

# Genesis, Cosmology, & EVOLUTION

By Rabbi Hillel Goldberg

*“There are two kinds of secrets in the world, make-believe secrets and real secrets. A make-believe secret is one that depends on its concealment . . . when it is revealed, the mystery vanishes and the secret loses its fascination. Such is the secret of the . . . stage magician. When the . . . trick becomes apparent . . . the magic disappears.*

*“Such is not the case with the real secret. A real secret can be open and apparent to everyone . . . Nevertheless, the more it is looked at and examined, the more of a secret it becomes . . . The story in the first part of the Book of Genesis is very well known . . . and still it remains a secret.”*

— Rabbi Adin Steinsaltz

The opening portion of Genesis describes the creation of the universe, including humankind. There are three ways to look at this portion. It is a poetic, theological statement about the nature and purpose of humanity; it is scientifically accurate; or, it is a rudimentary creation story. In fact, it is all three.

Genesis hardly seems to be scientifically accurate. Genesis' creation of the cosmos takes six days, while science estimates the age

of the universe to be fifteen billion years.

Genesis' process of creation is directed, while science proposes random evolution from inorganic to organic matter, then from simple to ever more complex life. The discrepancies between Genesis and science seem irreconcilable. However, a subtler and sharper reading of both the religious and the scientific sources reveals a different picture.

Genesis emerges as scientifically accurate,

not just by analogy or metaphor. This is difficult for the non-Hebrew reader to accept because of what I term the “Orthodox fallacy”. Simply put, when it comes to the Torah, Orthodoxy is not orthodox. The only readers who take the Torah both literally and unidimensionally — who are fundamentalists — are non-Hebrew readers. The simplicity ascribed to the Biblical account of creation within Western culture is not and never has been a part of the intellectual heritage of even the most Orthodox Jewish believers. The scientist, however, sees a Jewish reader back off from a literal and unidimensional understanding of Genesis, expressed in the translations, and exclaims, “bad faith!” To engage in an objective, cross-disciplinary analysis of Genesis, the scientist must acknowledge that even the most traditional reading of the Torah is never orthodox (with a small “o”). The only text that counts is the original, whose Hebrew is multi-layered in a way that is alien to the English language. What a scientist calls a “re-reading” may be an example of a time-honored hermeneutic endemic to Hebrew, generously indulged long before Galileo, Darwin, or Einstein. For millennia, the interpreter of the Torah has lived congenially with the multiple denotations and connotations of Hebrew words, phrases, and themes. Indeed, he has gloried in them, without, however, violating the plain sense of the text — without twisting its clear intent. If a reader lets Genesis be Genesis, not a translated stultification thereof, Genesis is scientifically accurate.

Beginning with this multi-valent mindset, I bring to the discussion of Torah and science a second ground rule: Intuition is irrelevant. If the believer intuits God and therefore finds random evolution preposterous, this proves nothing about either Torah or science. The believer’s intuition has no legitimate place in my analysis and will not guide it. Similarly, if a scientist intuits the absence or detachment of God and finds randomness reasonable, this, too, proves nothing and does not guide me. The text of the Torah and the findings of science, as well as the presuppositions of both, must speak for themselves.

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As obvious and objective as this methodology might seem, it is far — very far — from the tone of the discussion between science and religion ever since Charles Darwin published *The Origin of Species* in 1859. In fact, rarely has there been any “discussion,” only bitter debate that sheds heat, not light. There is a reason for this. More than any other science, evolutionary biology originated in relation to religion, specifically, to Genesis’ creation story. Darwin intended to disprove it. Evolutionary biology was born with a sharp polemical edge and has never really extricated itself to become a purely scientific perspective. One of Darwinism’s chief proponents, Richard Dawkins, wrote *The Blind Watchmaker* not only to defend Darwinism against its critics, but to prove that atheism is a logical and necessary deduction from Darwinism.

From its very beginnings, evolutionary biology has made a subtle methodological assumption: If Genesis is wrong, God does not exist. In classic syllogistical fashion, Darwinists maintained that if Genesis says that God created the earth in six days and made all species immutable, and if these claims are false, then God does not exist. There are two problems here. First, Darwin’s Bible (and indeed his entire circle’s) was a translation. Darwin rightly insisted on first-hand field work as the necessary basis for his biological conclusions, but he settled for second-hand religion. As we shall see, the Genesis that Darwin disproved does not exist; the English renderings he refuted do not, in critical details, reflect the Hebrew. Second, Darwin assumed that evolution disproved Genesis. If, then, evolution itself is wrong, Genesis is right. This is how Darwin understood the issue: Either Genesis or evolution. However, if evolution is wrong, this does *not* make Genesis right. Its truth is *not* dependent on scientific affirmation. As Professor Michael J. Behe, a biochemist whose work we cite below, notes, “No person is required by dint of logic to reach any particular supernatural conclusion solely on the basis of scientific observations and theories.” Yet, Darwin reduced the Torah to a scientific tract that would rise or fall on the coherence of his new biological science. This, not random evolution, is the primary injustice that Darwin did to the Torah. He simplified and eviscerated it, robbing it of its own central concern, which is spiritual-ethical, not scientific. Ironically, “Creation Science” makes the same mistake. Claiming to

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refute Darwinian evolution, creationism claims to prove that God created the world. However, no refutation of Darwinism, however valid, proves Genesis.

Nonetheless, in an age of scientific adventure, the conflict between Genesis and science must begin any serious exploration of the Torah. Although the primary purpose of the Torah is to elucidate the relationship between God and humanity, the Torah remains under a cloud without an initial encounter with science. A scientific refutation of Genesis would undercut its resonance and relevance. Therefore, I show how Genesis' simple language may serve as a prism for contemporary cosmology (though less so for evolutionary biology), and explain why Genesis' creation story exhibits such a rudimentary character. Upon analysis, if Genesis and science may credibly be interwoven, why does Genesis discourage this agenda by such simple, unscientific language?

## Cosmology: The Age of the Earth

Genesis apparently says that the cosmos was created in six days. Actually, Genesis says that the cosmos was created in five days, plus "one day" (*yom echad*). A careful reading of the Hebrew in Genesis and of discoveries in physics show that this is no linguistic quibble. Five plus one does not equal six, not when the unit of measure is "days." A day is not a number, not a mathematical symbol, but a measure of time. On earth, a "day" is twenty-four hours. On other astral bodies, which rotate on their axes faster or slower than the earth, the duration of a "day" varies. On Mercury, one year is only eighty-eight earth days, while on Pluto one year is 247.7 earth years. Time is relative (especially since the rotation of the earth is very slightly slowing), so that when Genesis labels each of five time periods a "day," how long is it? Which heavenly body's day is signified by it? When science speaks of billions of years, it means "earth years," but when Genesis speaks of five "days," Genesis may signify the earth's twenty-four-hour-periods or another astral body's twenty-four-billion-hour periods. The text does not say and the issue is open. Genesis can accommodate modern cosmology. This, however, is insufficient, especially since the Torah itself retrospectively subsumes its creation story under "a

six-day period" (Ex. 31:17). For precision, we must carefully probe what is erroneously translated as Genesis' "first day," as well as Einstein's understanding of time.

Genesis records no "first day." Instead, before its "second" day there is "one day." The two are not necessarily of equal duration. A first day, a first *anything*, begins a series. Whatever the duration of the five sequential days of Genesis, they are of equal duration. For the stage of creation preceding these five days to be identical to each of them — to be a "day" — it would have to be a "first day" — the first in the series. Instead, there is "one day." How long is it? Time is measured by the spin of a heavenly body, but in Genesis 1:1-2, no heavenly body is created, only unformed "heavens" and "earth." Next, in Genesis 1:3-4, God creates "light" and "darkness" — not, pointedly, "day" and "night." Day and night are indicators of a spinning astral body facing a sun; day and night indicate time. "Light" and "dark" precede time as we know it. If the units of time known on earth — twenty-four-hour units — were retroactively ascribed to the period of light and darkness named "one day," how long would this period be? Not only does Genesis not say, it would contradict its purpose to say so.

If Genesis wanted us to think of the initial stage of creation as a unit of time, Genesis would label it the "first day." By separating it from the continuum of the following days, Genesis indicates that it is "pre-temporal" and is meant to be pondered as such. A pre-temporal stage of creation conveys the mystery of creation. Time is the opposite of mystery. Time is quantifiable, an index of material motion. Time bestows the potential for mastery and control. Now, a critical element of human craving is an understanding of the origins of human life and of nature itself. At each level of human existence — individual, familial, national, species — humans crave knowledge of origins. An unmeasured pre-temporal stage of creation conveys this lesson: The origins of existence should remain a mystery, beyond quantification, beyond understanding and control — beyond time. Origins should not be reduced to measurable indices. Mystery respects the uniqueness of the cosmos and of the human being. Creation is a "real secret."

How "long" Genesis' initial stage of creation endured is indeterminate. Therefore, an estimate of the age of the universe in billions of years and Genesis' description of a

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pre-temporal period are not at odds. One could even say that these billions of years — units of measure that humans can mouth but hardly grasp — fit the Torah’s mysterious, untamable “one day.” Still, it is necessary to inquire: How long are the *rest* of creation’s single-day periods (the second through sixth days)? They may dilate to accommodate a current scientific measure, but do they? Or, is the Biblical measure just as precise as the scientific?

Gerald Schroeder examines Einstein’s special and general laws of relativity with reference to the Biblical and the scientific calendars. Whether marked for five days or fifteen billion years, a calendar is a measure of time; and time, Einstein discovered, is not absolute. Time is not a constant. Time moves slower under certain conditions and faster under others. The same clock runs slower or faster depending on the speed of the person observing the clock, the gravitational pull on the clock, and other variables. Time is relative. This defies normal observation only because all humans move at the same speed, under the same gravity and other conditions — those of the earth. If these conditions change, time changes. Einstein discovered that of the factors that measure time, only the speed of light is a constant, at 186,000 miles per second. Light’s velocity is impervious to the speed of the observer and of the light emitter. Laws of relativity render the calendar of Genesis scientifically accurate, as follows:

Under Einstein’s special law of relativity, an elapsed time is not necessarily the same for one and the same event. The elapsed time of an event depends, for example, on the speed of the observer. If it were possible for the same flash of light to be observed simultaneously in a speeding rocket and a stationary laboratory, the distance that the light would travel as viewed in the rocket would seem less than the distance as viewed in the laboratory. The light-flash would traverse seemingly different distances at seemingly the same time. However, the distances *cannot* be different. Since the speed of light is constant, any flash of light covers the same distance regardless of the position or conditions of the observer. It is the *time* that differs. One event, two elapsed times! Time is relative. The clock in the rocket runs slower than the clock in the laboratory. Every elapsed time is valid for the “reference frame,” or specific

conditions, under which it is observed. Schroeder writes:

*According to Einstein’s law of relativity, we now know it is impossible in an expanding universe to describe the elapsed time experienced during a sequence of events occurring in one part of the universe in a way that will be equal to the elapsed time for those same events when viewed from another part of the universe. The differences in motions and gravitational forces among the various galaxies, or even among the stars of a single galaxy, make the absolute passage of time a very local affair. Time differs from place to place.*

The relevance of Einsteinian relativity to the discrepancy between the calendar of the Torah and of the contemporary cosmologist is obvious. There is, in fact, no discrepancy. Rather, there are two elapsed times for the same events. There are two different “clocks,” so to speak.

Since no human being and not even a spinning heavenly body existed as God created the original, unformed matter, only the Divine clock existed. Under God’s measure, there was one day whose duration He did not disclose so as to preserve the mystery of His act of creation. Then there were five sequential units of equal duration, to which His clock assigned the duration of five days. When the planet earth and human beings came into existence, people measured the same events at approximately fifteen billion years. Six days, fifteen billion years; *one* event, *two* elapsed times, each relative to its own reference frame.

Einstein’s laws of relativity excise the enervating apologetics offered to resolve the conflicts between Genesis and cosmology and paleontology. Yes, the earth may be measured as older than a literal reading of Genesis; yes, there were dinosaurs 220 million years ago; no, their fossils were not imbedded in the earth by God to test the faith of His believers. We may even put aside the truism that only that which can be measured experimentally or mathematically qualifies as science, all else being speculation. The age of the universe is speculation because science cannot prove that physical change in the past proceeded under present conditions of duration, any more than science can establish the duration of Genesis’ “one day.” Perhaps, within a single temporal reference frame, a process now described as taking one million years actually took a few hours. Here, the change in measure is not one of time, but of actual chemical and physical process. Perhaps, unknown atmospheric pressures, temperatures, catalyzers,

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radioactivity, and the like, played havoc with our understanding of the tempo of change; perhaps, therefore, the earth really is but a few thousand years old. It is a defensible position, but it has no meaning for scientists, who witness the uniformity of the laws of nature everywhere. We may grant scientists this uniformity. Genesis is still scientifically reconcilable. The universe is a few days old and the universe is fifteen billion years old. Each is a measure of relativistic time, true for its own reference frame. Each time is “local.”

## Biology: Mechanisms of Evolution

So much for Genesis and cosmology. What about evolutionary biology? Can a descendent of a common ancestor to apes be unique? If Genesis is to be scientifically accurate, it must address more than cosmology. It must address evolutionary biology.

Evolutionary biology in the 21<sup>st</sup> century resists a paradigm shift of the magnitude that quantum mechanics brought to Newtonian physics at the beginning of the 20<sup>th</sup> century. Quantum mechanics *awed* most physicists, but a suggested shift in Darwinism, even by learned scientists, *angers* most biologists. Far from eliciting dispassionate analysis, scientific criticism of Darwinism elicits a dogmatic view of evidence or a hostility toward faith, as if it were science’s job to defeat or advance religion.

In one sense, contemporary cosmology and evolution forever changed the way one reads Genesis. Taken literally as six twenty-four-hour days during which inorganic matter, plant, animal, and human life are each created instantaneously, the creation story of Genesis cannot be squared with evolutionary biology — but then, it need not be. The creation story of Genesis is intentionally rudimentary for reasons we shall address below. Genesis is also scientifically accurate *if* we understand three things: (a) the biology of the 19<sup>th</sup> century, no less than a unidimensional reading of Genesis, is a parody; (b) Darwinists circumvent or disregard evidence and logic in the interests of a scientific faith; (c) a critique of Darwinism does *not* validate Genesis. An argument against evolutionary biology is *not* an argument for faith. That is a separate issue.

In 1859, the date of publication of *The Origin of Species*

— in the beginning, so to speak — the conflict between religion and evolution parodied each. The book of Genesis supposedly refuted by Darwin was a Genesis twice-deprived: first, of the relativity of Einsteinian time; second, of its original language, in whose English translations such distinctions as the difference between its unmeasured “one day” and the sequential second through sixth days are absent. Darwinism, supposedly refuting Genesis, was a science deprived of the reality it was supposed to explain: the mechanisms of biological change. These, we now know, embrace irreducibly complex biochemical systems and the nucleotides, DNA, and proteins that express the genetic codes. Despite the fact that none of these were known to Darwin, who knew no biology on the cellular and subcellular level, current evolutionary biology acts as if it were founded on them. Put differently, current

evolutionary biology acts as if the electron microscope, X-ray crystallography, and nuclear magnetic resonance were available to Darwin. Biology and its tools have metamorphosed since 1859, but in its essentials Darwinism has remained untouched. It is unwavering, a religion in its own right.

Based on five years of intensive field work, Darwin said this: Life’s forms evolve from its simplest form, ever upward in complexity, through the very gradual accumulation of small changes. These gradual changes occur through natural selection, “the survival of the fittest.” Those forms of life that exhibit

characteristics most adapted to their environment survive. The rest perish. Species are not fixed; some survive, some do not, and those that do survive, change. Genesis, therefore, is wrong because it attributes the forms of life to God’s design, and because it affirms that species are fixed. Evolutionary biology, however, needs neither Genesis nor the attribution of life to a Designer to be found wanting. The issue is not the faith of Genesis *versus* the faith of Darwinism. The issue is the faith of Darwinism *versus* mathematics, paleontology, logic, and biochemistry. As we address each, we must keep in mind that the faith of Genesis requires its own justification.

As biology advanced, Darwinists could no longer attribute the mechanism of biological change to “natural selection.” What, precisely, was to be selected? To Darwin, it was anatomical features, such as the shape of an eye. With advances in genetics, however, it became clear

**The issue is the faith of Darwinism versus mathematics, paleontology, logic, and biochemistry.**

that biological change resides in DNA. For Darwinism to remain valid, it had to be updated and applied to phenomena of which Darwin had no knowledge. For nature to select a fit DNA code “naturally,” mutations in genes had to be *random*. Evolutionary biologists transformed Darwin’s mechanism of anatomical change — natural selection — into *random mutation plus natural selection*.

**Enter mathematics.** If chance were to select between a pool of two usable protein forms to generate a useful gene, the odds of evolutionary success would be 50/50. Plausible. However, the pool of possible protein forms is  $20^{250}$ ! This virtually incomprehensible number is vastly larger than the number of seconds in a fifteen-billion-year-old universe. If chance were to select, by odds of  $1/20^{250}$ , the protein forms necessary for each small advance in biological complexity, this would require a stupefyingly long time. Four billion years — the estimated age of the earth — is simply too short for the random evolution of the human species. This (among other factors) impelled no less a figure than Francis Crick, the co-discoverer of DNA, to entertain the possibility that life on earth originated elsewhere and somehow arrived here from outer space! Under the Darwinian paradigm, not only has there been insufficient time for life to develop on earth — the record does not show it.

**Enter paleontology.** If the vast array of biological life consists of simpler forms that gradually evolved through small changes, this should be reflected in the fossil record. The fossil record now consists of millions of fossils. It ought to be filled with the transitional forms that once roamed the earth. The record, however, is full of critical gaps. Evidence *does* exist for what two English biologists call “the minutiae of evolution” — for “intraspecies events” or *micro*-evolution, such as a change of a bacterium into a drug-resistant bacterium, or changes in wing color in speckled moths. But the fossil record is silent on how the speckled moth got here to begin with, not to mention on how fish turned into people — on *macro*-evolution. Instead comes “Darwinian eschatology,” the biological version of a believer’s faithful wait for the Messiah. Darwinists counsel infinite patience. Time *will* tell, the transitional fossils *will* be discovered, we need only wait. The waiting has gone on since 1859 and the fossil record has ballooned, but with little evidence of macroevo-

lution. David Berlinski, who examines presuppositions of Darwinism, writes:

*The classical Darwinian theory of random variation and natural selection requires a continuous distribution of animal forms, one that must be reflected in the fossil record. The assumption of continuity is a crucial aspect of Darwinian theory . . . The fossil record does not appear to support the assumption of evolutionary continuity . . .*

Paleontologist Niles Eldredge:

*Evolution cannot forever be going on somewhere else. Yet that’s how the fossil record has struck many a forlorn paleontologist looking to learn something about evolution.*

The most serious gap in the fossil record is the “Cambrian explosion,” the sudden appearance of fossilized animal phyla about 600 million years ago. Philip E.

Johnson:

*Darwinist theory requires that there have been very lengthy sets of intermediate forms between unicellular organisms and animals like insects, worms, and clams. The evidence that these existed is missing.*

**Enter logic.** Falsifiability, a requirement of argument, is the idea that if a point is not subject to refutation — if it does not take into account contradictory evidence — it cannot be true. If claims of evolution made from the fossil record do not grapple with gaps in the record, these claims become a matter of

dogma or intuition. In Darwinism, the absence of falsifiability characterizes its treatment of paleontology — and more. Some organisms have *mal*-adaptive traits, yet survive. Under Darwinism, they should not, since Darwinism requires the survival of the fittest. Other organisms exhibit diametrically opposed traits, yet both survive. Under Darwinism, only one should. Evolutionary biology, however, incorporates all contingencies. Its practitioners readily expand or contract its definition in order to divert evidentiary challenges. No claim is falsifiable — therefore, none can be true.

Also illogical is natural selection (“survival of the fittest”). It is, as Tom Bethell observes, a tautology: *the fittest survive, and survival is the criterion of fitness*. Berlinski: “. . . biologists . . . explain the survival of an organism by reference to its fitness and the fitness of an organism by reference to its survival.” Two illustrations: *The shark survived for millions of years because it is adapted to its environment — after all, it has survived for millions of years.* Or: *A creature is fittest*

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*because it has more offspring than others; it has more offspring than others because it is fittest.*

Another logic chop: the evolution of the eye. Eyesight is a system, an interaction of many proteins. Neither the proteins nor how they fit together to yield visual perception is fully fathomed. Berlinski: “Could a system we do not completely understand be constructed by means of a process we cannot completely specify?” Can it be said that A caused B if no one knows wholly what A or B is?

An inconsistency: To Darwinists, natural selection has no “targets.” Change in nature is blind, not designed. Yet, Darwinists say that nature’s very many, very tiny randomly produced changes will accumulate, one after the other, to build the fittest biological form. This presents a problem. As Berlinski notes: “A system conserving certain features in view of their future usefulness has access to information denied a [blind] Darwinian system.” As tiny changes are randomly produced, some will ultimately become indispensable parts of a fittest form, but others will be useless. How does nature know to conserve the incompletely fit parts for future use and to discard the rest? To conserve a random, incompletely fit change for future use is to rely on design. Darwinism presupposes design even as it denies it. Computer programs that simulate Darwinism make this clear. First, a target word is pre-selected. Then the computer is turned on to test whether a random selection of letters can spell out the pre-selected word. The computer is stopped at intervals to see whether the first one or two letters have been selected, then these letters are conserved and the computer is turned back on. If the computer succeeds, it is because it or its operator knows which letters to conserve in order to reach a target. Darwinism wants it both ways: to deny design, and to presuppose it. Now, the fuzzy *logic* of natural selection veritably pales before the bald *reality* of design in the foundation of life, biochemistry.

*Enter biochemistry.* Bloodclotting and intra-cellular transport are examples of the human body’s many irreducibly complex, biochemical systems. Bloodclotting is an interaction of many proteins that functions only when every protein is in place. If one protein is missing, the system ceases to function. This is what makes it “irreducibly complex.” Now, under Darwinism, nature would never preserve *a single one* of an irreducibly complex system’s cas-

cade of proteins because each one would meet the classic Darwinian definition of *least fit*. Each protein has *no independent use* separate from the other proteins in the system. Further, none of the transitional forms of these proteins would be preserved, since a complex system functions only when *all* of its proteins, *fully* formed, interact at once. Evolution asserts the indispensability of “transitional forms,” of *partial usability* by a *partially developed* biological form, but in an irreducibly complex system there is no such thing as partial use or a partial form. This system’s proteins must come into existence totally developed and *en toto*. An irreducibly complex system must be *designed*.

Molecular biologists implicitly concede this. Behe has surveyed the major journals in biochemistry and molecular evolution of past decades. He has found thousands of articles, but only one or two even attempt to explain the *origin* of complex biochemical systems.

How they work, how one may have evolved into another, mathematical models for them — on all this, the literature is immense. On how a single complex system came into existence to begin with, the literature is silent. Similarly, Dawkins’ refutations of evolution’s critics in *The Blind Watchmaker* do not reach down to the molecular level. The scientific disciplines that forged the “evolutionary synthesis” — genetics, comparative anatomy, paleontology, embryology, and others — are all non-molecular. Molecules, however, are the foundation of life. It is on the molecular level that evolution does, or does not, occur. Here, evolution’s favorite examples, such as eyesight, function. Yet, writes Behe, “there has never been a meeting, or a book, or a paper on details of the evolution of complex biochemical systems.”

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## **Genesis’ Rudimentary Creation Story**

We reach, then, the pivotal issue: design. Based on scientific data, not on Genesis, life’s irreducibly complex biochemical systems were designed. Consider an alternate explanation, self-organization or “complexity theory.” Almost like spontaneous combustion of old, self-organization asserts (in Behe’s paraphrase) that systems with a large number of interacting components spontaneously organize themselves into ordered patterns. Why this alternative to design? At all costs, evolutionary biology must be pre-

served. In rejecting religion, evolutionary biology must sustain its own faith — non-faith. Notice the irony: Faith meets faith. It is an *unacceptable* leap of faith to embrace God and His design of the universe, but it is an *acceptable* leap of faith to embrace the spontaneous self-organization of staggeringly complex biochemical interactions! Implicitly, science concedes religion's foundation: leap of faith. Science cannot escape from the perplexity that faith responds to. Again, to be perfectly clear, the conclusion of design from the biochemical basis of life does not, and *should* not, compel one to accept a Designer. That is a spiritual decision. Preponderant design in nature merely removes faith from the realm of the irrational or the absurd. (Randomness in nature and its relation to the Torah is beyond the purview of the present article.)

Genesis, of course, submits that nature is designed. This is the first of Genesis' three principles. This is the postulate with which biochemistry and cosmology are increasingly consistent, including Edwin Hubble's theory of the "Big Bang." There was no universe — bang! —  $10^{-43}$  seconds later there was a universe. In Genesis, of course, the designer is God.

Genesis' second principle is creation step-by-step. Creation by God does not logically (or textually) require His creations to occur in six twenty-four-hour days, or instantaneously or directly. This point derives from no torture of the text in the face of new scientific evidence. It derives from Nachmanides, writing over 700 years ago, responding to the original Hebrew. Nachmanides observes that God created from out of nothing only the initial primeval matter of "one day." Then, from out of this matter, God formed all else on the second through sixth days. Indirectly, God unfolded water, earth, fish, bird, plant, animal, and human life by tapping the potential in the unformed matter that He created (1:26, 2:7). God acted one day at a time — in Einsteinian time, one *era* at a time. Nothing in Genesis says that this unfolding of life did not take eras, nor that once a living being was created, it could never change. Most important of all, Genesis even attributes variability to the human being. In pitting Genesis against the descent of humanity, Darwin argued against a straw man.

The issue is not whether species *resemble* each other, but whether they *descend* from one another. The similarity of

anatomical and DNA structures between humans and others is not at issue. Macroevolutionary descent, by the Darwinian mechanism of random mutation plus natural selection, fails for the mathematical, paleontological, logical, and biochemical objections already raised. What, then, of descent by another mechanism? That which Darwin termed "descent with modification" — the descent of the human being from a common ancestor to apes — is not sustained by the embryological evidence. Phillip E. Johnson:

*[Ontogeny does not recapitulate phylogeny.] Although it is true that vertebrates all pass through an embryonic stage at which they resemble each other, in fact they develop to this stage differently. . . . Only by ignoring the early stages of development can one fit Darwin's theory to the facts of embryology, but it was precisely the early stages that Darwin claimed were the most significant!*

Embryology does not support Darwin's claims for the descent of humanity. At the same time, Genesis does describe the descent of humanity. Lacking Hebrew knowledge, Darwin misread Genesis as regarding species as immutable. To Darwin, his most critical discovery was the variability of species. Just as cosmologists who were ignorant of Hebrew missed the difference between Genesis' "one day" and subsequent five days, Darwin's ignorance of Hebrew made him miss Genesis' variable human being.

Hebrew makes no distinction between upper case and lower case. All letters are uniform. The only way to know when the Hebrew intends a proper noun is through a careful reading of context. Translations generally cannot reflect this. Translations of Genesis' first of two creation stories refer to the first hominid as "Adam." However, the context reveals the hominid of Genesis 1:26 to be *adam*, a "lower case," generic, undifferentiated being. (Rashi regards it as a double-faced, male-female being.) *Derived from* this precursor is Genesis 2:7's "Adam," the "upper case" husband of Eve. First, God creates a single being, which He calls *it*; then He divides *it* into male and female.

*And God said, "Let us create , adam in our image" . . . And God created the adam in His image, in the image of God He created it; male and female He created them (1:27).*

The being — *adam* — from which God created male and female is different from both. However, translations gener-

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ally render both the male-female being and the partner of Eve as “Adam,” since in Hebrew the same word is used for both beings. Hebrew itself cannot distinguish between the male-female ancestor (*adam*; lower case “a”) and the partner of Eve (Adam; upper case “A”). This leaves a non-Hebrew reader, such as Darwin, clueless that *adam* of 1:26 is different from and ancestral to Adam of 2:7. Darwinism is built on the supposition that “literal Biblical tradition” supports the fixity of species, but Genesis sets down the physique of the initial hominid as variable, not fixed; as precursory, not final. Darwin never knew this because he never read the real Genesis, the one in Hebrew. The polemical edge of his entire life’s work is grounded in error.

Although the variability of species in Genesis does not assert the descent of man from a common ancestor to apes (Darwin’s claim), it would have been helpful had Darwin known Biblical Hebrew. Much misunderstanding between science and religion, which began in good measure with Darwin, might have been avoided. Darwin’s central interest was not evolution but the variability of species. Genesis affirms this. Had Darwin known so, the caricature of science and religion locked in mortal conflict might have been reduced to a more realistic — and manageable — configuration.

Genesis’ claim is the *fact* of ancestry, without further detail, because Genesis’ purpose is not scientific. Genesis is short on scientific detail because the uniqueness of the human being is its soul, not its physique. The one exception to God’s unfolding of life from primeval matter is the human soul. It is non-material and comes directly from God (1:27, 2:7).

*Because [writes Gerald Schroeder] our physical makeup is not what makes us unique and because sages and scientists agree that the matter of mankind has a common origin with all other universal matter, a theological problem is not posed by having the physique of mankind developed through an evolutionary process. Indeed, Nachmanides comments on Genesis 1:26 that the “us” in “And God said let us make man” refers to joint contributions by God and the existing Earth.*

To Nachmanides, it might make no difference if humanity were descended from a common ancestor to apes. Humanity’s uniqueness is still the direct result of God’s design. Darwin denied that God designed humanity because humanity is variable, not fixed; but Genesis

regards humanity as variable — and designed.

Genesis’ creation story is scientifically accurate, it now seems, in the sense that once a scientific fact is finally established, it fits Genesis. A fifteen-billion-year-old universe, Einsteinian time, and the descent of humanity (though not by Darwinism mechanism), all fit Genesis. In the main, contemporary cosmology is established and evolutionary biology is not, but neither is essential to Genesis. The truth of science does not establish the truth of Genesis. The consonance of Genesis and of scientific fact means only that the Torah is not refuted. Therefore, the Torah *could* be true. Genesis is short on scientific detail in order to divert attention from cosmology and biology — this, in order to establish its primary truth: theology. Here we reach

Genesis’ third principle. Its truth is established by its elucidation of the relationship between God and humanity. Here, and here alone, Genesis moves beyond the rudimentary and articulates the profound: By nature, humans are singular, created in the image of God, but also capable of evil. By purpose, humans should act in accord with their Divine side and thus be holy. The male and female human should cleave to one another and propagate the human species. Finally, humans should have faith. The Torah is to be believed, not proven. The Torah is not refuted by science, but this does not

establish the Torah. That requires faith. The Torah’s truth encompasses but is larger than science and reason. The Torah is a “real secret”. Its truth addresses the human being’s totality; intellect and emotion, soul and body, individual and community. No scientific truth can address the human totally, since truth is not total if it is totally demonstrable. Just as the creative act of God, yielding a universe, is ultimately a mystery, the human being is ultimately a mystery. Only faith, which is larger than science, can sustain this truth. **JA**

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