological implications, the freedom to let science explore material origins, intelligent design, and public science education. These topics are covered briefly and would spawn a great deal of discussion.

The book, in this reviewer's opinion, has two minor flaws. First, the topics in the second half of the book are covered very superficially; readers familiar with origins debate issues would certainly crave a deeper analysis of the implications of the cosmic temple inauguration view. It is, however, understandable—and forgivable—that there are space limitations, and an analysis that was too deep might turn away readers new to the origins debate. Second, while the author makes a very concise and lucid point about the difficulties of culture in translation, the author misses the mark slightly on explaining why historical/cultural scholarship is important in this area. Readers new to topics in the origins debate, and quite possibly skeptical of any new interpretation of the first creation narrative, need to be put at ease with the technique; an illustration or two from some noncontroversial passage of Scripture that has been illuminated by a proper historical/cultural understanding would have been helpful.

The book's strengths are many. The author makes his case for the cosmic temple inauguration view in a lucid and convincing way. His scholarship and depth of knowledge regarding the relevant archaeological data are obvious, yet he does not overwhelm the reader with so many details that the novice would get lost. There are numerous endnotes provided for those readers who want more. Groups choosing to study this book together will find helpful its organization by brief proposition. Also useful is the fact that the author included a brief summary for each proposition, and these summaries provide a transition into the next proposition, contributing to the transparency of the author's line of reasoning.

This reviewer tremendously enjoyed reading the book and found it thought provoking and paradigm shifting. Naturally, not all will embrace the book's thesis. Some on the one side, who may have embraced a view that this opening scriptural narrative is merely plagiarized fiction, may not fully appreciate the point. They should know that Walton has a very high view of Scripture and is unwilling to dismiss it as merely ancient storytelling; the narrative is significant, and we must not abandon attempts to deeply understand it. Those on the other side, who may seek to force the text into a set of historical events that occurred during six twenty-four-hour periods, may not readily accept the functional perspective presented. Again, Walton's high view of Scripture applies here; he desires to read the text literally, and a true literal reading of the text should be from a functional perspective—that is, after all, how the patriarchs and Israelites would have understood it. For those who wish to translate *yom* (day) as a long period of time, Walton points out that such an interpretation is inconsistent with good translation principles and is unnecessary.

As the author discusses in the latter half of the book, the thesis has tremendous potential to reshape much of the "science-religion" debate. He explains, "Though the Bible upholds the idea that God is *responsible* for all origins (functional, material or otherwise), if the Bible does not offer an *account* of material origins we are free to consider contemporary explanations of origins on their own merits, as long as God is seen as ultimately responsible." Neo-Darwinism and big bang cosmology may ultimately be replaced by better scientific theories, yet we need not reshape our understanding of Scripture to match the scientific theory *du jour*. Conversely, we need not shape our understanding of science around something that the Bible does not, in fact, specify.

I recommend the book to anyone interested in the origins question and look forward to seeing how these ideas shape origins discussions of the future.

Note

[1]Day one pairs with day four (light and lights), day two pairs with day five (heavens/waters and birds/fish), and day three pairs with day six (land and land animals).

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Religion & Science

BUDDHISM AND SCIENCE: A Guide for the Perplexed by Donald S. Lopez. Chicago, IL: University of Chicago Press, 2008. 264 + xiii pages, notes, index. Hardcover; $25.00. ISBN: 9780226493121.

Popular myths often persist because we ignore the complexities of history. One such myth that has persisted for the past 150 years is the idea that Buddhism and modern science are, without question, fundamentally compatible. In *Buddhism and Science*, Donald Lopez, distinguished professor of Buddhist and Tibetan studies, explores the legitimacy of this view. Lopez rightly points out that the claim for compatibility rests on one of two assumptions. Either Buddhism lacks an essence, in which case it can be interpreted in any way that it might need to be in order to be compatible with science, or Buddhism is very narrowly defined, in which case the narrowly defined version of Buddhism can be shown to be compatible with science.

Against the latter claim, Lopez demonstrates that the historic evolution of Buddhism itself is far too complex to warrant an overly narrow understanding of Buddhism itself. Thus, claims for the compatibility of modern science with say, Zen Buddhism (principally a Japanese tradition), overlook the rich traditions of Buddhism in India, China, Sri Lanka, or Tibet. Taking one strand of the tradition to be

representative of the whole is, for Lopez, unstable ground for drawing decisive conclusions about the compatibility of Buddhism and modern science. At the same time, Lopez recognizes that Buddhism is not infinitely malleable. Thus, while it is unacceptable to understand Buddhism in an overly narrow way, it is equally unacceptable to understand Buddhism in whatever way one wishes. The anti-essentialist view runs "the risk of allowing Buddhism to be everything and nothing." Says Lopez, "It is neither" (p. 216).

In unpacking these claims, Lopez spends the bulk of his book writing about the rich and complex history of Buddhism—focusing on key encounters between Buddhism and science. The result is that this book is primarily about the history of Buddhism, with a tip of the hat to a smattering of important scientific ideas. Still, the book is a fascinating study in the complexities of the relationship between religion and science generally, and of Buddhism's ongoing efforts to come to terms with the deliverance of modern science in particular.

Lopez traces this complex history over the past 150 years by focusing on five pivotal historical moments in the encounter between Buddhism and modern science. First, in chapter one, Lopez explores the compatibility of Buddhist cosmology and geography with modern science through the lens of a debate about the existence of Mount Meru—a centerpiece of Buddhist cosmology. The public debate between a Buddhist monk and a Sinhalese convert to Christianity took place in Sri Lanka in 1873. While the debate was thought to be a victory for Buddhism, Lopez explores how the ensuing history is marked by increasing ambiguity—with some Buddhist strands viewing the actual existence of Mount Meru as inessential to Buddhism itself. Second, chapter two treats the historical interaction between Buddhism and the "science of race." Third, in chapter three, Lopez focuses narrowly on the work of two Tibetan Buddhist monks: Gendun Chopel and the Dalai Lama. In painstaking detail, Lopez analyzes the writings of both to bring out the manner in which the largely isolated Tibetan Buddhists grappled with their encounter with the modern world. Finally, after a chapter on the western, historical study of Buddhism itself (chapter four), Lopez rounds out his study with a brief chapter (five) on recent neurophysiological studies of Buddhist meditation. Given the volume of attention that the latter has received in recent years, this chapter is regrettably brief—focusing largely on the practice of meditation from the Buddhist perspective.

As a work of historical scholarship, Lopez's book is remarkable. It is dense and detailed. And for a reader who is not acquainted with the intricacies of Buddhism, the details are often excruciatingly complex. In that respect, this book may serve more to induce perplexity than to guide one through it. However, for those with an interest in the relationship between religion and science, or for those who wish to dispel the popular myth that all things scientific have been anticipated by the Buddha, Lopez's *Buddhism and Science* is a welcome resource.

Reviewed by Justin D. Barnard, Associate Professor of Philosophy, Union University, Jackson, TN 38305.

GLOBAL PERSPECTIVES ON SCIENCE AND SPIRITUALITY by Pranab Das, ed. West Conshohocken, PA: Templeton Press, 2009. 224 pages, index. Paperback; $29.95. ISBN: 9781599473390.

In an era of globalization, it is increasingly important that we listen to one another. This is the spirit of the Global Perspectives on Science and Spirituality (GPSS) Program, of which the editor of this book is the leader. In recent years he has worked with scholars from around the world to bring their insights on issues relating to science and spirituality to a Western audience. This book contains twelve of the award-winning essays selected from among 150 applicants from over twenty countries.

This book is extremely broad. Authors from Poland, Russia, America, Hungary, China, Korea, Germany, Czech Republic, India, Japan and Slovakia contribute chapters. Chapters are presented from the positions of Christianity, Daoism, Buddhism, psychology, Indian spirituality, process philosophy, and mathematics. The editor has succeeded in bringing a variety of voices to the Western reader, but I am not sure how many readers are conversant or interested enough in this breadth of ideologies and cultural perspectives to remain interested throughout. Each chapter is quite demanding in its complexity.

The book is unique in bringing together scholars from many countries and persuasions. This open approach is a challenge to many Christians who are often guarded in what resources they will draw on in formulating their position. It made me ask to what extent ASA writings might more creatively explore new territory while holding to fundamental truths. I leave it to other readers to decide if the premise of the GPSS is an avenue of new thinking for us evangelical Christians, or not.

The essays in this book lack a unifying position. Most books I have read on science and faith have defended an authentic Christian approach to the issues. This book is open, and advances no particular religion. That is both a strength and a weakness. The strength is that it expands the limits of what can be considered. Furthermore, the breadth of religious perspectives presented reminds us of the complexity of the issues from a global perspective. The weakness is that the book lacks a foundation or guiding approach. After completing the book I was still unclear what the editor hopes to accomplish. I am accustomed to using accepted methods of Scriptural exegesis in doing theology and the scientific method in doing science, and then seeking for positions acceptable to both disciplines as I consider issues of science and faith. The essays in this book rely on such a disparate set of epistemological methods that it is hard to read them critically.

Even though many countries and ideologies are represented, the book is not contextual enough. In these essays, the scholars spend more time wrestling with Western paradigms and their cultural or religious reaction to them than clearly presenting an indigenous position on science and faith. For example, they wrestle with the positions of scholars like Foucault, Barbour, and Freud. Most of the references are to Western authors and in English. This compromises the book's true globalism. It also feels as if these authors are academics and not sincere adherents of the positions they are presenting. It reminded me

what a treasure the ASA is with excellent scholars and sincere adherents.

The chapters are short and challenging enough to open up interesting discussion in a graduate-level course on science and faith. The book might also alert readers to present but less publicized questions for science and faith research.

Reviewed by Mark A. Strand, China Director, Shanxi Evergreen Service, Shanxi Province, China.

Science Education

SCIENCE AND CHRISTIAN EDUCATORS VIDEO SERIES by Gordon J. Glover. Series may be accessed via the *Beyond the Firmament* website (www.blog.beyondthefirmament.com/video-presentations/science-and-christian-education/) or youtube (www.youtube.com/glovergj).

Educators who teach in a Christian setting often find themselves in a dilemma when tackling the integration of modern science and the biblical text. On the one side, there is the mounting scientific evidence for an ancient biosphere characterized by common ancestry, and on the other, there is the proposition that if the big bang and evolution are right, then the Bible is wrong—about everything. Into this milieu steps Gordon Glover, who presents a clarifying perspective on the historical, philosophical, and scientific underpinnings of the current controversies between science and theology. In his sixteen-part video series, *Science and Christian Education,* he promotes a harmonious position that respects both the authority of Scripture and the integrity of the scientific method.

The impetus behind the series began when Glover, the author of *Beyond the Firmament* (reviewed in *PSCF*, December 2008), was approached by some of the educators at the private Christian school where his children attended, with questions about how to teach the natural sciences in the context of Christian worldview education. Realizing the lack of suitable resources, he independently produced this series of ten-minute videos that are accessed via the Internet. Although the series is not particularly academic or scholarly, the tone is both instructive and engaging, and the technical aspects, including effective visual illustrations, are well done. The prospective viewers extend far beyond the intended audience of Christian educators to include high school and college students, pastors, laypersons, or anyone who recognizes that "all truth is God's truth" and is seeking to integrate the discoveries of scientific investigations with the tenets of Christian orthodoxy.

The first four lessons provide the philosophical foundations that are crucial, yet often lacking, in science and faith discussions. In the first lesson, entitled *Through a Glass Dar*kly, Glover deftly explains how the core of the perceived conflict between science and theology is the hermeneutical and epistemological limit of humankind's understanding. In lesson two, he delves into a description of the defining qualities of legitimate science versus pseudoscience and distinguishes between methodological naturalism and philosophical materialism. Through his discussion of ultimate and proximate causality in lesson three, Glover explains how the Bible's timeless theological truths are maintained even as modern science continually updates the technical details of our scientific understanding. He challenges viewers to let go of the false notion that the findings of science diminish God, and to embrace scientific discovery as a means to increase their understanding of how God operates in the natural world. In his fourth lesson, Glover defines and provides examples of "folk science" and then admonishes the writers of current Christian science curricula for their abandonment of good scientific methodological instruction. His use of creation science and flood geology models as examples of this neglect is particularly thought provoking.

In lessons five through eight, Glover shifts his focus to the physical sciences, including cosmology, astronomy, physics, and geology. He contends that those who accept young earth creationism but reject geocentrism are actually rejecting the model with the stronger biblical case. He also questions the usefulness of the young-earth paradigm in evaluating astronomical and geological data, and addresses the inadequacy of the current flood geology model to either explain the record of fossil succession or to produce useful scientific data. Some viewers may find his strong criticism of the young-earth paradigm in these lessons to be disconcerting. In the ninth lesson, Glover addresses the fallacies of the appearance-of-age argument that continues to circulate as an alternative interpretive paradigm amongst some Christian believers.

In lessons ten through twelve, the life sciences are highlighted with an emphasis on universal common descent and biological systematics. Although his discussions of modern-day classification schemes and molecular genetics may confound some viewers, most should be able to grasp the strength of the converging lines of evidence that support the theory of common ancestry as the only valid paradigm for understanding the life sciences. He also issues a challenge to those who promote anti-evolution agendas to evaluate their motivation for doing so.

In lessons thirteen and fourteen, Glover categorizes the intelligent design movement as a modern version of folk science. Using pseudogenes and natural weather systems as examples, he acknowledges the truth of intelligent design in a theological sense, but asserts that the design inference is incapable of answering scientific questions, and actually runs the risk of prematurely halting scientific investigation. Using a courtroom as his visual backdrop, Glover puts forth the contentious proposal that intelligent design is not a philosophy of discovery, but is rather a philosophy of ignorance that fails in helping students understand the facts of nature.

In lessons fifteen and sixteen, the emphasis of the series shifts to the nature and scope of biblical authority, the real crux of the faith and science dilemma for many Christian believers. Glover challenges all creationist camps to step outside their own paradigms and to honestly approach Genesis from its original cultural context. He summarizes the ancient Near Eastern origin of the Genesis creation accounts and describes the pitfalls of concordism. In his discussion of the principle of accommodation, Glover

explains how both the authority of Scripture and the integrity of the scientific method can be maintained.

> With accommodation, we simply accept that God never intended to reveal scientific truths in the Bible that transcend culture, but rather kept all revealed scientific knowledge within the context of cultural beliefs. Therefore, we shouldn't expect God to fill the Bible with scientifically relevant trivia so that every generation of man, regardless of his scientific progress, can perform some objective test that confirms the truth of Scripture. Instead, we believe that God naturally accommodates his revelation to the scientific worldview of the original audience.

As a biology professor teaching at a Christian university, I am often struck by how difficult it is to present current scientific models and theories while upholding biblical authority in a manner that is credible and does justice to both. I have successfully used these video lessons in my undergraduate biology courses to broaden my students' perspectives on both the nature of science and the various interpretations of the history of life as revealed through God's creation. Although some of the ideas and interpretations presented are controversial among Christian believers, I commend this series as a venue for those who are seeking to construct a framework for integrating modern science with a Christian worldview.

The series is available for download at www.beyondthefirmament.com/videos/Education/

To purchase DVDs of the series, contact Gordon Glover at contact@beyondthefirmament.com.

Reviewed by Jane Beers, Assistant Professor of Biology, John Brown University, Siloam Springs, AR 72761. ◈

Letters

Book Review Response Letter

I appreciated Rolf Bouma's willingness to review my book, *Dominion Over Wildlife? An Environmental-Theology of Human-Wildlife Relations* (Eugene, OR: Wipf and Stock, 2009) published in the March 2010 issue of *Perspectives on Science and Christian Faith* (p. 62). Reviews constitute a gift of time and as such are to be treated with respect.

By the same token, reviewers have a responsibility to be sure their comments are accurate and in accordance with the goals of the book under review. Unfortunately, some of Bouma's statements failed to inform readers of the contours of my argument as well as the volume of evidence presented in support of my view on human-wildlife relations. I will highlight a few examples. First, he insinuated that I was unfair by calling my description of the Christian animal rights position, a "caricature." That is quite a claim, given that I engaged the Christian animal rights activists' evidentiary appeal to three separate intellectual domains, namely, Scripture, ethics, and science. In which section(s) did I mischaracterize their view? Unfortunately, Bouma did not say, nor did he provide one specific instance. Second, his assertion that I failed to appreciate Linzey's "the greater serves the lesser" argument completely missed the point of my findings (which involved a detailed analysis of his interpretation of Scripture), namely, that Scripture provides no support for such a position. In fact, I go to great lengths to show that Christ, the perfect example of what it means to be a godly and obedient human, never served animals in a manner Linzey suggests. Third, Bouma's final paragraph leaves the reader with the impression that my Shepherdist position does not countenance limits on the human use of animals (despite my previous statements affirming my support for the protection of species). Such is clearly not the case as anyone who reads the final chapter would understand (cf. p. 172). I contend that Christians are obligated to treat animals in a way appropriate to their owner, namely, Christ. Ultimately, Bouma's suggestion that I engage the thought of Rolston's theocentric view failed to consider that if my exegesis, ethical reasoning, and use of scientific evidence was correct, then obedience to God's will as revealed in Scripture and nature is about as theocentric a view as any Christian could hope to obtain.

Regrettably, Bouma seems to have been caught up in reacting to theological labels rather than in assessing my treatment of the biblical evidence, the only infallible source for Christian doctrine. Maybe that is why he considered my book more of an apologia rather than a theology. Apparently, he skipped chapter 1 (p. 14f), in which I explained why the book focused on the consumptive uses of wildlife: (a) it avoids anachronisms and speculation because the Bible speaks of these activities; and (b) if humanity's consumptive use of wildlife violates God's perfect will, as the Christian animal rights activists claim, then a whole host of human uses of animals are in danger of being immoral as well. To my knowledge, very few environmental theologies provide such a sustained review of the morality of a concrete, real-world practice (namely, hunting, trapping, and fishing) followed by suggestions on how Scripture's answer to consumptive use of wildlife may provide guidance on how humans should utilize the environment. Bouma certainly has a right to disagree with my evaluation of Scripture, ethics, and science (he offered no comment concerning the third); I just wish he had taken the time to provide some concrete examples of where he saw error.

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Humans: The Mean between Science and God

Mary L. VandenBerg, in "What General Revelation Does (and Does Not) Tell Us" (*PSCF* 62, no. 1 [2010]: 22), wrote,

> The first issue mentioned was how much concordance there is between what the Bible and science tell us about the nature and operations of the physical world. The second issue, and the focus of this article, was how much concordance there might be between what the Bible and science tell us about God.

VandenBerg indicates that science is the study of the physical aspect of nature; consequently, its subject matter is data that can be collected, in principle, with the aid of purely physical devices. Schrödinger discovered for himself that Democritus of Abdera already understood this state of affairs in the fifth century BC, prior to the advent of the sophisticated instrumentations of today.[1] Experimental data is subsequently generalized into laws of nature. Additionally, theoretical models are constructed that lead logically to such laws and make predictions that can be experimentally tested.

Schrödinger also indicates that we construct the real world around us out of our "sensations, perceptions, and memories."[2] In fact, once the "data" have been obtained, one is dealing with logical mental constructs that are assumed to be related in a faithful manner to that which is real. However, knowledge is to be contrasted to information, which is purely physical.[3] For instance, neuroscientists can detect brain waves via purely physical devices. However, that physical information cannot decipher the knowledge-content underlying nonphysical human thought, which can be understood and communicated only by other conscious beings.

Humans are physical/nonphysical/supernatural beings. This is quite consistent with the Christian notion of humans as body/mind/spirit (Matt. 6:22; Rom. 12:2; 1 Cor. 2:11). Therefore, the study of humans that goes beyond the physical aspect and ventures into the nonphysical/supernatural is tricky, owing to the difficulty of obtaining unambiguous and consistent data. Note that in the biological, psychological, sociological, and economic sciences, one is relying more and more on a quantifiable description of humans; this is tantamount to emphasizing the physical over the more important aspects of humans. The Bible deals with humans in historical contexts, which are not amenable to generalizations into scientific laws. In fact, the importances of the Bible are the truths it provides of the nonphysical/supernatural aspects of humans.

On the second issue, knowledge of the physical aspect of nature tells us nothing of God. Schrödinger considers the following scientific metaphysics:

> (a) the assumption that the course of natural events can be understood (hypothesis of comprehensibility) and (b) exclusion of or dispensing with the cognizing subject (from the understandable world-picture aspired to), who step back into the role of an external observer (objectivation).[4]

This scientific worldview is compatible with the metaphysics implied by theology. The metaphysics underlying science does not regulate all means of knowing and, so there can be no conflict between science and theology. Therefore, one must emphasize, when considering the first issue, that the subject matter of science and the argument of the Bible overlap only in the physical aspect of nature, since nature itself is a physical/nonphysical/supernatural entity owing to the existence of humans. Gould's "nonoverlapping magisteria," namely, science and religion, can be understood only in this sense.[5] In addition, the Bible deals with ontological, rather than experimental issues.

The question of existence is biblically understood in terms of a Creator that continuously upholds his creation (Gen. 1:1; Heb. 1:3). Humans, created in the image of God, use their creative power to observe, reason, and attempt to understand the whole of reality. The ancient Greek aphorism, "know thyself," is best approached by biblical truths of revelation, not by scientific knowledge. In fact, it is knowledge of Jesus the Christ that reveals who humans truly are, and that revelas his redemptive power over sin, which science can never even address.

Notes

[1]Erwin Schrödinger, *What is Life?* with *Mind and Matter* and *Autobiographical Sketches* (Cambridge: Cambridge University Press, 1992), 163.
[2]Ibid., 118.
[3]Rolf Landauer, *Physics Today* 44, no. 5 (1991): 23–9.
[4]Erwin Schrödinger, *What is Life? and Other Scientific Essays* (New York: Doubleday and Company, 1956), 182.
[5]Stephen Jay Gould, "Nonoverlapping Magisteria," *Natural History* 106 (March 1997): 16–22. www.stephenjaygould.org/library/gould_noma.html

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More on the Two Books Approach

Mary VandenBerg's article, "What General Revelation Does [and Does Not] Tell Us," (*PSCF* 62, no.1 [2010]: 16–24) is in my opinion another attempt to discredit the "Two Book" interpretation of Scripture. For many years, I have been interested in the discoveries of science and how it all relates to biblical knowledge. In this quest, I have read many books on this subject, and attended lectures such as "The Epic of Creation" series, sponsored by the Zygon Center. All of these were interesting and informative, however, it always seemed that something was missing. Finally, Hugh Ross, founder of Reasons to Believe, began his concordant approach (*PSCF* 59, no. 1 [2007]: 46–50). This study relies on testable scientific detail from the biblical creation texts and the book of nature. The Bible is clear on the fact that God's word includes both the words of the Bible and his words written in the heavens and the earth. For example, Ps. 19:1–4 tells us "the heavens declare the glory of God"; Ps. 85:11, "truth springs from earth and rightness looks down from heaven"; and Rom. 1:20, "For since the creation of the world his invisible attributes—his eternal power and divine nature—have been clearly seen, being understood through what has been made, so that they are without excuse." Such studies are never complete because new discoveries in science continue. However, in my opinion, the two-book approach is very powerful in convincing unbelievers, especially scientists, in the saving knowledge, of our Creator Jesus Christ.

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A closely affiliated organization, the Canadian Scientific and Christian Affiliation, was formed in 1973 with a distinctively Canadian orientation. The CSCA and the ASA share publications (*Perspectives on Science and Christian Faith* and the *ASA/CSCA Newsletter*). The CSCA subscribes to the same statement of faith as the ASA, and has the same general structure; however, it has its own governing body with a separate annual meeting in Canada. Contact CSCA by writing to: Canadian Scientific and Christian Affiliation, PO Box 63082, University Plaza, Dundas, ON L9H 4H0 or visit their website at www.csca.ca

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