

Dual-Time Concept and Mythology Illuminate Intersection of Science and Religion (The Non-linear Time Concept Illuminates the Intersection of Religion and Science.v2)

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Abstract: Ancient records have numerous examples of concurrent, but different, accounts of time passage for the same events. The ambiguity leads to unreliable dating and diminished credibility in the factual nature of the events. As a result, ancient stories, particularly those with religious ties, are often designated as mythology with no scientific credibility. We show that viewing these stories with a dual-time perspective (linear for the human point-of-view and non-linear for the divine point-of-view) can relieve some of the ambiguity, and demonstrate factual consistency and credibility. As an example, we use the Genesis creation account – showing likely valid fact-based roots. The human perspective is a 24-hour Day, but the scientific record perspective is non-linear. Comparing creation myths and using Kinematic relativity, we present a mathematically-based BCE calibration for the Days, demonstrating that science and Genesis can be seen as totally consistent – differing only in the method of expressing their dates.

Keywords: relativity and biblical time, non-linear time, Genesis and science, Genesis timeline, intersection of science and religion, biblical chronology, creationism, comparative mythology.

Introduction

Modern science takes as truth that time, in this Universe, is linear. Peculiar effects occur deep in the cosmos in the vicinity of massive bodies – like the dead, collapsed stars that form black holes. And, Einstein’s Special Relativity indicates (and has been verified) that the passage of time changes with speed – noticeably so the higher the speeds. But, for us poor mortals during our ordinary lives, time is linear. Each day is made of 24 hours composed of 3600 precisely-measured seconds. A day (today) is exactly the same length as a day 100 years ago, or even thousands of years ago. That allows clocks to have meaning to us, and machines to work properly. Unfortunately, the concept of linear time causes difficulties when one tries to make scientific sense of the timing of some of the most ancient events – a problem non-linear time might help solve.

Every ancient civilization has its tales from the earliest times. Most are accepted as “only” mythology. There are two extreme positions on the significance of the meaning of mythology. Opinions range from ‘simple tales made up to teach morality and social organization to the early emerging society’ to ‘stories of events that are factual, containing at least a kernel of (embellished) truth’.

One group of stories often centers about the exploits of the “super heroes”, the gods and the god-kings. The individuals often possess extra-human strength like Atlas and Hercules in Roman and Greek mythology. One familiar example is the incredible voyage of Odysseus in Homer and his encounters with the Cyclops and the sirens. Another example of a story, once accepted as historic, then questioned as not fact-based is the existence of the Xai dynasty in China and Yu’s taming of the Great flood (1, 2). In recent years, supporting evidence has been

presented that lends credibility to the probable occurrence of both of these events (3, 4), hypothesizing natural explanations for the otherwise legendary (non-factual) nature of the events in question – shifting the probabilities from mythology back to the possibility of reality.

Another trait of characters in this group is that some of the individuals had unnaturally long lifetimes. For example, the god-kings of the mythical Egyptian period reigned hundreds of years according to Manetho but much more human-like times according to Panodorus (5). Similarly, the ancient Sumerian King List (6) indicates the pre-flood kings were granted kingship directly from heaven and reigned 18,000 to 43,000 years each; and, numerous later kings were recorded as reigning hundreds of years by some tablets but only normal times by other records. Efforts to explain the reign lengths and record differences as political or recording errors have not met with complete success. But, the cases of the dual records might indicate two simultaneously different perceptions of time depending on the record.

Another type of ancient literature encompasses the sacred books of religious beliefs, for example, the Rig Veda of the Hindus, the Tau Te Ching of the Chinese, and the Bible of the Hebrews. These writings are more than just moral and philosophical direction to the early population. They also include mysticism, origin stories and often some verifiable historical narrative – generally in poetic form indicating their earliest oral tradition. As a general rule, tradition maintains these writings were inspired truth. Like the super hero category, the origin stories are given little credibility as reflecting “real” knowledge given that the earliest people are accepted as lacking the scientific sophistication of the modern world, and so, had no way to gain actual scientific facts.

An example of this type of story is the biblical Genesis story (7) which provides a picture of the Universe from when it came into being through the arrival of Man. Tradition says it was the inspired word of God as recorded by Moses about 4,000 years ago (some accept it as being told directly, by God, to the “first man”, Adam). The earliest belief was that the Genesis account accurately describes the coming into being of a Man-centered Universe as the result of a purposeful creation act by the Creator God. Because this story laid the ideological foundation for the Judeo-Christian world, it was generally not questioned as truth.

The factual basis of that truth was aggressively challenge by Galileo (8) in 1615 with his defense of the heliocentric solar system, stating that heliocentrism was not contrary to biblical texts and that the Bible was an authority on faith and morals not on science. Later, Louis Agassiz’s evidence for the extreme age of the Earth (9), in 1837, and Charles Darwin’s evolution theory (10), in 1871, shifted the perceptions about Earth’s development, causing the traditional twenty-four-hour creation Days to lose much of their credibility as validly timed events.

The conflict between the old truth and the new science eventually arrived at a truce. In more moderate circles, the interpretation of Genesis gravitated to a more symbolic, separate but equal, understanding of existence (11). We see this attitude expressed as science being recognized as a modern understanding of the material world, while Genesis reflects the symbolism of God’s teachings. Walton (12) elucidates this perspective, stating that “no scientific information is offered in the Bible that would not have been generally known in the ancient world and compatible with old world science.” This attitude is frequently taken to mean that Genesis is not materially consistent with modern science.

The dialog over the intersection of science and religion is the subject of much attention (13, 14). In 2011, a survey of university scientists indicated that the majority of them agreed that, at some level, there was no conflict between science and religion – evolution being one of the main contentious issues (15). Despite this apparent congeniality on the matter, there are still the

two extremes that clash over the “truth” of Genesis especially in the educational environment where the God-implemented creation, rather than the natural evolution is seen as a denial of science (16 – 18) which translates into a conflict over the factual basis of the Genesis account in general.

Although the more moderate creationists recognize the scientifically determined age of the Earth and its evolutionary changes, and, the Days in Genesis are acknowledged to be long (19), there is no systematic method of addressing the changing Day lengths, and natural evolution is not accepted as a competing alternative to specific creation. Attempts to validate Genesis’ factual basis and content are often taken with skepticism on both sides, in part because the breach between the two extreme opposing positions assumes Genesis cannot be shown, in any systematic way, to agree with both sides.

Wiseman (20) proposed a solution to this dilemma. Instead of assuming the actual creation events occurred in six 24-hour days, he presents a case for the idea that the Genesis Days were, in fact, six 24-hour periods, but the narrative indicates God’s instruction to Adam about His creation activities in the long distant past – events that likely took very long in time (as the science point-of-view would require). Further, the need for the six-day chunks of time was required by Adam as a period of rest in between instruction periods – not a limitation on God’s creation abilities. Weisman further postulates that this interpretation is consistent with the fourth Commandment which directs no work be done on the seventh day – a natural (and sacred) commemoration of the creation instruction personally delivered by God Himself.

We agree that Wiseman’s argument is both satisfying and reasonable as far as it goes, but, it is only the first step in resolving the timing question of the science-religion debate. We postulate that the six-day timing is the result of an additional consideration – that the events related in Genesis physically occurred in six definable periods as viewed from a non-human (God’s) perspective. We hypothesize that God’s time (as presented in the Bible) is non-linear, while Adam’s (and our own) time is linear. With this perspective, God’s creation would have, indeed, occurred in six 24-hour Divine Days – each of which is longer than a human 24-hour day – without altering the 24-hour instruction days proposed by Weisman. Further, it is possible with Kinematic Relativity to map the God Days onto the human days, providing, for the first time, the previously lacking systematic method for showing the exact length of each creation Day in human time (hundreds of thousands to billions of years). We present that mapping here, and, show the correlation between the Genesis narratives for each Day with the corresponding science record data.

Our hypothesis takes into consideration Walton’s caution (21), that to understand Genesis, one cannot assume the modern English meanings of these words. One must focus, instead, on how the ancient Hebrews understood their meanings with all of the flexibility that entails. He notes the word “Day” could be interpreted within the context of Genesis 1: as “an interval of time”, but it should be noted that that meaning is not uniformly accepted. (This “time interval” is the meaning used here as describing God’s perspective.) He also notes that the word “create” could be understood to mean “giving function to something” – the completion of a task. In this context, the completed task is assumed to be the end of a development phase of the evolutionary events (as indicated by the scientific record) described for each day.

In the following sections, we, first, compare the biblical narrative of events (for each Day) with scientific record observations that qualitatively appear to describe the same events. The time period encompassed by the biblical creation picture is divided into six intervals. The length of each interval is not explicitly specified except to say, “*there was evening and there was*

morning” on each particular “Day”, but we believe that information about the length is encoded in the description of the events occurring within the intervals.

The scientific record observations have been divided into six well-defined development phases that we hypothesize represent the biblical creation Days. These six phases are separated by specific events (that are scientifically timed with measurement uncertainties), rather than loose qualitative transitions. That is, they present a break with the previous development interval and set up conditions for the next development interval. They mark the end of the creation task for each Day. The scientific event set includes BCE dates (and uncertainties) used later in the correlation of the two time sequences. Following the qualitative comparison, we describe the concept of Kinematic Relativity and non-linear time, and apply its mapping to the calibration of the biblical Days.

Events of Day 1

Genesis 1:1 through 1:5 describes the first creation task, when there was a “*void*” followed by a “*wind*” and then the “*light*”. From a modern cosmological point-of-view, out of the void there was a burst of energy called the Big Bang (BB) which began time and the physical Universe, followed by a brief ($\sim 10^{-33}$ seconds) inflationary expansion of space (as though driven by a powerful wind) (22). By $\sim 10^{-6}$ seconds, the Universe had cooled enough to allow elementary particles to form (23, 24). There was now a distinction between the pre-universe void and created matter/energy that became the particles that now exist in the Universe.

The cosmological dating of the beginning of the Universe is based on observations and model-driven determinations of the age of the oldest stars (25). Using this measure, the BB age has been re-evaluated repeatedly – 13.4 ± 1.6 Ga (billions of years ago) in 1999, 13.8 ± 0.6 Ga in 2012, to the latest best values 13.8 ± 0.02 Ga in 2015 (26) and $14.7 + 0.3 / - 0.7$ Ga in 2017 (27). This wide disparity (particularly in the last two estimates) is due, in large measure, to the different model assumptions used. Burbidge (28) cautioned very early on that model results were strongly dependent on the assumptions used (one being, the amount and distribution of “Dark Matter” added). We consider this caution in selecting the BB date used to end Day 1.

From the “creation” point-of-view, the BB could be the creation task that brought the “*light*” into existence. This event (at $15.0 - 13.8$ Ga is placed at the end of Day 1.

Events of Day 2

Genesis 1:6 through 1:8 describes the second creation task to “*separate the water from the water*.” The concept of the “waters” as the basis of existence is seen in many eastern myths, as in the Egyptian god Nu, the primeval watery mass (29), as the water of creation in Sumerian tradition (30), and Hindu tradition where all was water before the heat of creation (31).

From a modern cosmological point-of-view, this appears to be the time when cosmic and geological “waters” are being differentiated. During the earliest moments of its evolution, the undifferentiated matter/energy in the Universe quickly coalesced into the particles (10^{-6} seconds after the BB) that later started forming stars and galaxies (~ 400 million years after the BB) (32). By 4.6 Ga (~ 9.2 billion years after the BB), the solar system began to form.

Radioactive dating shows the Earth appears to have formed in only about 100 million years after the solar system (33), with its interior differentiating into well-defined layers (during the geological Hadean Eon ending ~ 3.8 Ga) with evidence of sufficient upper crust formation to support plate tectonics ~ 3 Ga (34). The Earth’s atmosphere underwent differentiation (during the Archean Eon ending ~ 2.5 Ga) allowing the build-up of water and methane due to high volcanic

activity and enhanced heavy asteroid bombardment. This fostered the development of the first single-celled microbes ~3.8–3.4 Ga.

But, there was no significant breathable oxygen before ~2.4 Ga. This developmental interval of time ended with the Great Oxidation Event (2.5–2.2 Ga, the beginning of the Proterozoic Period) (35) when photosynthesizing algae developed, contributing to a rapid rise in the atmospheric oxygen needed for the next phase in the development of life.

From the “creation” point-of-view, the Great Oxidation Event could be the completion of the creation task – a break after the early evolution of the Earth, preparing it for the development of life. This event (at 2.5–2.2 Ga) is placed at the end of Day 2.

Events of Day 3

Genesis 1:9 through 1:13 describes the third creation task that “gathered (the waters)” letting the “dry land appear” which then allowed the “earth (to) sprout vegetation.” From a modern science point-of-view, this sounds like continent and ocean building and the development of early vegetation.

Geologically, continent and ocean building did not occur as a single event, but as a cyclic process referred to as tectonic pulsing. This period saw the buildup of a series of super continents (36), the earliest of which was Rodinia (~1,100–750 Ma, millions of years ago). As the super continents repeatedly broke apart and reassembled, they “gathered (the waters)” into new ocean basins each time.

The fossil record shows that tectonic pulsing can be associated with ecosystem and climate changes that impacted the development and diversity of species through sea level changes, volcanic activity, and asteroid impacts associated with radiation spikes (37). During the Cambrian Period, beginning ~543 Ma, (38) there was a major increase in multi-cellular plants and animals with the primitive sea plants, seed ferns and corals flourishing in the CO₂ rich atmosphere.

In the early Devonian Period, beginning ~415 Ma, the Earth’s rotational axis shifted with a drift in the magnetic pole (Pole Wander completed by 390–380 Ma) (39). This led to rapid plate movement as the super-continent Gondwana and Laurussian drifted northward. The warm, humid, ice-free climate (favorable conditions for the previous vegetation development) changed to cooler, drier and glacial. Drastic climate swings and a series of massive extinctions were not conducive to further stable development of plant species for tens of millions of years.

From the “creation” point-of-view, the unfavorable climate swings caused by the Polar Wander could be the completion of the creation task – a break after the development of vegetation, preparing for the development of higher animal life. This event (at 390–380 Ma) is placed at the end of Day 3.

Events of Day 4

Genesis 1, verses 14 through 19 records Day 4 as the time when “lights in the expanse of the sky” first appeared. The most conservative fundamentalist interpret this to mean this was when the sun, moon, and stars were created. The creation of the celestial bodies at this time is inconsistent with modern scientific understanding – that is, after the creation of the Earth (Day 2) and the vegetation (Day 3). This misalignment in the order of appearance creates a major problem with any attempt to correlate the biblical timeline with science. The more moderate creationist recognized the likelihood that the appearance of the “lights” corresponds to atmospheric clearing, but the exact timing has not been universally agreed upon or systematically

determined. To resolve this difficulty, it is proposed that this passage in Genesis reflects the consequences of the major impact contributing to the KP_g (dinosaur) extinction at the end of the Cretaceous Period ~65 Ma. Various dating techniques place the KP_g extinction event between 64.5 and 65.7 Ma (40).

Throughout the Cretaceous period, amphibians, reptiles, carnivores and dinosaurs roamed the Earth. Then, a massive comet impact in Mexico (41) caused devastating environmental effects for more than a decade. Prolonged impact debris and sulfate aerosol clouds decreased solar transmission to 50-80% below normal. This shut down photosynthesis for up to 6 months and reduced surface temperatures to near-freezing conditions globally for a decade. Combining these conditions with acid rain and altered ocean stratification and circulation resulted in the area dependent extinction of 60-80% of all living animals and marine invertebrates. Finally, when the atmosphere cleared, the celestial bodies were again visible from the surface of the Earth.

This atmospheric clearing could be considered the time when the “lights” were placed in the sky. From the “creation” point-of-view, it would represent the end of the “task” for Day 4 – that is, the end of the age of the dinosaurs, leaving the life forms that would survive into the new age or next phase of development. This interpretation of the events could resolve any perceived inconsistency of the “creation” of the lights after the creation of the Earth.

Appealing to another mid-east creation story, can shed some light on the ancient world’s beliefs about creation events in the very distant past. Egyptian mythology describes a catastrophic event in the following way (29). The words of the Egyptian myth are in (“italics”) preceded by the proposed interpretation.

The comet (“*it fell on them their moment*”), filled the atmosphere with dust, debris and hydrocarbon clouds that darkened the sky, blocking the sun (“*through plant-like clouds*”), then the sky cleared. *I* (Neb-er-tcher the creator god) *restored to them what had been taken away from them, and I appeared out of the plant-like clouds.*” Here, traditionally the “I” is also interpreted as the sun.

This myth demonstrates that an impact-like event is entrenched in the ancient mid-east culture. Although it is not linked to the Genesis account, the Egyptian creation myth clearly shows the existence of the sun, followed by a period when the sun’s light was obscured and then finally restored to visibility. This is the scenario hypothesized for Day 4 in Genesis.

One must now address whether the connection between Day 4 and the KP_g extinction impact can be supported by its relative placement in the sequence of the other creation Days. This is done below with the BCE calibration for all six Days provided by the Kinematic Relativity development.

From the “creation” point-of-view, the KP_g extinction could be the completion of the creation task – a break between the old world and the new world development with the life that would survive to evolve into modern form. This event (at 64.5–65.7 Ma) is placed at the end of Day 4.

Events of Day 5

Genesis 1:20 through 1:23 describes the waters bringing forth “swarms of living creatures” and flying “birds.” From a modern science point-of-view, the Paleocene Period (beginning ~65 Ma) saw the extinction and subsequent short-term survival of species with greatly reduced populations in the post impact environment. During the Miocene Climatic Optimum (~17–15 Ma), the planet warmed and there was an onset of opportunistic species blooms and radiation induced evolution of new land, marine and avian species occurred. For the

first time, modern birds, fish and marine invertebrates appeared. This includes the early primates whose line split between the Old and New World monkeys and the other Hominines that eventually evolved into the precursors of earliest Man.

The Earth then became steadily colder in a series of steps (42) as ice returned to Antarctica and glaciers spread across North America and Europe. This step-wise transition to the Great Ice Age was steady except for a brief warming period (10.8–10.7 Ma) associated with the Earth's Orbital Eccentricity Maximum. This brief warming period paved the way for the next phase of evolutionary development to the modern species seen today.

From the “creation” point-of-view, the brief warming at the Orbital Eccentricity Maximum could be the completion of the creation task – the break leading to the development of modern animal species. This event (at 10.8–10.7 Ma) is placed at the end of Day 5.

Events of Day 6

Genesis 1:24 through 1:31 describes the Earth bringing forth “every kind of living creature: cattle, creeping things, and wild beasts.” From a modern science point-of-view, this time (the late Miocene, ending ~5.3 Ma, through the Pliocene, 5.3–2.6 Ma, and into the early Pleistocene geological periods) saw changes in the ecosystem that allowed less developed animal life to evolve into the earliest modern forms that Adam might have seen.

By ~10 Ma, there were widespread grass dominated ecosystems (43) paving the way for the larger grazing mammals, including the modern horse, elk, elephants, camels, bison, as well as, “wild beasts,” such as wolves, foxes, badgers and saber-tooth tigers. The primate line split between the apes and pre-man, as the chimpanzees, gorillas and orangutans appeared (~5–7 Ma), and, *Australopithecus* (pre-man) was first seen (~3 Ma).

The exact lineage and driving force from pre-man to modern man (*Homo sapiens*, *H. sapiens*) is still debated. It is generally agreed that the earliest *Homo* ancestor was from East Africa and dates to 3–2 Ma (44), the time period connecting *Australopithecus* to the earliest species of the *Homo* genus (most notably, *H. habilis*, *H. erectus* and *H. rudolfensis*) who first appeared ~2.5 Ma.

The evolution of the *Homo* genus is the result of diversification in the earlier lineage, followed by extinctions favoring the more generalist populations (45). The period of greatest diversification in East Africa was 1.9–1.8 Ma. The last pre-man had the small brain and body size similar to modern chimpanzees, but already showed signs of upright, bipedal locomotion. By *H. habilis*, brain size had increased ~40%, but otherwise, he was more similar to his predecessor than his successors.

A substantial fossil record indicates that by ~2 Ma, *H. erectus* is found to have the most human-like characteristics and sophisticated tools (46–48). Body size had increased, longer legs allowed long distance running, shoulders now allowed throwing projectiles, and hands and feet were no longer tailored for tree climbing. Brain size increased ~40% again over *H. habilis*, habitation was now primarily land rather than tree dwelling, and the reproduction cycle and development phase was now closer to *H. sapiens*.

The transition in *H. erectus* (1.9–1.5 Ma) makes him the first predecessor of *H. sapiens* and the likely first man (the adam of Genesis – “Let us make man”). The answer to what drove the final transition from more-animal to more-human is still debated – leaving the question of whether there is an identifiable, datable event that marks the point when the eyes of *H. erectus* were opened, and awareness of his cognitive superiority pushed him over the threshold to becoming more human.

Maslin (45) argues that extreme environmental variability led to significant brain expansion, in two large steps occurring ~1.9 Ma and ~200,000 years ago. Iannicelli (49) expands the environmental argument stating that wide-spread wildfires likely forced *H. erectus* to leave Africa ~1.8–1.6 Ma (the “Out of Africa Event 1”), indicating sufficient advancement had allowed the flexibility to move to, and thrive in, other and colder environments. This flexibility came from the consistent and habitual use of fire associated with: cooking, maintaining warmth, providing light and frightening predators.

Wrangham (50) proposes that the controlled use of fire spurred the final transition of *H. erectus* from *H. habilis* due to changes in diet. The change took place when cooking emerging 1.9–1.5 Ma (50, 51), resulting in the divergence of the two species that was more just altered calorie balance of a cooked- over a raw-food diet.

Burton (52) proposes a mechanism for why the domestication of fire, the hallmark of humanness, caused such cognitive and physical advancement. The gradual willingness of early *Homo* to approach and use fire took millions of years to develop, but the final step from use to manufacture allowed the extension of light periods for each day, altering the hormonal cycle of their melatonin. This bio-chemical change, in-turn, enhanced memory formation, leading to expanded cognitive abilities.

Appealing to mythology can shed some light on the ancient world’s primordial memories about the importance of fire to early man. In the Chinese myth of the Fire Driller (Producer) (53), Sui-jen, a traveler who worked for the good of all living beings, discovered the sacred sui-wood fire tree and took with him one of its twigs that carried fire so he could always have fire to use. It was only much later that the Yellow Emperor taught humans to cook. In the Hindu hymn (54), fire (*Agni*) had been *hidden from our* (man’s) *view*. Then *Matarisvan* (a wanderer) *brought* (fire) *to us from far away produced by friction, from the Gods*. The hymn recalls pungent smoke, and that *some go before* (possibly running from it in fear), *and others round about thee sit* (for the benefits it provided and seeing it as a *friend*). In both of these myths, there was no mention of theft or retaliatory anger on the part of the gods.

In the Greek myth of Prometheus (55), the story is quite different. After *God and Nature* created order out of the (pre-universe) *Chaos*, all the animals began to appear. The Titan brothers, Prometheus and Epimetheus, were given the task of bestowing gifts (*faculties necessary for their preservation*) to all the animals. Epimetheus gave away all the gifts – leaving man with none. Prometheus then took fire from the gods and gave it to man, enabling him to subdue the other animals, make weapons, provide warmth in the cold, and produce light in the dark. For his crime, Prometheus was punished and chained to a rock (earth), and, at the same time, Pandora (his brother’s wife) released evil into the world because of her curiosity.

From a comparative mythology point-of-view, Bulfinch (56) recognized a similarity in the Pandora part of the story with the Genesis 2: story of the fall of Adam and Eve due to the tempting (crime) by the serpent. We suggest there may be a greater similarity if one also considers the eastern myths.

In both the eastern myths and Genesis, the center of the action is the tree that has a “gift” denied to man – one fire and the other is “an apple”. In both the Greek myth and Genesis, the protagonist is punished (because of the unlawful transfer of the “gift” to man) by being bound to the earth – one is chained to a rock and the other is condemned to crawl on his belly.

The major impact of receiving the unlawful gift in the stories is that the “*eyes* (of Adam and Eve) *were opened (to good and bad)*”. In short, the acquisition of fire conveyed previously un-possessioned knowledge – the good of having the ability to cook, stay warm and see in the dark;

the bad of having the ability to make weapons and kill. The relevance of this set of tales seems to parallel Burton's proposal that the fire opened the eyes of early man leading to advances in cognitive development that did not happen to the animals without habitual fire manufacture and use.

Further, we suggest that the Genesis 2: "*tree of knowledge*" was the fire-producing tree of type in the Chinese myth; the "*apple*" was the symbolic remembrance of the fire being voluntarily embraced (for cooking and other things) of Wrangham and of Burton; and, the "*cherubim and the fiery ever-turning sword*" driving Adam and Eve from the Garden (Genesis 3:) was a primordial memory of the wildfires of Iannicelli that drove *H. erectus* in the "Out of Africa Event 1". (Speculation about "*the tree of life*" that gave immortality requires further investigation of possible parallels between science and mythology.)

From the "creation" point-of-view, the *opening of the eyes* (and the beginning of awareness by *H. erectus* as the first true man) could be the completion of the creation task – the first to manufacture fire and migrate from Africa (the "Out of Africa Event 1"). This event (at 1.9 – 1.5 Ma) is placed at the end of Day 6.

To complete the picture, after the end of Day 6, the "creation tasks" ended, but, the evolutionary development process continued. By ~250,000 BCE early *H. sapiens*, *H. neanderthalensis* and other descendents of *H. erectus* are found. By ~150,000 BCE modern humans are recognized, and by ~25,000 years ago (after some evidence of inter-breeding among the *Homo* members) *H. sapiens* remains the non-extinct member of the group as modern Man (57, 58). The first complex language is postulated to have appeared by ~40,000 BCE; and evidence of the first farming occurred in the Levant by ~10,000 BCE. Finally, the individual Adam is born (traditionally ~6000 years ago).

Kinematic Relativity and the Calibration of the Genesis Days

The correlation between the science ending event times and the Days uses a mathematical expression based on Kinematic Relativity to give the BCE calibration. Imagine that the Genesis point-of-view is a relativistic one, in the scientific sense of two observers traveling in space-time with different timescales.

The reference to relativity typically brings to mind the Relativity of Einstein (59) which is based on a four-dimensional space-time. Three are spatial and one is time, and all four are connected, that is they are not independent of one another. Einstein assumes equivalence in the laws of nature for all observers whatever their positions and relative states of motion. That is, everyone will see nature act the same way. It requires all observers make their measurements using the same rigid ruler and uniformly ticking standard clock. It also requires linear time in all reference frames. This form of relativity is the one that science has accepted (and is verifying) as valid from our point-of-view as occupants of the Universe. Although this is the most familiar relativity form, other versions have been proposed that differ radically.

One version of particular relevance to the Days' calibration is known as Kinematic Relativity (KR) proposed by Milne (60) in 1948. Like Einstein's relativity, KR is based on a four-dimensional space-time. However, in KR, the laws of nature may be the same, but how the Universe is seen will be different for observers in different reference frames. In KR, this means that time-dependent physical phenomena (like the decay of a neutron for example) will be measured differently by different observers.

The most important concept of KR is that of the passage of time. It assumes that any observer can locate two local events as a sequence (one later than the other). However, it does

not require uniform time flow (i.e., an evenly running clock). This dynamical time provides for the existence of different time-scales (unlike Einstein's relativity which has shifted but equivalent time-scales in different reference frames). This form of relativity is the one that could explain the Genesis timeline from God's point-of-view outside of this Universe.

Milne investigated a system with a set of independent observers, each with their own clock but no universal clock synchronization method. He postulated that it was possible for one observer to re-graduate his clock so that he could, in some sense, keep the same time as the other observers. The re-graduation, done on a point-by-point basis, was possible given the right mapping function (representing a particular type of clock) so that all observers could agree on a universal time.

Milne's solution had one observer with a clock based on one time coordinate, t -time, where this observer had constant-velocity motion relative to the other observers. The second observer had a clock based on a different time coordinate, τ -time, where this observer was at rest. Milne's mapping function takes the form:

$$(1) \quad \tau = t_0 \log_{10}(t/t_0) + t_0$$

The zero of t -time (t_0) is the origin and fundamental event – when the separation of the observers vanished and events initially were seen simultaneously. For (1), $t > 0$, but it can take on values less than t_0 . In τ -time, when $t < t_0$, τ takes place in negative time. This situation is analogous to BCE dates represented as negative dates.

The Days' calibration uses a slightly modified version of Milne's function. Because of the Sumerian influence on the Hebrew culture (the Hebrew patriarch, Abraham, came from Ur, a Sumerian city of much repute), the log-base is changed to "6". The Sumerians were known to have a mathematical system (61) based on a mixture of both "6" and "10" rather than "10" alone as is common in our current Western culture. In the correlation here, the base-6 part of the Sumerian number system is seen in log-base, modifying Milne's function as:

$$(2) \quad \text{End-of-Day} = \tau/t_0 = \log_6(t_0/t) + 1.$$

The reversal of the log argument (t_0/t rather than t/t_0) results from the direction of time flow ($t_0 > t$) in the calibrated t -time system (i.e., years BCE are represented as positive numbers decreasing from t_0 as time moves forward.) The scaled coordinate τ/t_0 is identified as the end-of-Day in the Days timeline, and t is the BCE calendar year on science record timeline.

To apply the function, the t_0 needs to be identified. This is done by considering another mid-east tradition – the Hindu cyclic Universe where there is a periodic destruction of all matter in the Universe followed by a creation event. The timing of the destruction is encoded in the sacred Kalpa cycles (62) – a set of long period major cycles intertwined with short period minor cycles. These cycles are precisely calibrated to modern BCE dates. The Hindu major (kapla) cycle starting at 14,932,947,087 BCE begins with a massive destructive event that left a mass-less void (our pre-Universe condition). The beginning of the first creation portion of the fourth minor (manvantaras) Hindu cycle after the mass-less void is achieved, occurs at 14,004,147,087 BCE. It is this event that we chose as t_0 .

Table 1 summarizes the mapping results. It compares the computed mapping time for each Day with the time of the corresponding observed scientific ending event. It shows that for each Day, the mapped time and the observed scientific ending event time corresponds well

within the data uncertainty. This indicates that the functional form of the transformation is providing a valid mapping. Note that the Days' events are consistent with the science record (in content and order of occurrence) assuming the KT extinction is Day 4. (Appendix A shows the effect of varying t_0 .)

The protracted timeline, supported by the mapping, implies that the human species (mankind) is the "adam" appearing on Day 6. This appears at odds with the most conservative fundamentalist interpretation of the Bible that traditionally accepts Adam the individual as being created on Day 6. However, it is clear from comparisons of the Hebrew and the Sumerian traditions that the extended picture is not out of line.

The Sumerian tradition (63) indicates that, when "mankind" was first created, it had much in common with the animals. "No clothes were worn". "They grazed in the fields and drank water from the ditches." This description is in keeping with the modern anthropological view of "early man" when the tool makers shared more in common with the apes and pre-man than the thinkers ("modern man"). The end of this myth indicates that Man ("the thinker") was finally "given breath" (the names and language) and the knowledge of agriculture.

Concluding Remarks

We note that describing the biblical narrative in terms of God's creation activities versus scientific evolution is not intended to elevate one perspective over the other. The point of our hypothesis is that both points-of-view represent the same events, but they result from a difference in the "Original Cause". Whether the Universe came into being as a result of God's pronouncement as religion contends, or a random quantum fluctuation initiating the Big Bang as science contends, Kinematic Relativity shows a path for a totally consistent picture of its development starting from the moment it began regardless of the starting point.

Sacred ancient texts, with logical consistency in philosophical and theological arguments and reflections, provide religion with justification for its faith and belief in God as the "Original Cause" (64, 65). The ancient religions, including those with or without an extensive pantheon of gods, tend to acknowledge the "One" that emerged from the void to bring the Universe into existence (7, 29, 30, 66 – 68).

Consistency in their data-driven models provides science with evidence for its acceptance of their theory of the beginning. Some believe there is an argument for science as having become a "secular religion" (69), primarily based on the evolution versus specific creation of man debate. The argument could be extended to make a case for the initiating quantum fluctuation being an allegory for a creator god. This analogy, however, can be contested because from a scientific perspective there is no way to determine the "true cause" of the fluctuation before the Universe and time came into existence. As Hawking (70) notes, "To ask what happened before the beginning of the Universe would be a meaningless question".

However, being a meaningless question to science in no way invalidates the validity of the sacred texts as containing "real" information about the beginning. The ability to identify a transformation between the biblical Days and specific events in the scientific record may not be simple coincidence. It may illustrate a profound knowledge, in the ancient world, of the reality of the evolution of the Universe, including the Earth and its life.

Table 1. This compares the end-of-Day mapping times (column 2) with the associated dates bracketing the science record event Ending the development period (column 4). The mapped time is the BCE calibration for the Genesis Day (τ/t_0 of equation 2). The italicized words above the dotted line in column 3 are the Genesis description of events during the Day. The words below the dotted line indicate the science record evolution during the entire development period.

<i>Genesis Day</i>	<i>Mapped End-of-Day Date (millions of years ago)</i>	<i>Genesis Creation Task</i> Corresponding Scientific Development & Ending Event	Ending Event Date (millions of years ago)
1	14,004.1	“void” followed by “let there be light” Pre-Universe state. Ending with the Big Bang event	15,000 – 13,800
2	2,334.0	“separate water from water” Formation of stars, galaxies, solar system, & Earth and its atmosphere. Ending with the Great Oxidation event	2,500 – 2,200
3	389.0	“gathering the waters” & “vegetation” Continent and ocean building, development of early vegetation, seed ferns and corals. Ending with the Polar Wander event	390 - 380
4	64.8	“let there be lights in the sky” Populated by amphibians, reptiles, carnivores and dinosaurs. Ending with the KT extinction event	65.7 – 64.5
5	10.8	“swarms of living creatures” & “birds” Evolution of new land, marine and avian species. Ending with the Orbital Eccentricity Maximum event	10.8 – 10.7
6	1.8	“every kind of living creature” and “man” Appearance of grazing animals, wild predators, primates and early man. Ending with fire and “Out of Africa Event 1”	1.9 – 1.5

However, two issues with the religious texts as containing “real” information arise. The first is the issue of specific creation. Since Kinematic Relativity provides consistency between the Genesis timeline and the scientific record timeline (and specific creation cannot), religion is faced with accepting (and in most cases does) the idea of natural law driving the evolution of the Universe. This acceptance is analogous to the ancient Egyptian picture of how the Creator runs the Universe (71). That is, the Creator was the equivalent of a hands-off manager – once the

Universe was brought into existence, He allowed evolution to carry on through the laws of nature that He established.

The second issue is how the ancients came by the “real” information given their apparent lack of what we recognize as modern science (including data gathering ability). This issue is not understood today by any science we currently recognize. Non-scientific-recognized theories include the information coming from: God directly, direct instruction by visiting aliens, mystical practices, psychical experiences and other less defined ideas. A lack of a verifiable theory is taken by many as support for the idea that there is no “real” information in Genesis. Currently, a potential theory that is scientifically accepted does not yet exist and requires further study.

Finally, we hasten to point out that the case of credible scientific content in Genesis is far from proven by the calibrated BCE dates for the Days obtained through the Kinematic Relativity transformation. The existence of a successful transform does not prove (and was not intended to prove or imply) the existence of a creating deity. Nor does it prove (and was not intended to prove or imply) that science and natural evolution by the laws of nature disprove the existence of God or are the ultimate answer to existence. But, using consistency (between the science data record and the KR transform predicted dates) as a measure of evidence, and assuming the hands-off manager analogy for the creator God, we have shown both Genesis and the science record can be seen as representing the same events. The transform demonstrates that the dual-time perspective offers plausible support for a credible scientific basis to Genesis – an intersection between a scientific perspective and the religious-based symbolism of the Bible.

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APPENDIX A

Effect of Varying t_0 on Mapping Predictions

Table A.1 This shows the variation of the predicted BCE year for each of the creation Days. M is the minor manvantaras (Mantu) cycle of the kapla starting at 14,932,947,087 BCE. Within each kalpa there are 14 Mantu cycles. Concurrently, there are 1000 minor maha-yuga (Yuga) cycles starting at the beginning of the kalpa – giving 71 or 72 creation periods (associated with the Yuga) within each Mantu. The M = 4, 1st creation period entries are the values from Table 1 based on the $t_0 = 14,004,147,087$ BCE. The entries in bold are those predicted values within the scientific record dating of the End-of-Day events.

Day	M = 1	M = 3		M = 4		
	1 st creation period (Ma)	1 st creation period (Ma)	50 th creation period (Ma)	1 st creation period (Ma)	15 th creation period (Ma)	50 th creation period (Ma)
1	14,933.0	14,315.1	14,099.2	14,004.1	13,939.3	13,788.1
2	2,488.8	2,385.9	2349.9	2334.0	2323.2	2298.0
3	414.8	397.6	391.6	389.0	387.2	383.0
4	69.1	66.3	65.3	64.8	64.4	63.8
5	11.5	11.0	10.9	10.8	10.8	10.6
6	1.92	1.84	1.81	1.80	1.79	1.77