

# What Science Tells Us about the Age of the Creation

Kurt P. Wise

**Kurt P. Wise** is Professor of Science and Theology and Director of the Center for Theology and Science at The Southern Baptist Theological Seminary. He earned a Ph.D. in paleontology from Harvard University and previously served as Assistant Professor of Science and Director of the Center for Origins Research at Bryan College in Dayton, Tennessee. Dr. Wise is the author of *Faith, Form, and Time: What the Bible Teaches and Science Confirms About Creation and the Age of the Universe* (Broadman & Holman, 2002).

## Methods of Modern Science

Science is one of those human activities that is usually easy enough to identify, but very difficult to actually define.<sup>1</sup> In its most basic form, however, science seeks to understand the physical world—i.e., the object of science’s attention is the physical creation. Towards that end, the standard of truth is the physical world itself. The veracity of any theory of understanding is measured by how well the theory corresponds to the data (the observed characteristics) of the physical creation.<sup>2</sup>

The actual methods employed by scientists to develop or evaluate the theories are diverse and have varied substantially over the centuries.<sup>3</sup> Some methods were rejected by most scientists at their inception, others became popular before falling out of favor, and still others have persisted. In the study of the past, what is currently most popular is to study the *modern* world and apply to the past what has been learned about the modern world. It has proven to be very successful to assume that the regularities (i.e., natural laws) and the physical processes of the world do not change across all of space and across all of time. The assumption that the world operates in a consistent, unchanging manner is called “methodological uniformitarianism.”<sup>4</sup> Another related methodological rule that, because of its success, is currently popular in studies of history, is to appeal to *known* processes rather than unfamiliar process. This methodology is called “actualism.”

To believers, methodological uniformitarianism and actualism are appealing because they are each consistent with the physical creation being sustained by an unchanging God.

Applying these simple methods of science to the study of the creation, however, poses difficulties. Among these difficulties is the problem of created history.

## The Problem of Created History

When children are told the story of the creation they are often told that God spoke the word and suddenly, whatever God spoke simply appeared. What was not there one moment was there the next. Let us suppose for a moment that creation *did* occur in just this simple fashion. At some point on Day 3 of the Creation Week (and not true one moment before), rivers would be cascading over boulders and meandering among sand bars and about the roots of water plants, and the wind would be rustling the leaves of trees, and fruits would be dangling ripe from tree branches. At some moment on Day 4 (but not one moment before) the sky would be dappled with the lights of thousands of stars. At some moment on Day 5 (unlike the previous moment), fish would be swimming in the sea and birds flying in the sky. The next day butterflies would suddenly appear fluttering over flowers in full bloom, and so it goes.

Let us say that a mere moment after one of these creations we (unnaturally, of course) introduced a modern scientist into

the scene and let him do what he normally does. But, let us say that although he uses methods current to modern science, he is not made privy to the fact that the creation had occurred just a moment before. What would such a scientist deduce? The scientist would begin by collecting data about the physical world before him. Then, having deduced the nature and behavior of the creation before him, the scientist would apply the principles of uniformitarianism and actualism to infer what had happened before the scientist began observing—i.e., before the creation itself. The cascading river water and rustling wind, for example, would be traced back along a course to pre-creation positions farther and farther upstream and upwind. Likewise, the fruits and leaves of trees would be traced back to earlier times—again before both the scientist’s first observation and their actual creation. Starlight would be traced back light seconds, light minutes, and light hours, days, and years to distant pre-observation and pre-creation positions in the universe. Fish and birds and butterflies would be traced back along hypothetical flight paths pre-dating observation and creation.

Further studies by the scientist would lead to the discovery of natural processes of development, which would, in turn, allow for the inference of even more pre-creation history. The careful observer of river water might discover that that water is sourced in precipitation, which in turn arises from condensation from water vapor in the sky, sourced in turn from the evaporation of ocean water many miles distant. From these discoveries, just-created cascading river water would be traced back to precipitation, clouds, water vapor, and ocean water in ever more distant pre-creation times

and places. The study of wind might lead to the discovery of great trends in air motion from higher pressure zones to lower pressure zones and thus long-scale inferences about pre-creation winds. The study of plant growth and development would lead to inferences of pre-creation ripening of fruit from pollinated flowers and the development of both flowers and leaves from buds on limbs and successive tree structures ultimately from seeds. The study of light might lead to theories of starlight arising from fusion in the center of stars, millions of years before the creation. The study of animals would lead to pre-creation inferences of fish and birds maturing from their respective eggs and butterflies progressively backwards from cocoons, caterpillars, and even eggs before that.

Even further studies would lead to the discovery of natural cyclical processes. River water would be discovered to be part of a cyclical process of water evaporating, condensing, precipitating, and collecting—only to return again to repeat the process over and over again. The study of great trends in wind would lead to the discovery of giant convection cells of surface air warming by the sun’s heat and rising, then cooling and sinking, and warming again in an ever-repeating cycle. Plants and animals would be seen to be birthing, developing, maturing, and producing young that, in turn, would go through the same process over and over again. Stars might even be discovered to be formed from gas clouds and generate light until they self-destruct to produce gas clouds that start the process over again. Being cyclical, these processes allow for the continued maintenance of the creation and they are quite consistent with an unchanging Creator and

Sustainer. But being cyclical, they also provide no hint of where they actually began or where they might ultimately terminate. In fact, if they were created to sustain an everlasting creation<sup>5</sup> there would be no termination point. Just as James Hutton famously concluded about the soil and rock cycle, there would be “no vestige of a beginning and no prospect of an end.”<sup>6</sup> Our scientist in that situation would infer a fully functioning creation reaching countless millions and billions of years—and more—back into pre-creation times. Our scientist would infer both *deep time* and *deep history*<sup>7</sup>—neither of which were actually true.

If God did speak a creation into being which was fully functional and provided with provisionary cycles it would not only appear to be very old (already showing evidence of deep time which had never elapsed), but it would also appear to record a long series of historical events (i.e., already showing evidence of deep history that had never occurred). In similar fashion, the same Creator, when He created wine from water in the midst of the Cana marriage feast, formed wine looking older than it really was (the emcee of the feast inferred that it had been there for at least the full duration of the feast) and, presumably, with apparent history that never occurred (bottling following pressing, following harvesting of grapes, following the development of grapes from flowers, following pruning, following years of grape vine growth, etc.). A modern scientist following such a creative event would entirely miss the creation event, and, in fact, infer that “all things continue as they were from the beginning of the creation” because, in fact, that is exactly what modern scientists assume. Add a bit of misplaced certainty, and one

has a scoffer who concludes that *because* there was no creation, there was also no judgment to come.<sup>8</sup> In short, the modern scientist—either in the present or even in the garden soon after the Creation—*cannot* infer the truth about the creation. In fact, the methods of modern science might be totally blind to the creation because of the problem of created history.

### **The Catastrophic Failure of Modern Science**

Modern science cannot infer *how* the creation occurred because God utilized processes in creation that we do not observe in the present. Since God claims to have *ended* all the works of the Creation on the seventh day,<sup>9</sup> science would fail to deduce the mode, the tempo, and the order of creation. In general, modern science will fail to infer the correct process when that process is unobserved by humans in the present. Because of this, modern science will certainly err in its study of such things as the conception and resurrection of Christ—because we do not observe fatherless human conception or humans rising from the dead. In fact, since miracles and wonders are, by definition, outside normal human experience, at least the vast majority of the miracles and wonders—and possibly all of them—cannot be understood by modern science. Science is not the right method to study miracles.

But we have already seen that science’s failure is even more substantial than that. Science not only fails properly to understand the *process* of creation, it is also blind to the fact or event of creation itself. The scientist infers an unbroken history *through* the creation event, as if it had never occurred. This is not only because the process of creation is outside the experience

of a scientist, it is also because God wove into the creation various processes that were intended to maintain the creation indefinitely into the future. These cyclical processes effectively make the creation event invisible to the eyes of science. In general, if provisional cycles were either instituted (such as in the creation) or re-instituted after a cycle-breaking event, many aspects of the event itself would be invisible to scientists using assumptions of uniformitarianism and actualism. The more localized the event, the more invisible the event will be. The more the history of the universe was designed to continue seamlessly through a given event, the less one would expect science to notice the event at all. Thus, not only would modern science fail to understand the nature of the conception or resurrection of Christ, it would—like most of the world at the time—not even infer that either event had ever happened at all. The same can be said for a vast percentage of the miracles and wonders recorded in Scripture. In fact, even though many of them were global, most of the events of Genesis 1-11 are invisible to science.

For example, consider first the world before the Fall of man. Certain elements of the Genesis account such as the tree of life and a talking serpent are clearly outside of modern experience and would never be deduced from modern science. Neither the identity of the tempter, nor the cause of man's Fall nor the nature of the curse could be inferred from science. But that is only the beginning. Before the Enlightenment,<sup>10</sup> the church believed the pre-Fall world was not only without carnivory<sup>11</sup> but, in fact, lacked animal death altogether.<sup>12</sup> It was a world that not only could have persisted forever, but it was without thorns and thistles<sup>13</sup>

and a world without suffering.<sup>14</sup> Such a world is so unfamiliar (and unthinkable) to us today, that modern science cannot (and would not) infer anything like this as part of earth history. And, since God intended the cursed creation to persist through time—at least until the final judgment—after the curse he established (and/or re-established) cyclical processes for the preservation of the creation in this fallen state. The scientist projects modern cycles of provision through the curse in the same way he projects those same cycles through the creation. In both cases he presumes the existence of the *present* world and its processes when they did not exist—in one case (pre-Creation) when there was no world at all, and in the other case (pre-Fall, post-Creation) when the world existed, but in an uncursed state with processes of preservation designed to preserve that world forever. If the cursed world did change as radically as the Scripture suggests, the modern scientist not only fails to understand what happened in the Fall, but fails to deduce that it ever happened at all. He not only fails to recognize specific elements of the world between the Creation and the Fall, he in fact fails to recognize that that world ever existed at all.

The antediluvian world poses similar difficulties. First, modern science would be blind to specific elements such as cherubims yielding swords, humans living in excess of 900 years or generating young at 500 years of age or walking directly into the presence of God rather than dying. Science would not be able to infer the nature of the antediluvian world, the structure of the human genealogical tree, or the provision through this time of seed and sacrifice. But then there is also the fact that God promised to never again

repeat the flood.<sup>15</sup> Neither the reason for the flood, nor the nature of the Flood, nor the means of salvation through the flood would be inferable. But God also promised to never again interrupt the day/night and seasonal cycles.<sup>16</sup> This indicates that not only did the flood involve processes outside of human experience, but the flood somehow interrupted the normal provisional cycles. Not only, then, would science be unable to infer the nature of the flood—and in fact potentially miss its place in earth history altogether—but err also in the projection of provisional cycles of the *present* back through the flood into the antediluvian world. The Bible alludes to unfamiliar geography before the flood. Eden's location on the modern earth is elusive because of the absence of Eden itself, the curiously unfamiliar nature of Eden's rivers (one great river dividing into four<sup>17</sup>), and the mismatch between the biblical description of Eden's surroundings and the geography of the modern world.<sup>18</sup> But there are hints of an even greater difference in the global distribution of fountains of water<sup>19</sup> and antediluvian oceans and continents.<sup>20</sup> Combined with the possibility of a different climate,<sup>21</sup> different geology,<sup>22</sup> and different biology,<sup>23</sup> it may be that the pre-flood world had different provisional cycles than were established after the flood's interruption of such cycles. If so, modern science would—just as in the case of the Creation and the Fall—not only fail to understand or even recognize the flood, but also incorrectly deduce the nature of the world before it. With just a little bit of hubris the modern scientist could easily say that “all things continue as they were from the beginning of the creation”<sup>24</sup> and be ignorant, as the Bible says, not just of the creation, but also of the flood.

And, if the patriarchs between Noah and Abraham lived as long as the Bible indicates, and the confusion of tongues was as abrupt as the narrative suggests, modern science would also fail to deduce the Babel event and the correct nature of human history between the flood and Babel. In short, if the events of Genesis 1-11 are correct as presented in Scripture, modern science would not be able to infer *any* of them on its own. Without Scriptural revelation modern science would catastrophically fail to deduce anything like an accurate earth history before the time of Abraham. If the reading of the Bible that is popularized in children's bible stories is true, science would be unable to infer a single truth about earth history before Abraham as it is given in Scripture. Its success rate would be zero percent!

And it is not just modern science that would so fail. If methodological uniformitarianism and actualism were applied by people living in any segment of earth history, there would be catastrophic failure in deducing the remainder of earth history. Adam using this methodology before the Fall would not have seen the Creation, and he would not have predicted anything like the curse would ever occur. He would also have projected pre-Fall conditions into both pre-creation and post-curse times. Likewise, antediluvians would be blind to the Creation and the curse, and would have been able to predict neither the flood nor the world following. Thus judgments such as the curse, the flood, and the judgment still to come are unpredictable to the people living before them. Without divine revelation, divine judgment comes upon everyone unawares.

Beginning with Genesis 12, the biblical narrative focuses on particular human lineages and leaves behind global earth

history—not picking up global history again until the last book of the Bible. Science fails in this vast intermediate section of Scripture as well, but since the Scriptural account is more localized and focusing more on human history than on the history of the physical world, science can cover up its failure by claiming that the Bible is addressing different issues from modern science. But the failure of science is just as catastrophic. The God of Scripture is an intervening God. He consistently and constantly operates in a fashion different from the “natural” course of the creation. Humans do not by nature seek God (John 15:16; Eph 1:4; 2 Thess 2:13); God draws us to Him. Humans cannot by nature save themselves (Matt 19:25-26; Mark 10:26-27; Luke 18:26-27); God has to save us. Humans cannot by nature please God (Heb 11:6); God has provided the gift of faith so that we can please Him. Humans cannot in their own power escape the power of sin (John 8:34); God provides the power over sin. Whereas natural law and process *might* be sufficient to generate the bodies of humans and animals,<sup>25</sup> there may be no natural process capable of generating the souls of either. An “intervening” God would frustrate science’s attempts to study any of those interventions. In fact, most people’s understanding of a prayer-answering God would frustrate the ministrations of science. Considering all this, it seems somewhat surprising that any believer in the living God of Scripture would accept the ubiquity of science’s success. The high view of science held by the church may be a sad measure of how much the church really does *not* believe in a prayer-answering God.

### **The Necessity of Special Revelation**

To make sure that we would correctly infer the events at the Cana feast, we have been given divine revelation of the event.<sup>26</sup> This is not only because we would incorrectly infer these events because they happened so long ago, this is also because we would incorrectly infer the events even if we had been there! In fact, because the official of the feast would most certainly incorrectly infer the event, Jesus performed the miracle immediately before the servants of the feast and sent them to the very feet of the official. Jesus asked the servants to fill the water purification jugs with water. The servants *knew* that the jugs were full of water because they labored to fill the jugs with water with their own hands. Then, Jesus told those same servants to draw from those jugs and bring what they drew directly to the official. As the text specifically clarifies, the servants *knew* that what they gave to the official had been water. Jesus sent eye-witnesses of the truth to the feet of the official. Although the servants were silent, the official could have consulted with the servants, but did not. Jesus sent eye-witness testimony of the truth about the wine that the official failed to consult. Without that testimony, the official deduced a reasonable, but incorrect, history of the wine.

In a similar way, the same Jesus—creator of all things—also provided us with eye-witness testimony of the creation—and, in fact, eyewitness testimony of the Fall, the flood and Babel as well. The Triune God was not only the best possible eye-witness (being the most honest, the most correct, the most capable of communicating, and having the most understanding and the best perspective), but was also the *only* eyewitness before any

other observer had yet been created. At least one of the reasons for the account—given first probably orally to Adam before it was given by inspiration to Moses—was because humans would deduce an *incorrect* history if they lacked the information. Without that information, the best human attempts would catastrophically fail to deduce even one fact related in Genesis 1-11. Not only was every single word of Genesis 1-11 correct (as we believe when we accept the inerrancy of Scripture), and not only was every single word of Genesis 1-11 profitable for spiritual purposes (as we deduce from 2 Tim 3:16), but every word was *necessary* for man to infer correctly the actual history of the creation. Without it (or by ignoring it) humans not only cannot infer the correct history of the world, they will certainly deduce an incorrect history of the world.

Truly, then, the Bible is *not* a textbook of science. This is because without using the Bible, no textbook of science can arrive at the truths Scripture provides. The Bible is thus greater and more foundational than any textbook of science could ever be. If a person desires to know the truth about the origin of things, it is *mandatory* that they *first* consult with the Bible and adopt the claims Scripture makes. We *must* start with the Bible or we *will* certainly err about earth history. We must *not* change the meaning of the biblical text to fit the conclusions of modern science, for science *cannot* be correct whenever it studies a situation where God uses (or used) processes other than those observed by scientists in the present.

According to 2 Tim 3:16, Scripture is both necessary and sufficient for man's spiritual development. If the biblical data is also necessary for inferring the correct history of the creation, then perhaps the

biblical data is also sufficient. Whereas the information we have been given in Scripture cannot be deduced by humans on their own, perhaps the remainder of the story *can* be inferred by careful human study. It might be part of the dominion mandate given to man to start with God's special revelation and carefully study the physical world to deduce the rest of the story. If so, the brevity of the Genesis 1-11 account might suggest just how much responsibility God gave to man in the execution of his dominion role.

### **How Old Is the Creation?**

Science can potentially determine the age of things, and thus could be applied to the question of the creation's age. However, given what has already been said, we must first examine the Scriptures to see if God has revealed anything in his Word relevant to that question. If so, that information must provide the framework within which we determine the actual age of things. And, in fact, the Bible does provide important information on the age of the creation.

First, working back from the time of Abraham, the genealogies of Genesis 5 and 11 allow us to reckon time from Abraham back to the flood and the Creation of Adam before that. The human longevities related in these passages are well outside the experience of modern science. In fact, modern science not only finds these ages uninferable, but also impossible. The genealogies of Genesis 5 and 11 are either erroneous or they are correct, as can only be known by divine inspiration. Furthermore, the unique genealogical formulae and unique chronological information (e.g., paternal ages) of Genesis 5 and 11 suggest these genealogies are not only designed differently from other genealo-

gies in Scripture but that they are specifically designed for chronology. This in turn suggests that these genealogies were provided to us without gaps and with reliable numbers.<sup>27</sup> With this working hypothesis, the creation of Adam is only about 2000 years before the birth of Abraham.

Second, there is the length of the Creation Week. If, as the Bible claims, God really did create by the word of his mouth and God really did end the works of his creation at the end of Day 6 of the Creation Week, then modern science can deduce neither the mode nor the tempo of his Creation. As indicated above, without divine revelation we would not be able to even infer the creation occurred, let alone when it happened, how long it took, what order it was in, or how it happened. If God created in the manner indicated in the Creation account, we would be able to infer nothing that is related to us in the Creation account! We are entirely indebted to God's eye-witness account for how and when the creation occurred. A natural reading of that account leads to the same conclusion held almost universally by Jews and Christians all the way up to the Enlightenment<sup>28</sup>—that creation occurred in a week of six earth-rotation days. Exceptions to this conclusion came from inferences *outside* Scripture (e.g., Augustine concluding the creation was instantaneous based on theological reasoning;<sup>29</sup> Grosseteste and Descartes and Rosenmüller<sup>30</sup> and others after them based on scientific reasoning).

Given two millennia in the Adam-to-Abraham genealogies and a week from the beginning of creation to the creation of Adam, the creation dates to about 2000 years before the birth of Abraham, or approximately 6000 years ago. From

this we conclude that the actual age of the universe as a whole—including the contained galaxies, stars, planets, and earth—is approximately 6000 years.

### **Science to the Rescue?**

Following the reasoning presented above, one would expect that if it ignored the claims of Scripture, modern science would deduce deep history and deep time before the actual beginning of things. And, truly, modern science deduces ages for the universe, for the most part, *millions* of times older than the Bible suggests. Again, by the reasoning presented above, science would also be expected to reconstruct incorrectly the mode, tempo, and order of creation. And, again, none of the objects listed in Genesis 1 (the earth, the sun, the moon, the stars, plants, animals, humans, etc.) are suggested by modern science to have been formed instantaneously by anything approaching the word of God. Nor does modern science deduce the order of origin given in Genesis 1. Modern science reverses the earth-before-sun, plants-before-animals, and flying-before-land animals order given in Genesis 1. As we concluded above, modern science is not the place to begin to determine the age or nature of creation.

Can we use science to determine anything about the age of things? Perhaps. When we turn to the biblical account we learn not only about the creation, but also the Fall and God's response in the form of the curse. The pre-Fall world was designed to persist forever and might—because of the provisional cycles embedded within it—appear infinitely old. With the curse, however, we are told that the universe was made subject to corruption (Rom 8:19-21), groans and travails in pain (Rom

8:22), and “waxes old like a garment” (Ps 102:25-26). Whereas it might not be possible to determine how old things really are, it might be possible to determine how long things have been decaying.

An example might be the decay of DNA. Deleterious mutations accumulate in organismal DNA, increasing what is called the mutational genetic load of organisms. Although we are not quite able to measure this mutational load directly, we can measure some related phenomena. In human DNA, for example, new mutations of all types (neutral, deleterious, and presumably advantageous) accumulate at a rapid rate (on the order of one to ten mutations per generation per person). The number of mutational differences between all humans seems roughly consistent with what would be accumulated in the 6000 years since Adam’s Fall going through the population bottlenecks of the flood and Babel.<sup>31</sup> Another example concerns the earth’s magnetic field—an important protector of life on earth. It seems that the magnetic field of the earth is decreasing in intensity, dropping half of its strength every 1400 years or so. It does not seem possible for that decay to have been occurring for as long as even 10,000 years—i.e. quite consistent with an earth-impacting Fall only about 6000 years ago.<sup>32</sup> Similarly, the loss of material by some comets as they orbit the sun suggests they have been losing material like this for less than 10,000 years (consistent with a solar-system-impacting Fall only 6000 years ago).<sup>33</sup> Even the absence of supernovae remnants in our vicinity of the galaxy older than several thousands of years suggests stars may have been blowing up in this region for less than 10,000 years (possibly consistent with a galaxy-impacting Fall only 6000 years ago).<sup>34</sup>

The time before the Fall is quite unfamiliar to us. It seems quite impossible to imagine human DNA which does not mutate, or magnetic fields which do not lose energy, or comets which do not lose matter, or stars which do not blow up. As a result, modern science would not only not deduce such a pre-Fall world, it would deny its existence. In fact, modern science would argue that DNA, the earth’s magnetic field, comets, and exploding stars have been around for billions of years. Yet, there does seem to be evidence that the modern fallen world has only been decaying for only about 6000 years of time—just as the Bible claims. In fact, instantaneous creation of a creation initially designed to exist forever, which began decaying only about 6000 years ago explains not only the evidence of only thousands of years of decay, but also evidence for deep time.

If one wishes to determine how long it would take modern laws and processes to create something, then science probably supplies the best possible estimate. If one wants to determine how old something *really* is, one needs to consult a reliable witness. The only reliable witness for the age of the universe and the earth is the Bible. As a scientist I am convinced that the Bible—and not science—is the correct place to begin to determine the age of things. I also believe that the Bible is very clear about the creation being only about 6000 years old. And, because of its critical importance in understanding the world, I would suggest that this means that the creation really is only about 6000 years old. And, although much of modern science deduces a very different history for the creation, the authority and importance of Scripture not only indicates that the creation is thousands of years old, but also explains why modern science arrives

at the wrong conclusions it does *and* why some data seems to be quite consistent with a creation only thousands of years old. This is because God created a fully-functioning, mature world only about 6000 years ago.

## ENDNOTES

<sup>1</sup>Consider, for example, the many volumes which have been written on the definition of science, and which not only define it in different ways, but also define it in contradictory ways. See, e.g., J. P. Moreland, *Christianity and the Nature of Science* (Grand Rapids: Baker, 1989); and Delvin Lee Ratzsch, *Science and its Limits: the Natural Sciences in Christian Perspective* (2<sup>nd</sup> ed., Downers Grove, IL: InterVarsity, 2000).

<sup>2</sup>Science studies the physical world and values the data of the physical world in the process. Analogously, conservative Christian theology studies God and values the data of Scripture in the process.

<sup>3</sup>Unlike what we are taught in school, there is no singular “scientific method” that defines science. See Philip Kitcher, *The Advancement of Science: Science Without Legend, Objectivity With Illusions* (Oxford: Oxford University, 1993); C. John Collins, *Science and Faith: Friends or Foes?* (Wheaton, IL: Crossway, 2003); E. David Cook and Robert C. O’Connor, “What are the Philosophical Implications of Christianity for the Natural Sciences?” in *Not Just Science: Questions Where Christian Truth and Natural Science Interact* (eds. Dorothy F. Chappell and E. David Cook; Grand Rapids, MI: Zondervan, 2005), 48-60.

<sup>4</sup>Methodological uniformitarianism is not the same as uniformitarianism in general. Methodological uniformitarianism

includes the uniformity of natural law and uniformity of natural process, but not such things as uniformity of rate or natural conditions (see, e.g., Steven A. Austin, “Uniformitarianism: A Doctrine that Needs Rethinking,” *The Compass of the Sigma Gamma Epsilon* 56, no. 2 (1979): 29-45; Stephen Jay Gould, “Uniformity and Catastrophe,” in *Ever Since Darwin: Reflections in Natural History* (ed. Stephen Jay Gould; New York, NY: W. W. Norton & Co., 1977), 147-52.

<sup>5</sup>A possible meaning in Ps 78:69; 104:5; 148:4-6; Eccl 1:4. A probable inference made from the fact that if Adam had taken of the tree of life he would have lived forever (Gen 3:22).

<sup>6</sup>The last sentence in James Hutton, “Theory of the Earth; Or, An Investigation of the Laws Observable in the Composition, Dissolution, and Restoration of Land upon the Globe” [based upon a paper read March 7 and April 4, 1785], *Transactions of the Royal Society of Edinburgh* 1, no. 2 (1788): 299-304 and James Hutton, *Theory of the Earth, with Proofs and Illustrations* (Edinburgh, 1795).

<sup>7</sup>John McPhee (*Basin and Range* [New York: Farrar, Straus, and Giroux, 1981]) and Stephen Jay Gould (“Deep Time and Ceaseless Motion,” in *An Urchin in the Storm: Essays About Books and Ideas* [ed. Stephen Jay Gould; New York: W. W. Norton & Co., 1987], 93-103) popularized the phrase “deep time” to refer to the concept of millions and billions of years—especially in the eighteenth century as it gradually replaced the Bible-based concept of a universe originating at approximately 4000 B.C. I am using the phrase “deep history” to refer to the concept of many, many successive historical events.

<sup>8</sup>2 Pet 3:6-8.

<sup>9</sup>Genesis 2:2.

<sup>10</sup>E.g., Gregory of Nyssa's fourth century *On the Origin of Man*; Peter Lombard's twelfth century *Sententiarum*; Luther's sixteenth century commentary on Genesis.

<sup>11</sup>Genesis 1:29-30. Also suggested by the lack of carnivory in the new heavens and earth (Isa 11:6-9; 65:25).

<sup>12</sup>The application of Rom 5:12 not just to humans, but also to the entire creation (as the curse is suggested to be global in Rom 8:19-22). Suggested also by the new heavens and new earth being without natural evil and curse (Isa 11:6-9; 65:17-25; Rev 21:1-4 with 22:3).

<sup>13</sup>Genesis 3:18.

<sup>14</sup>Isaiah 11:19, 65:25; Rev 21:4.

<sup>15</sup>Genesis 8:21.

<sup>16</sup>Genesis 8:22.

<sup>17</sup>Genesis 2:10. Except at deltas where large rivers fragment into smaller unnamed river courses, rivers most typically unite rather than divide as they flow downstream. Although lakes on topographic divides can source more than one major river, there are no known examples of one major river dividing into even two major rivers, let alone four.

<sup>18</sup>Neither the four rivers nor the four lands of Gen 2:11-14 are certainly identified with any four rivers or lands known in the present. The river names most naturally apply to rivers on different continents (Gihon as the Nile in Africa; Tigris and Euphrates with the large rivers in Asia; Pison as a minor river of the same name in European Turkey). The land names also most naturally apply to lands on different conti-

nents (Ethiopia in Africa; Assyria in Asia).

<sup>19</sup>The globally-distributed "fountains of the great deep" which were broken up at the beginning of the flood (Gen 7:11) were stopped up later (Gen 8:2). This suggests a different distribution of springs in the antediluvian world than is observed today.

<sup>20</sup>On day three of the creation week God commanded the waters to be "gathered together into one place" and let the dry land appear (Gen 1:9). With the exception of a few large lakes, a single ocean could describe the current earth. Nonetheless, some have seen reason to believe that the distribution of continents in the original creation was significantly different than in the present (e.g., Antonio Snider-Pellegrini, *La Création et ses Mystères Dévoilés* [Paris: A. Franck & E. Dentu, 1859]).

<sup>21</sup>The fact that something other than rain watered the garden before the creation of Adam (Gen 2:5-6) and Adam and Eve were comfortable without clothes might be explained by a tropical location for the garden of Eden. Nonetheless, some have suggested the pre-Flood world experienced a very different climate from the present (e.g., Thomas Burnet, *Telluris Theoria Sacra* [London: Kettilby, 1681]; John C. Whitcomb, Jr., and Henry M. Morris, *The Genesis Flood* [Phillipsburg, NJ: Presbyterian & Reformed, 1961]; Joseph C. Dillow, *Waters Above* [Chicago, IL: Moody, 1981]. Tree ring evidence led Kurt P. Wise ("Were there Really no Seasons? Tree Rings and Climate,"

*Creation Ex Nihilo Technical Journal* 6, no. 2 (1992): 168-72) to suggest that the pre-Flood world was warmer than the present.

<sup>22</sup>Evidences that suggest a very different geology before the flood include: (a) a different distribution of continents (see above); (b) a different distribution of springs around the world (see above); (c) Edenian geography which does not correspond to any modern locale (see above); (d) the flood beginning with a "breakup" of the rocky openings of pre-flood springs (Gen 7:11—see David M. Fouts and Kurt P. Wise, "Blotting Out and Breaking Up: Miscellaneous Hebrew Studies in Geocatastrophism" in *Proceedings of the Fourth International Conference on Creationism* [Pittsburgh, PA: Creation Science Fellowship, 1998], 217-28); and (e) a huge thickness and worldwide distribution of fossil-bearing sediment some people believe to have been deposited in the flood. Various of these evidences have led some to suggest a very different geologic structure for the world before the flood (e.g., Thomas Burnet, *Telluris Theoria Sacra* [London: Kettilby, 1681]; William Kirby, *On the Power, Wisdom, and Goodness of God as Manifested in the Creation of Animals, and in their History, Habits, and Instincts* [London: Pickering, 1835]; Walt Brown, *In the Beginning...* [self-published, 1989]).

<sup>23</sup>Fossils suggest that animals of the past were very different than animals of the present.

<sup>24</sup>2 Pet 3:6-8.

<sup>25</sup>Given all that biologists know about living things, biology has never

really understood what life itself is. In sections of biology texts labeled "What is Life?" there are lists of what living things *do*, but never a characterization of life. It is entirely possible that life is not physical, does not follow natural law and process, and cannot even be studied by science. It is not clear how much else about living organisms cannot be understood by natural law and process; thus, it cannot be known for sure that natural law and process alone really *can* generate a new generation of offspring.

<sup>26</sup>John 2:1-11.

<sup>27</sup>See, e.g., Travis Richard Freeman, *The Chronological Value of Genesis 5 and 11 in Light of Recent Biblical Investigation*, (Ph.D. diss., Southwestern Baptist Theological Seminary, 1998).

<sup>28</sup>E.g. *Jubilees*; Josephus's first century *Antiquities of the Jews*; second century *Epistle of Barnabas*; Clement of Alexandria's third century *The Miscellanies*; Ephrem Syrus's fourth century *Genesim Commentari*; Bede's eighth century *Hexameron*; Peter Lombard's twelfth century *Sententiarum*; Vincent of Beauvais' thirteenth century *Speculum Quadruplex*; Melancthon's and Luther's and Calvin's commentaries on Genesis.

<sup>29</sup>E.g. Augustine, *De Genesi ad Litteram*.

<sup>30</sup>Robert Grosseteste, *Hexaëmeron* (c 1230); René Descartes, *Principia Philosophiae* (Amsterdam: Ludovicum Elzevirium, 1644); Johan Georg Rosenmüller, *Antiquissima Telluris Historia a Mose* (Ulm, 1776).

<sup>31</sup>The time has been calculated to

be up to 600,000 years (common female origin argued by Rebecca L. Cann, Mark Stone King, and Allan C. Wilson, "Mitochondrial DNA and Human Evolution," *Nature* 325 (1987): 31-36 which research was redone by Max Ingman, Henrick Kaessmann, Svante Pääblo, and Ulf Gyllensten, "Mitochondrial Genome Variation and the Origin of Modern Humans," *Nature* 408 (2000): 708-13; common male origin argued by R. L. Dorit, H. Akashi, and W. Gilbert, "Absence of Polymorphism at the AFY Locus on the Human Y Chromosome," *Science* 268 (1995): 1183-85), but this is a maximum time based upon extreme assumptions and it assumes no population bottlenecks (times such as the flood and Babel when human population was reduced to very small values). Using more reasonable assumptions and considering population bottlenecks such as the Bible describes, human history can be included within the last 6000 years.

<sup>32</sup>E.g., Thomas G. Barnes, *Origin and Destiny of the Earth's Magnetic Field* (ICR Technical Monograph 4; El Cajon, CA: Institution for Creation Research, 1983) updated by D. Russell Humphreys, "Reversals of the Earth's Magnetic Field During the Flood," in *Proceedings of the First International Conference on Creationism* (vol. 2; Pittsburgh, PA: Creation Science Fellowship, 1986), 113-26; and D. Russell Humphreys, "A Physical Mechanism for Reversals of the Earth's Magnetic Field During the Flood", in *Proceedings of the Second International Conference on Creationism* (Pittsburgh, PA:

Creation Science Fellowship, 1990), 129-42.

<sup>33</sup>E.g., Danny Faulkner, "Comets and the Age of the Solar System," *Creation Ex Nihilo Technical Journal* 11, no. 3 (1998): 264-73.

<sup>34</sup>E.g., Keith Davies, "Distribution of Supernovae Remnants in the Galaxy," in *Proceedings of the Third International Conference on Creationism* (Pittsburgh, PA: Creation Science Fellowship, 1994), 175-84.