CREATION RESEARCH SOCIETY

QUARTERLY

Volume 62 Fall 2025 Number 2

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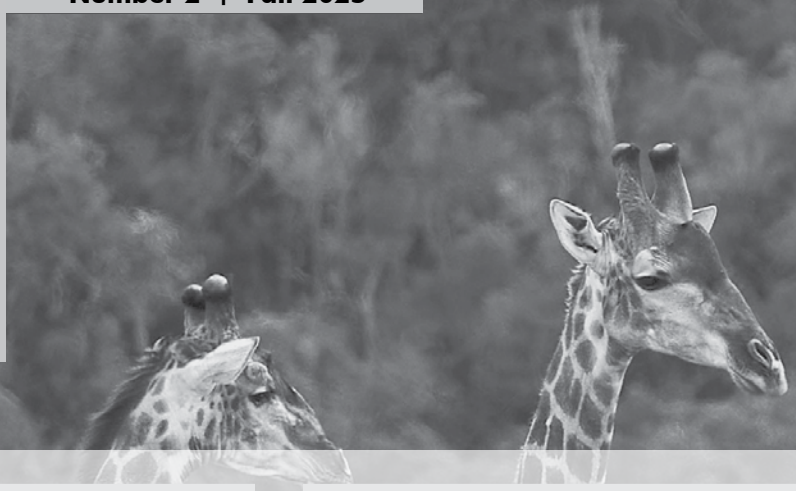

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Haec Credimus

For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested on the seventh. —Exodus 20:11

Cover by Michael E. Erkel, Afton, Virginia

Cover photos by Brian Kester

Design services by Cindy Blandon, cblandon@aol.com

The *Creation Research Society Quarterly* is published by the Creation Research Society, 1 W. Firestorm Way #145, Glendale, AZ 85306, and it is indexed in the *Christian Periodical Index* and the *Zoological Record.*

Send papers on all subjects to the Editor: CRSQeditor@creationresearch.org or to Tim Clarey, 1806 Royal Lane, Dallas, TX 75229.

Send book reviews to the Book Review Editor: Mary Beth Kaiser, Book Review Editor, marybethd4@gmail.com.

ISSN 0092-9166

Printed in the United States of America

Editorial

In Memory of Dr. James J.S. Johnson

On July 20, 2025, Dr. James J. S. Johnson unexpectedly left this world to be with our Lord Jesus. Jim served the last few years as the Biblical Studies Editor for *CRSQ*. He was also my colleague at ICR for the past 12 years, my friend, and my brother in Christ. Dr. Johnson was born in Washington, D.C. on April 28, 1956. He was 69 when he passed and is survived by his wife Sherry, his three children, and eight grandchildren.

One of Jim's favorite verses was, "Nevertheless do not rejoice in this, that the spirits are subject to you, but rather rejoice because your names are written in heaven" (Luke 10:20).

This issue of *CRSQ* contains his last two articles that were submitted and reviewed. The first is entitled, *Exegetical Notes on Genesis 2: God is Glorified in Creating Mankind in His Own Image*. He was the sole author. And Jim was one of the co-authors of the second article entitled, *Extensive Messianic Prophecy Corruptions and Flood-Related Chronology Errors Disqualify the Septuagint (LXX) Revisited and Expanded.*

Jim's passion for the Word of God is exemplified in these articles and in his many past articles in *CRSQ* and in other journals.

Dr. Tim Clarey
Editor

Post-Flood Paleoclimate: Reexamining the Sediment and Ice Core Records in Light of the Global Flood

Kadyn Kunisaki*

Key Words: Cenozoic Era, Climate Change, Global Flood, Ice Age, Paleoclimatology

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Accepted for publication November 11, 2024

Abstract

The term *climate change* is widely used but often understates the severity projected in secular climate literature. Within mainstream science, *climate change* frequently functions as shorthand for *catastrophic climate change*, with careful phrasing employed to minimize questioning of the prevailing consensus. The observational record does indicate a clear warming trend since the mid-twentieth century; however, creationists do not dispute these data. Instead, the point of contention lies in the secular interpretation of paleoclimate records, particularly those extending far beyond the period of human observation. This paper reexamines Cenozoic Era sediment and ice core records, which secular scientists cite as evidence for catastrophic climate change. It will be shown that the Biblical record—specifically the Global Flood and post-Flood Ice Age—offers a superior explanatory framework for paleoclimate data, challenging the historical basis for climate alarmism.

Simple Summary

This article suggests that understanding Earth's past climate, called paleoclimatology, is more accurate when viewed through the Biblical story of the Global Flood and the Ice Age that followed, instead of the common scientific view. Mainstream science assumes Earth is millions of years old and uses information from ancient sediment and ice to warn about "catastrophic climate change." However, this paper argues that these interpretations are mistaken. By taking the *same* climate data and re-dating it to fit a Biblical timeline (for example, placing the Global Flood around 4,375 years ago), the author believes that very warm periods in Earth's past were actually part of the warm global climate during and right after the Flood. He explains that the quick cooling seen in the data after the Flood was due to widespread volcanic activity and increased evaporation, which then led to a single Ice Age. While secular scientists suggest many different reasons for climate shifts over long periods, this study proposes that the Global Flood is the main, powerful event that explains the entire paleoclimate record. The author concludes that worries about catastrophic human-caused climate change are based on an incorrect understanding of Earth's climate history, emphasizing God's promise that such a global catastrophe will not happen again.

Disclaimer: *According to Mike Oard, creation scientists have not thoroughly examined the deep-sea sediments used in this study (Oard, 2024, personal communication). The intent is simply to show that the secular climate reconstruction, even with its circular reasoning and favorable dating practices, better fits the Biblical framework.*

Introduction

Paleoclimatology provides insight into Earth's climate history and is widely used by secular scientists to calibrate climate models, assess climate sensitivity, and develop analogs for future climate states. On the surface, this appears neutral, as understanding past climates can help predict future trends. However, if secular assumptions—particularly uniformitarianism and its millions-of-years' timeline—are inaccurate, then paleoclimate reconstructions reflect a fundamentally flawed interpretation of the past. This study addresses that issue by reframe-

ing Cenozoic paleoclimatology within a Biblical framework. The paper begins by describing the methodology and datasets employed, followed by a summary of the secular interpretation of the paleoclimate record. It concludes with a reinterpretation of the record according to the Biblical timeline. While secular research struggles to converge on a consensus regarding the primary drivers of past climate changes, the Biblical framework provides a coherent explanation, connecting the paleorecord directly to the catastrophic Global Flood.

Methodology

The paleoclimate reconstructions in this study are derived from stacked deep-sea benthic foraminiferal oxygen-isotope curves (Lisiecki and Raymo, 2005; Zachos et al., 2008) and high-resolution deuterium (stable hydrogen isotope) profiles from the European Project for Ice Coring in Antarctica (EPICA) Dome C ice core record (Jouzel et al., 2007). The first two curves (Lisiecki and Raymo, 2005; Zachos et al., 2008), covering 65 Ma to 100 ka, were translated into temperature profiles using the Hansen et al. (2013) prescription, which converts deep sea oxygen isotope ratios to sea surface temperatures. This prescription generates profiles mirroring figures in Hansen et al. (2013) and Haywood et al. (2019). For the EPICA Dome C ice core record, the temperature profile, covering 100 ka to 70 years before present, is based on the conversion of stable hydrogen isotope measurements. Reported values in Jouzel et al. (2007) were divided by a standard amplification factor to convert polar to global temperatures (Hansen et al., 2013).

Original data from Zachos et al. (2008), Lisiecki and Raymo (2005), and Jouzel et al. (2007) were dated using the secular timeline; therefore, the paleoclimate reconstructions in Figure 1 extend back to ~65 Ma. To reframe the temperatures into the Biblical framework, primary reference horizons (ie.Flood/post-Flood Boundary, Glacial Maximum, Ice Age End) in the reconstruction were dated using the Masoretic Text (Wright, 2012), as well as the timeline for the post-Flood Ice Age (Oard, 2019). The data points following the Flood/post-Flood Boundary were linearly interpolated between reference horizons. From this methodology, it is important to mention that any climate data before the Flood/post-Flood Boundary reflects a high level of uncertainty because of turbulent sedimentation occurring during the Flood year. After the Flood/post-Flood Boundary though, sedimentation rates subside to near-uniformity, which allows for a more accurate conversion of oxygen isotope ratios to surface temperature.

The use of linear interpolation assumes that sedimentation rates reached uniformity immediately following the Flood/post-Flood Boundary. While a simplifying assumption, it is sufficient for illustrating post-Flood temperature trends to first approximation. Maximum and minimum temperatures at the post-Flood Boundary and Glacial Maximum provide upper and lower bounds for estimating the overall post-Flood cooling rate. Future studies may refine this approach by considering non-linear sedimentation decay rates following the Flood/post-Flood Boundary, potentially applying Vardiman (1996)'s exponential model.

Data Availability Statement: Datasets for this study were retrieved from the website Real Climate, which provides data for Zachos et al. (2008), Lisiecki and Raymo (2005), and Jouzel et al. (2007), as well as other temperature reconstructions extending back to the hypothetical Cambrian Period (Schmidt, 2014).

Oxygen Isotope Ratios

Before discussing secular versus Biblical interpretations of the paleoclimate record, it is important to understand isotope ratios and their correlation to temperature. Oxygen, for example, has three stable isotopes: ^{16}O, ^{17}O, and ^{18}O. These occur in the atmosphere in proportions of approximately 99.757%, 0.038% and 0.205%, respectively (Rosman and Taylor, 1998). Using the global average proportion of the heavier ^{18}O isotope to the lighter ^{16}O isotope (0.205/99.757), scientists can determine oxygen isotope ratio deviations ($\delta^{18}O$) for different periods in the record. Theoretically, this deviation provides information about the environment when and where the record formed. In uniformitarian thought, the precipitation rate is proportional to the temperature throughout the record; therefore, the isotope ratio accurately details past precipitation rates and temperatures (Oard, 2005).

Issues do preclude a straightforward conversion of $\delta^{18}O$ into temperature values though. Many variables, such as the oxygen isotope ratio of evaporating seawater, the distance of travel for moisture from its source region, and precipitation intensity, complicate the use of isotope ratios as a temperature proxy, specifically during the Pleistocene Ice Age (Vardiman, 1997; Oard, 2020). Additionally, there is debate about whether $\delta^{18}O$ values are better interpreted as a function of environmental temperature or ice sheet extent (Oard, 1984; Hebert, 2014). Despite these factors, this study presumes that isotope ratios are an effective proxy for relaying relative warming and cooling trends in paleoclimates following the Flood/post-Flood Boundary.

A second issue with paleoclimate records, specifically those derived from sediment and ice cores, is circular reasoning in dating reference horizons (Hebert, 2014). While concerns are warranted regarding chemical "wiggles"

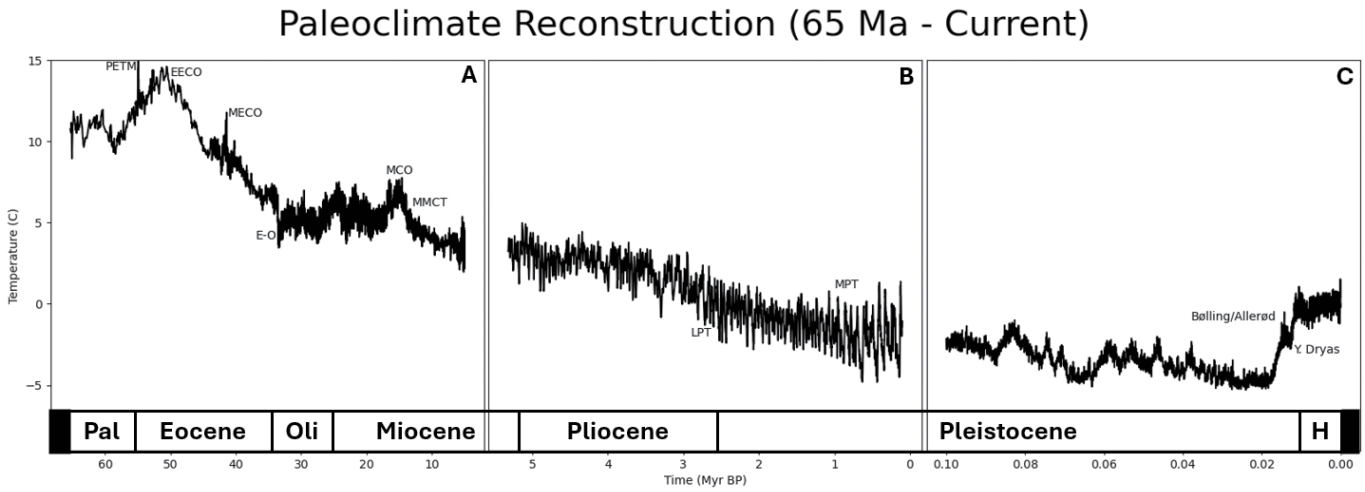

Figure 1. Secular paleoclimate reconstruction from the Paleocene to Holocene. Box A displays data from Zachos et al. (2008), Box B displays data from Lisiecki and Raymo (2005), and Box C displays data from Jouzel et al. (2007). Each major climatic event (labelled in figure) is covered in detail within the paper. The 0°C line on the temperature axis is based on the Pre-Industrial Average.

in Cenozoic sediments, as well as supposed glacial-interglacial cycles of the Pleistocene Ice Age, the relative ages of reference horizons provide a general idea of when warm and cool climates occurred in Earth history. Using these relative dates from secular studies, the paleoclimate record can be reinterpreted into a Biblical framework. Conceptually, this aligns with Vardiman (1996) where the sediment record following the Cretaceous/Tertiary Boundary was reinterpreted using a young Earth framework, albeit Vardiman (1996) used an exponential decay rate for sedimentation following his Flood/post-Flood Boundary.

Primary Assumptions: Following the Flood/post-Flood Boundary, isotope ratios in sediment and ice core records provide a reasonably accurate assessment of temperature trends and relative dating in paleoclimate reconstructions.

Paleoclimatology–Secular Framework

The following section presents the secular framework for paleoclimate reconstructions. Its purpose is to highlight the extensive research conducted on each identified "major climate change" while emphasizing that, despite the volume of study, there remains no consensus regarding the primary causal mechanisms driving these events.

Eocene Epoch

The Eocene Epoch (approximately 56–33.9 Ma) was the warmest period in the Cenozoic Era (Zachos et al., 2008). This was an interval of significant atmospheric CO_2 concentration (minimum 1,125 p.p.m.v., parts per million by volume), consisting of warm climatological features, such as the Paleocene-Eocene Thermal Maximum (PETM), the Early Eocene Climatic Optimum (EECO), and the Middle Eocene Climatic Optimum (MECO). The Eocene Epoch also marked the initial transition from greenhouse to icehouse climate, otherwise known as the Eocene-Oligocene (E-O) Transition (~33.7 Ma). These four features are highlighted in Figure 1a, a temperature conversion based on Zachos et al. (2008).

Paleocene-Eocene Thermal Maximum

The PETM (~56.3 Myr ago), a transient hyperthermal (or rapid warming event) embedded in the warming trend of the Early Eocene, is thought to have lasted 200 kyr with a global temperature increase of 5–8°C, all of which occurred in less than 10,000 years (Zachos et al., 2008; McInerney and Wing, 2011). One study estimated the average global mean surface temperature increased to 31.6°C during this period (Inglis et al., 2020).

The PETM coincides with significant carbon release, verified by a large negative carbon isotopic excursion (CIE), as well as dissolution of deep-ocean carbonates. Secular scientists have proposed many carbon sources, such as methane hydrates and permafrost, to explain the 10,200 petagrams (10^{15}) of carbon (PgC) released during the PETM; however, many recent studies suggest that volcanism better explains the increase (Gutjahr et al., 2018; Tierney et al., 2019; Haynes and Honisch, 2020). Gutjahr et al. (2018) stated:

> "We find strong evidence for a much larger (>10,000 PgC) and on average isotopically heavier carbon source than considered previously. This leads us to identify volcanism associated with the North Atlantic Igneous Province (NAIP), rather than carbon from a surficial reservoir, as the main driver of the PETM" (Gutjahr et al., 2018).

Jones et al. (2019) proposed another feature of the NAIP—methane produced by sub-horizontal sheets of magma—as the most likely source for the large mass of carbon released during the PETM. In modelling, lateral mantle flow rates were 100–200 mm yr^{-1} above current flow speeds in the NAIP sill province, which allowed for high magma production rates and rapid release of carbon into the atmosphere and shallow oceans (Jones et al., 2019).

Although the consensus view for the cause of warming during the PETM is carbon release from volcanism, a few studies have offered astronomical (or Milankovitch) cycles as another potential mechanism for the onset of the PETM (Li et al., 2022; Piedrahita et al., 2022). This follows from studies suggesting that warming preceded the release of carbon by several thousand years (Slujis et al., 2007; Slujis et al., 2011). If accurate, these relegate NAIP volcanism to a long-term positive feedback mechanism during the Eocene Epoch rather than a causal mechanism (Jones et al., 2019). This does not negate CO_2's role in warming; however, it does highlight an unknown initial cause for the PETM.

Early Eocene Climatic Optimum

Occurring between 53–51 Ma, the EECO resides at the primary peak of the Late Paleocene to Early Eocene warm period. One estimate calculated the average global mean surface temperature during the period was 27°C, approximately 14°C warmer than the pre-industrial average (Inglis et al., 2020). Considered a product of increased CO_2 levels, the EECO's concentration is estimated at 1400ppm, although published values range anywhere from 500–3000ppm (Anagnostou et al., 2016).

Two primary causes have been suggested for EECO warming: transient hyperthermal events, such as the PETM, Eocene Thermal Maximum (ETM)-2, and ETM-3, and enormous volcanic eruptions, such as those associated with the Pana Formation in Southern Tibet (Lauretano et al., 2015; Zhang et al., 2023). Both naturally lead to increases in atmospheric CO_2 concentration, and therefore, can theoretically explain the long-term warming associated with this period.

Middle Eocene Climatic Optimum

The MECO, which began approximately 40.6 Ma with peak warming at 40 Ma, marked a rapid reversal of the long-term cooling that began following the EECO (Bohaty et al., 2009). The MECO was a period of high CO_2 concentrations (as high as 4000 ppmv) and global warming, exhibiting a 4–6°C increase in surface and deep ocean temperatures (Bohaty et al., 2009; Pearson, 2010). Immediately following the short lived MECO, the climate experienced a rapid cooling with subsequent return to pre-MECO temperatures within 200 kyr (Bohaty et al., 2009).

The cause of the MECO is still debated. A study by Bohaty and Zachos (2003) suggested either metamorphic decarbonation in the Himalayan orogeny or ridge volcanism associated with plate reorganization as the mechanism for the transient rise in CO_2 levels. Another study suggested a volcanic arc flare-up in the Neotethys subduction zone causing massive volcanism in Iran and Azerbaijan (van der Boon et al., 2021). This follows from the dating of Eocene rocks in Iranian volcanic provinces around 40 Ma (van der Boon et al., 2021). Van der Boon et al (2021) also estimated a total CO_2 release between 1052 and 12,565 PgC, which is compatible with MECO carbon release. Still other studies suggest Milankovitch cycles as the cause of MECO warming (Westerhold and Rohl, 2013; Giorgioni et al., 2019).

Eocene-Oligocene Transition

According to Coxall and Pearson (2007), The E-O Transition was a major period of climate change at 33.7 Ma that lasted approximately 500 kyr. Characterized by a +1.5 per mil rise in oxygen isotopic values of benthic foraminifera, the E-O Transition marked the initial shift from greenhouse to icehouse climate (Liu et al., 2009; Hren, 2013). It also marked the first semi-permanent continental scale Antarctic ice sheets (Coxall and Pearson, 2007).

The cause of the E-O Transition is widely debated; however, three possible mechanisms are often invoked: declining greenhouse gases, the opening of the Southern Ocean gateway allowing Antarctic ice build-up, and Milankovitch cycles (Coxall and Pearson, 2007; Katz et al., 2008; Hren, 2013). Although there seems to be agreement that all three played a role in the transition, many studies suggest that either the CO_2 concentrations reached levels that ultimately triggered rapid ice expansion on Antarctica or that ice expansion led to CO_2 sequestration (Deconto and Pollard, 2003; Pagani et al., 2005; Hren et al., 2013). Regardless, CO_2 concentrations during the Late Eocene Epoch, which ranged between 1000 and 1500 ppmv, rapidly decreased to current concentrations during the Late Oligocene (Pagani et al., 2005).

Miocene Epoch

The E-O Transition marked the initial shift from greenhouse to icehouse climate; however, the Miocene Epoch (23–5 Ma) that followed exhibited a dynamic climate of early and late glaciation interrupted by a 2 Myr green-

house interval known as the Miocene Climatic Optimum (MCO) (Steinthorsdottir et al., 2020). The general trend of the Miocene (and Pliocene) Period(s) though was a gradual cooling culminating in the Pleistocene Ice Age. Figure 1b shows the two primary features of the Miocene Epoch: the MCO and the Middle Miocene Climatic Transition (MMCT).

Miocene Climatic Optimum

The MCO, which occurred between 17–14 Ma, was a period of global warming ~3–4°C above present temperatures (Sosdian et al., 2020). A phase of relatively high CO_2 concentration (470–630 ppm), the MCO is considered a strong analog for future climates following the Intergovernmental Panel on Climate Change (IPCC)'s Representative Concentration Pathway (RCP) 4.5 or RCP 6.0 scenarios (Sosdian et al., 2020; Steinthorsdottir et al., 2020).

Many studies suggest the MCO was caused by enhanced volcanism and magmatism associated with the Columbia River Basalt Group (CRBG) (Mckay et al., 2014; Kasbohm and Schoene, 2018; Sosdian et al., 2020). Three lines of evidence support this theory: first, during this period, a total of 4090–5670 PgC was released into the atmosphere, which when included with cryptic degassing of the large igneous province, largely reproduced the atmospheric CO_2 change observed during the MCO (Mckay et al., 2014). Second, data showed that 95% of the CRBG erupted between 16.7 and 15.9 Ma, near the peak of the MCO (Kasbohm and Schoene, 2018). Finally, seafloor magnetic records indicate high crustal production rates between 19 and 14 Ma (Goto et al., 2023).

Middle Miocene Climatic Transition

Following the MCO, the MMCT ushered in a sustained icehouse climate at approximately 14 Ma (Raitzsch et al., 2021). The MMCT was marked by the expansion of the East Antarctic Ice Sheet, as well as a large positive CIE (~1‰) (Raitzsch et al., 2021).

Despite the well-documented isotopic record of the Miocene Epoch, the cause of the MMCT is still highly debated. Some studies have suggested the MMCT followed from the final closure of the Tethys Seaway, a prehistoric ocean that separated Laurasia and Gondwana (Woodruff and Savin, 1989; Wright et al., 1992). However, a recent study concluded that the closure of the Tethys Sea was not the main driver of global cooling and Antarctic Ice Sheet expansion (Hamon et al., 2013). Instead, Hamon et al. (2013) suggest the initiation of the MMCT stemmed from pCO_2 drawdown.

CO_2 decrease during the Miocene Epoch corresponds to the Monterey CIE. The classic interpretation, known as the "Monterey Hypothesis," proposed that long-term cooling invigorated upwelling leading to increased carbon burial rates along the Pacific margins (Vincent and Berger, 1985). However, a more recent study suggested the Monterey CIE CO_2 drawdown arose from increased chemical weathering rates (Raymo, 1994). According to Raymo (1994), "The increased supply of nutrients stimulated productivity in oceanic upwelling zones…leading to enhanced burial and preservation of organic matter in the Monterey Formation and other deposits." This interpretation differs slightly from the "Monterey Hypothesis" in that carbon burial is driven by nutrient delivery to the oceans rather than upwelling (Raymo, 1994).

Pliocene-Pleistocene Epoch

The Pliocene and Pleistocene Epochs, referred to as the Plio-Pleistocene, began approximately 5.3 Ma and lasted until 11.7 ka (Jimenez-Moreno et al., 2019). A period of gradual cooling, the Plio-Pleistocene culminated in the most recent Ice Age, characterized by cyclical glacial–interglacial oscillations. Figure 1b, a temperature conversion based on Lisiecki and Raymo (2005), and Figure 1c, a temperature conversion based on Jouzel et al. (2007), show the temperature reconstruction of the Plio-Pleistocene, highlighting three major events: the Late Pliocene Transition (LPT), the Middle Pleistocene Transition (MPT), and the Pleistocene Glacial Retreat (PGR).

Late Pliocene Transition

The Pliocene Epoch is typically broken into two stages: the Zanclean stage (5.3–3.6 Ma) and the Piacenzian stage (3.6–2.6 Ma) (De Schepper et al., 2014; Jimenez-Moreno et al., 2019). The Zanclean, or Early Pliocene, encompasses the Pliocene Climatic Optimum (PCO), a period of global average temperatures approximately 4°C higher than today and CO_2 concentrations around 410 ppm (Bartoli et al., 2011). The Piacenzian, or Late Pliocene, contains the LPT (Lawrence et al., 2010). During the LPT, CO_2 concentrations decreased by about 100 ppm, which led to significant glaciation in both northern and southern hemispheres (Bartoli et al., 2011; De Schepper et al., 2014).

Two primary mechanisms have been proposed for the LPT: altered heat transport from ocean gateway closures and decreased atmospheric CO_2 (Lawrence et al., 2010). For altered heat transport, Lawrence et al. (2010) stated:

> "The closure of two low latitude ocean gateways, the Panamanian Seaway and the Indonesian Throughflow, have figured prominently in arguments for altered heat transport as the explanation for the end of the Early Pliocene warm period."

Regarding CO_2 concentrations, modest concentration decreases were observed during the LPT; however, associated global cooling allowed for the appearance of sizable ice sheets in the Northern Hemisphere, which

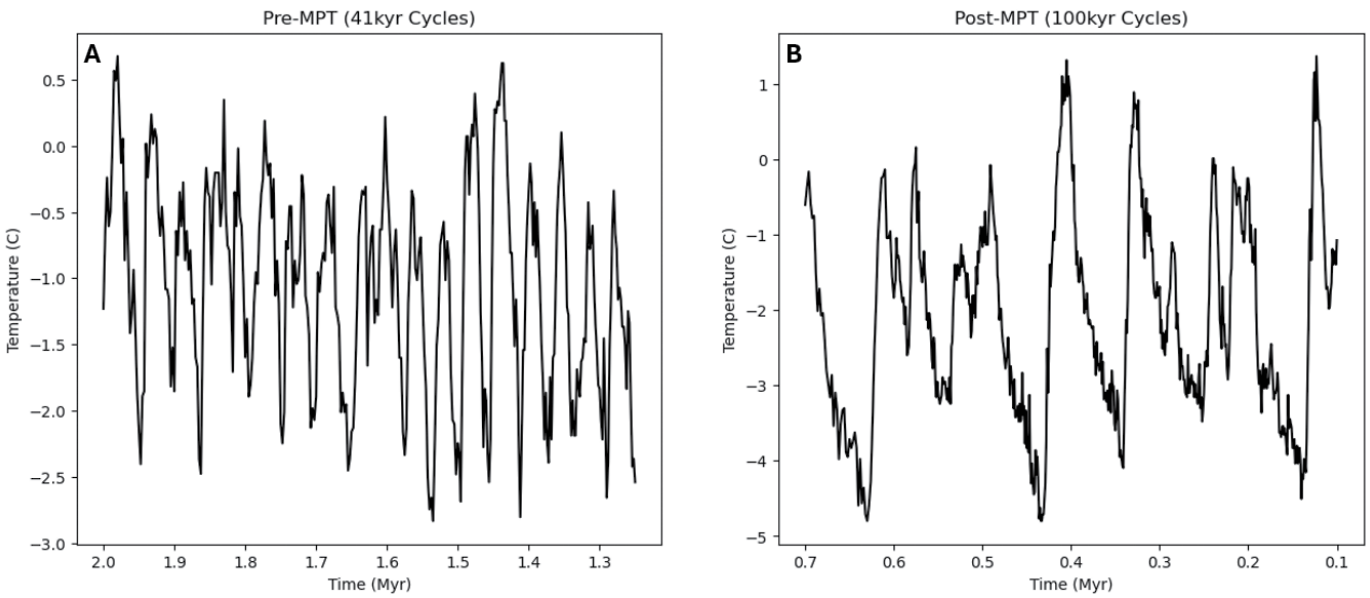

Figure 2. Change in periodicity following the Middle Pleistocene Transition from 41-kyr to 100-kyr cycles. The 0°C line on the temperature axis is based on the Pre-Industrial Average.

intensified the ice-albedo feedback mechanism amplifying regional cooling (Lawrence et al., 2010).

Middle Pleistocene Transition

The MPT, which occurred between 1.25 and 0.7 Ma, marked the major transition in glacial-interglacial cycles from 41-kyr symmetric to 100-kyr asymmetric periods (Willeit et al., 2019). The MPT also brought on "longer, colder, and dustier late Pleistocene ice ages with larger continental ice sheets and lower global sea level" than pre-MPT glacial periods (Chalk et al., 2017). Figures 2a–b show the glacial-interglacial cycles pre- and post-MPT.

The MPT occurred without any major variations in orbital forcing; therefore, the changes to periodicity in glacial-interglacial cycles arose from internal responses of the climate system rather than external forcings (Chalk et al., 2017; Farmer et al., 2019). Internal responses typically fall into one of two categories: ice sheet dynamics or global energy budget adjustments (Chalk et al., 2017). Regarding ice sheet dynamics, a couple of studies suggested the removal of regolith as the mechanism that led to ice sheet growth following the MPT (Clark et al., 2006; Willeit et al., 2019). Both studies (Clark et al., 2006; Willeit et al., 2019) suggested that regolith caused by extensive weathering over 100 Myrs led to more mobile, thinner ice sheets susceptible to orbital forcing. Once the regolith was removed, higher friction induced by Precambrian bedrock led to thicker ice sheets, which drove a change in orbital forcing response from 41 kyr to 100 kyr periodicity (Clark et al., 2006). Regarding global energy budget adjustments, a study by Farmer et al. (2019) suggested a tight linkage between Atlantic Ocean meridional overturning and deep-ocean carbon storage. In the study, they found that carbon inventory increased by 50 gigatons during the MPT, which facilitated deep ocean carbon storage, lowering CO_2 concentrations and enabling the observed expansion of continental ice sheets following the MPT (Farmer et al., 2019).

Pleistocene Glacial Retreat

Deglaciation following the Last Glacial Maximum (LGM) began approximately 19 ka, culminating in significant decreases to large continental ice sheets, such as the Laurentide and Cordilleran Ice Sheets, as well as a global sea level rise of around 120 meters (Shakun and Carlson, 2010; Smith et al., 2011). This period was highlighted by two primary events: the Bølling/Allerød (14.7–12.9 ka) and the Younger Dryas (12.9–11.7 ka) (reference Figure 1c). Ultimately, the PGR filtered into the current Holocene epoch, which is considered an interglacial within the Quaternary Period.

Three primary mechanisms are offered to explain observations during the PGR: CO_2 increase, Boreal summer insolation increase, and Atlantic meridional overturning circulation intensification (Shakun and Carlson, 2010). According to Shakun and Carlson (2010):

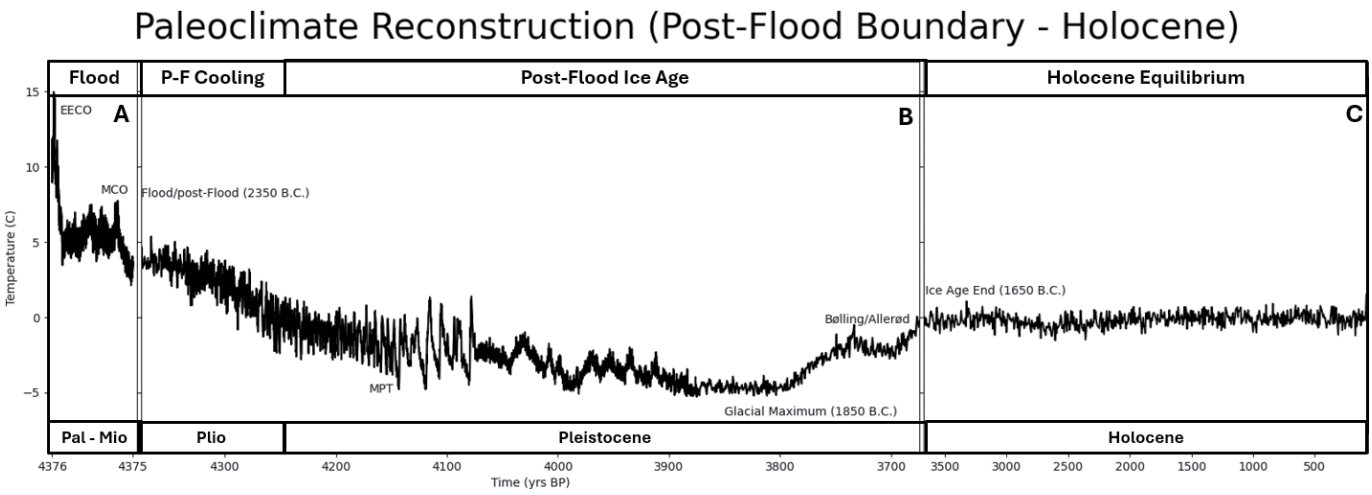

Figure 3. Paleoclimate record compressed into the Biblical timeline from the middle of the flood (~4376 BP) through the Holocene Epoch. Major secular climatic events (labelled in figure) are provided to orient the reader to the data. Notice the timeline is non-linear, meaning Box A represents the end of the Flood year (~7 months), Box B represents the 700-years from the Flood/post-Flood Boundary to the end of the Ice Age, and Box C represents the Holocene Epoch (~3675 years). The 0°C line on the temperature axis is based on the Pre-Industrial Average.

> "The similar timing of the LGM and [deglaciation] between the Northern and Southern Hemispheres suggests that the hemispheres were synchronized at orbital timescales. Atmospheric greenhouse gases are the most likely synchronizer given their global nature."

However, they do note that deglaciation in most records began before CO_2 rose, which signifies CO_2 is a feedback mechanism rather than a cause. Therefore, Shakun and Carlson (2010) suggest that Boreal summer insolation explains the shift toward an interglacial 19–22 ka, while CO_2 increase reinforces the long-term warming pattern. The third mechanism, Atlantic meridional overturning circulation intensification, explains the bipolar seesaw pattern observed in the Northern and Southern Hemispheres. According to Shakun and Carlson (2010), "The Bølling/Allerød and Younger Dryas climate oscillations were an expression of this bipolar seesaw with the Antarctic Cold Reversal representing the opposite sign response of the Southern Hemisphere."

Paleoclimatology—Biblical Framework

The secular perspective of paleoclimatology, with its presupposition of millions of years, treats each sustained climate change as a separate global event, requiring independent causal mechanisms, such as CO_2 fluctuations, Milankovitch cycles, or volcanism. In contrast, the Biblical framework interprets the paleoclimate record as reflecting a single, overarching causal mechanism: the Global Flood. Figure 3 illustrates this reinterpretation by mapping the data from Figure 1 onto a Biblical timeline. The Flood/post-Flood Boundary is placed at 4,375 years before present (BP), corresponding to the Masoretic date of the Flood (circa 2350 BC; Wright, 2012). The Glacial Maximum is positioned at 3,875 years BP, 500 years after the Flood/post-Flood Boundary, and the end of the Ice Age is set at 3,675 years BP, 700 years after the Flood/post-Flood Boundary (Oard, 2019).

Flood/Post-Flood Boundary

Based on deep-sea benthic foraminifera curves and previous creationist research, the Flood/post-Flood Boundary resides near the boundary between the Early Cenozoic warm period and the colder Plio-Pleistocene. This follows closely with the Catastrophic Plate Tectonics (CPT) model developed by Baumgardner (2003), which proposes that the breakup of "the fountains of the great deep" drove rapid subduction of oceanic lithosphere resulting in a new ocean floor by the Flood's end. Lithosphere production, as well as immense volcanism spurred by CPT, warmed the world's oceans causing a significant increase in global temperature, as reflected at the Flood/post-Flood Boundary in Figure 3b (Oard, 1990; Hebert, 2013).

Cenozoic oxygen isotope data deposited prior to the Flood/post-Flood

Boundary corresponds to the Flood Year (Figure 3a). Climate interpretations from this interval are unreliable because the standard equations used to convert oxygen isotope ratios to temperature rely on partition functions that assume a relatively constant temperature. While this assumption becomes reasonable after the Flood—especially as time progresses beyond the Flood/post-Flood Boundary—it is implausible during the Flood itself due to extreme, rapidly changing conditions. What can be inferred, though, is that the global climate was warm during and immediately following the Flood.

The actual date (circa 2350 BC) for the Flood/post-Flood Boundary is based on the Masoretic Text; however, the placement of the boundary in the sediment record is based on temperature maxima found in four locations: the EECO, MECO, MCO, and the Miocene/Pliocene. Because of the progressive nature of the Global Flood, temperature spikes likely indicate catastrophic flood processes; therefore, the final "spike" at the Miocene/Pliocene Boundary indicates a reasonable location for the Flood/post-Flood Boundary (see Figure 3b). This location best aligns with previous research indicating a later end to the Flood—although Oard (2013) and Clarey (2017)'s research favors a slightly later Flood/post-Flood boundary between the Pliocene and Pleistocene.

Although oxygen isotope data supports the Miocene/Pliocene Boundary as the Flood/post-Flood Boundary, its exact placement remains the subject of debate. Positive feedback mechanisms in the climate system—particularly within the carbon cycle—could extend warming beyond the end of the Flood, making a boundary near the EECO plausible. However, CPT-induced subduction zone volcanism complicates this timing, as volcanic aerosols (e.g., SO_2) provide a negative feedback on warming. Consequently, the observed temperature trend depends strongly on climate sensitivity to both CO_2 and volcanic aerosols. Further research is needed to establish baseline sensitivities, which would allow for a more precise placement of the Flood/post-Flood Boundary. Regardless, the paleoclimate record consistently supports a boundary located above the Cretaceous Period.

Post-Flood Cooling

Rapid plate subduction associated with CPT subsided following the Flood; however, vast volcanism continued as the Earth equilibrated, providing a mechanism for rapid cooling of the Earth's climate. According to Abbot and Davies (2012), 1.927 volcanic events are observed in the Greenland Ice Sheet during the Ice Age portion. Data indicate that a single volcanic eruption can produce regional cooling of approximately 0.5°C to 2.5°C. Accordingly, the immense volcanism during the ~500 years between the Flood and the Ice Age maximum likely drove the sustained cooling observed in Figure 3b (Oard, 2019). Additionally, during this period, warm oceans led to increased evaporation and higher snowfall rates on cold mid- and high-latitude land surfaces (Hebert, 2017). Ultimately, it was the coupling of both subduction zone volcanism and increased evaporation that provided the ingredients necessary for the Ice Age, namely cooler summers and increased high latitude precipitation (Oard, 2019).

The rapid post-Flood global cooling observed in this study is consistent with Vardiman (1996), though the rate of cooling is higher due to the compressed timeline of the post-Flood Ice Age. Specifically, the temperature decline from the Flood/post-Flood Boundary to the Ice Age maximum is –0.20°C per decade, approximately 0.06°C per decade faster than Vardiman (1996)'s estimate. By comparison, the magnitude of this natural cooling (0.20°C per decade) is slightly lower than the magnitude of the +0.26°C per decade currently attributed to anthropogenic forcing (Forster et al., 2024). Figure 4 provides a representative depiction of the rapid cooling following the Flood/post-Flood Boundary.

Post-Flood Ice Age

Creationists have conducted considerable research on the post-Flood Ice Age (Hebert, 2013; Clarey, 2019; Oard, 2019; Gollmer, 2023). Although secular scientists propose five major ice ages in Earth history—Mid Precambrian, Late Precambrian, Late Ordovician, Late Paleozoic, and Pleistocene—the sedimentary data from which they infer the first four strongly suggests underwater landslides rather than ice advances (Oard, 2019). This leaves only the Pleistocene Ice Age, an icehouse climate that lasted ~585 years, from the beginning of the Pleistocene Ice Age to the Holocene (reference Figure 3b).

Often referred to as the HEAT model, the Biblical framework of the Ice Age better explains Pleistocene climate (Hebert, 2013). Rather than proposing multiple mechanisms, such as "tipping points" for the transition from greenhouse to icehouse climate (i.e., the Eocene/Oligocene Boundary) or Milankovitch cycles as the pacemaker of glacial-interglacial periods, the Global Flood provides a powerful, singular mechanism to explain the whole of the paleoclimate record, from observed Eocene through Pleistocene cooling to Glacial Maximum and finally to the Ice Age's conclusion (Hebert, 2013; Oard, 2019).

Secular scientists interpret the Pleistocene Ice Age as containing multiple glacial-interglacial cycles (Figures 2a–2b), with the current Holocene Epoch considered an interglacial embedded within this Ice Age (Berger and Loutre, 2002). In contrast, creationists

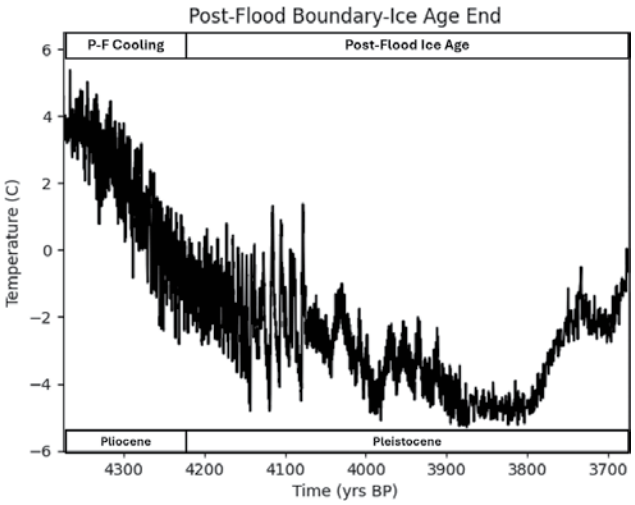

Figure 4. Temperature reconstruction from the Flood/post-Flood Boundary to the end of the Pleistocene Ice Age. This graphic depicts the rapid -0.20°C per decade cooling, as well as the +0.26°C per decade warming following the end of the Global Flood.

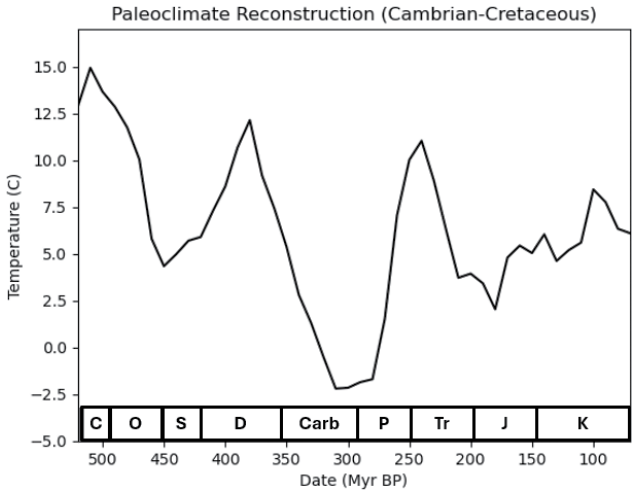

Figure 5. Paleoclimate record during the Flood year from the Cambrian to the Cretaceous. The 0°C line on the temperature axis is based on the Pre-Industrial Average.

argue that these glacial-interglacial cycles are a misinterpretation of ice core records, particularly in the lower portions where annual layers are not preserved (Hebert, 2018). Figure 3b shows the period from the Flood/post-Flood Boundary to the end of the Ice Age. While the glacial-interglacial cycles remain visible even after timeline compression, a reinterpretation of oxygen isotope ratios would likely smooth the curve, as chemical variations at depth reflect shorter-term fluctuations—seasonal or even single-storm events—rather than decade- or century-scale climate changes. Future research will focus on reinterpreting ice core-derived temperatures within the Biblical Ice Age framework.

Ice Age End

According to secular scientists, Earth currently resides in the Holocene interglacial period. The Biblical framework, on the other hand, suggests this "interglacial" is a recovery of the climate system to a post-Flood equilibrium state (see Figure 3c). Following the cessation of CPT, residual catastrophism from the Flood declined to the currently observed rates, the ocean thermohaline circulation balanced, and volcanic aerosols were removed from the stratosphere, all allowing for the climate system to reach the equilibrium state observed for approximately 3,675 years (reference Figure 3c).

Like the rapid cooling trend (reference "Post-Flood Cooling" section), evidence for the strength of natural forcing is also observed in rapid warming from Glacial Maximum to the beginning of the Holocene. During this period, the Earth's climate witnessed a +0.27°C per decade increase in temperature. This rate is 0.01°C greater than current estimates of anthropogenic forcing, which indicates that natural forcing is much stronger than currently assessed.

Discussion

Earlier Climate Records

This paper focuses on the paleoclimate record from the Flood/post-Flood Boundary to the end of the Ice Age (i.e., Cenozoic Era); however, climate reconstructions do exist for the Flood Year. One study often referenced in paleoclimate records is Royer et al. (2004), which provides oxygen isotope ratios extending back to the Devonian Period. Figure 5 displays the Royer et al. (2004) temperature reconstruction derived from oxygen isotope ratios, which stretches from the Devonian Period through the Cretaceous. Although a warming trend emerges following the Triassic/Jurassic Boundary, inferring climatic trends from sediments during the Global Flood is impractical; therefore, these datasets were purposefully omitted.

Volcanism

Secular scientists associate volcanism with many global warming periods in the paleoclimate record (Gutjahr et al., 2018; Kasbohm and Schoene, 2018; van der Boon et al., 2021). They claim CO_2 increases stem from many major volcanic eruptions occurring over periods of thousands to millions of years. Creationists observe the same volcanism in the geologic record; how-

ever, the short Biblical timeline allows eruptions during and immediately following the Flood to function as a cooling mechanism for post-Flood climates. Secular scientists cannot draw these same conclusions because of their commitment to millions of years; therefore, they struggle to explain the origin of the Ice Age.

Climate Change

Periods such as the EECO are frequently used by secular scientists to compare Representative Concentration Pathways (RCPs) to past climates. One study projected that under RCP 8.5, "[future climates would] most closely resemble [the] Eocene" by 2150, with CO_2 concentrations reaching 1,200–2,500 ppmv (Burke et al., 2018; Lunt et al., 2021). However, the likelihood of achieving Eocene-level warming is extremely low, as events like the PETM and EECO were consequences of a unique, never-to-be-repeated Global Flood. This is not to imply that climate change is fabricated—particularly not the IPCC's moderate RCP scenarios—but rather to counter claims of catastrophic climate change, which God has promised will never occur again (Genesis 8:22). Less extreme radiative forcing pathways, such as RCP2.6, are projected to produce climates similar to the Pliocene (~5–3 Ma) by the end of the century (Steinthorsdottir et al., 2020).

Secular scientists claim anthropogenic forcing is rapidly altering the equilibrium state observed throughout the Holocene epoch. Alarming claims of catastrophic climate change fill media headlines; however, creationists believe these stem from a gross misinterpretation of the paleoclimate record. Because secular scientists assume CO_2 concentrations drive major climate changes, they predict Earth could be headed toward unlivable conditions, if humans do not curb emissions. Hansen et al. (2013) perfectly sum up the secular fear of climate change in their closing discussion on global habitability. According to Hansen et al. (2013):

> "The Earth was 10–12°C warmer than today in the Early Eocene and at the peak of the PETM. How did mammals survive that warmth? Some mammals have higher internal temperatures than humans, and there is evidence of evolution of surface-area-to-mass ratio to aid heat dissipation…However, human-made warming will occur in a few centuries, as opposed to several millennia in the PETM, thus providing little opportunity for evolutionary dwarfism to alleviate the impacts of global warming. [The authors] conclude that the large climate change from burning all fossil fuels would threaten the biological health and survival of humanity, making policies that rely substantially on adaptation inadequate."

Biblical creationists do not share this same fear because we know the paleoclimate record tells a vastly different story. If secular scientists would simply start from the actual historical record of origins, rather than the theories of evolution and uniformitarianism, they would see that the paleoclimate record points to the catastrophic Global Flood!

Conclusion

In this study, it was shown that secular paleoclimate reconstructions provide compelling evidence for the Biblical framework. Of course, interpretations of deep-sea sediments are subject to human error, especially when created with uniformitarianism in mind, but thankfully, Christians also have the infallible Word of God to support our interpretation of the paleoclimate record. Furthermore, Christians have the Word of God to support claims against catastrophic climate change. After Noah and his family exited the Ark and sacrificed offerings on the altar, God promised that he would "not again curse the ground…for man's sake" (Genesis 8:21). Furthermore, God told Noah that "while the earth remains, seedtime and harvest, and cold and heat, and summer and winter, and day and night shall not cease" (Genesis 8:22). When the paleoclimate record is reexamined through the lens of Scripture, the Flood and its aftermath provide a causally sufficient, theologically consistent, and scientifically coherent explanation of Earth's climate history—one that secular models, with their reliance on deep time and unstable cycles, fail to achieve.

References

Anagnostou, E., E.H. John, K.M. Edgar, G.L. Foster, A. Ridgwell, G.N. Inglis, R.D. Pancost, D.J. Lunt, and P.N. Pearson (2016). Changing atmospheric CO_2 concentration was the primary driver of Early Cenozoic climate. *Nature* 533:380–384.

Bartoli, G., B. Honisch, and R.E. Zeebe. 2011. Atmospheric CO_2 decline during the Pliocene intensification of Northern Hemisphere glaciations. *Paleoceanography* 26(4).

Baumgardner, J.R. 2003. Catastrophic plate tectonics: The physics behind the Genesis Flood. *International Conference on Creationism,* Volume 5. Creation Science Fellowship, Pittsburgh, PA.

Berger, A., and M.F. Loutre. 2002. An exceptionally long interglacial ahead? *Science* 297(5585):1287–1288.

Bohaty, S.M., J.C. Zachos, F. Florindo, and M.L. Delaney. 2009. Coupled greenhouse warming and deep-sea acidification in the Middle Eocene. *Paleoceanography* 24(2).

Bohaty, S.M., and J.C. Zachos. 2003. Significant Southern Ocean warming event in the Late Middle Eocene. *Geology* 31(11):1017–1020.

Burke, K.D., J.W. Williams, M.A. Chandler, A.M. Haywood, D.J. Lunt, B.L.

Otto-Bliesner 2018. Pliocene and Eocene provide best analogs for near-future climates. *Proceedings of the National Academy of Sciences* 115(52):13288–13293.

Chalk, T.B., M.P. Hain, G.L. Foster, E.J. Rohling, P.F. Sexton, M.P.S. Badger, S.G. Cherry, A.P. Hasenfratz, G.H. Haug, S.L. Jaccard, A. Martinez-Garcia, H. Palike, R.D. Pancost, and P.A. Wilson. 2017. Causes of Ice Age intensification across the Mid-Pleistocene Transition. *Proceedings of the National Academy of Sciences* 114(50):13114–13119.

Clarey, T. 2017. Local catastrophes or receding Floodwater? Global geologic data that refute a K-Pg (K-T) Flood/post-Flood Boundary. *CRSQ* 54(1):100–120.

Clarey, T. 2019. Subduction was essential for the Ice Age. *Acts and Facts* 48(3).

Clark, P.U., D. Archer, D. Pollard, J.D. Blum, J.A. Rial, V. Brovkin, A.C. Mix, N.G. Pisias, and M. Roy. 2006. The Middle Pleistocene Transition: Characteristics, mechanisms, and implications for long-term changes in atmospheric pCO2. *Quaternary Science Review* 25(23–24):3150–3184.

Coxall, H.K., and P.N. Pearson. 2007. The Eocene-Oligocene Transition. *Deep-Time Perspectives on Climate Change: Marrying the Signal from Computer Models and Biological Proxies*. Geological Society of London, London, UK.

DeConto, R.M., and D. Pollard. 2003. Rapid Cenozoic glaciation of Antarctica induced by declining atmospheric CO2. *Nature* 421:245–249.

De Schepper, S., P.L. Gibbard, U. Salzmann, and J. Ehlers. 2014. A Global Synthesis of the Marine and Terrestrial Evidence for Glaciation During the Pliocene Epoch. *Earth-Science Review* 135:83–102.

Farmer, J.R., B. Honisch, L.L. Haynes, D. Kroon, S. Jung, H.L. Ford, M.E. Raymo, M. Jaume-Segui, D.B. Bell, S.L. Goldstein, L.D. Pena, M. Yehudai, and J. Kim. 2019. Deep Atlantic Ocean carbon storage and the rise of 100,000-year glacial cycles. *Nature Geoscience* 12:355–360.

Forster, P.M., C. Smith, T. Walsh, W.F. Lamb, R. Lamboll, B. Hall, M. Hauser, A. Ribes, D. Rosen, N.P. Gillett, M.D. Palmer, J. Rogelj, K. von Schuckmann, B. Trewin, M. Allen, R. Andrew, R.A. Betts, A. Borger, and T. Boyer. 2024. Indicators of global climate change 2023: Annual update of key indicators of the state of the climate system and human influence. *Earth System Science Data* 16(6):2625–2658.

Giorgioni, M., L. Jovane, E.S. Rego, D. Rodelli, F. Frontalini, R. Coccioni, R. Catanzariti, and E. Ozcan. 2019. Carbon cycle instability and orbital forcing during the Middle Eocene Climatic Optimum. *Scientific Reports* Volume 9. Creation Science Fellowship, Pittsburgh, PA.

Gollmer, Steven M. 2023. A rapid Ice Age and transition to ice sheet growth. *International Conference on Creationism* 9:267–279.

Goto, K.T., M.L.G. Tejada, E. Tajika, and K. Suzuki. 2023. Enhanced magmatism played a dominant role in triggering the Miocene Climatic Optimum. *Communications Earth and Environment,* Volume 4.

Gutjahr, M., A. Ridgwell, P.F. Sexton, E. Anagnostou, P.N. Pearson, H. Palike, R.D. Norris, E. Thomas, and G.L. Foster. 2018. Very large release of mostly volcanic carbon during the Paleocene-Eocene Thermal Maximum. *Nature* 548(7669):573–577.

Hamon, N.P. Sepulchre, V. Lefebvre, and G. Ramstein. 2013. The role of Eastern Tethys Seaway closure in the Middle Miocene Climatic Transition (ca. 14 Ma). *Climates of the Past* 9(6):2687–2702.

Hansen, J., M. Sato, G. Russell, and Kharecha, P. 2013. Climate sensitivity, sea level, and atmospheric carbon dioxide. *Philosophical Transactions of the Royal Society,* Volume 371.

Haynes, L.L., and B. Honisch, 2020. The seawater carbon inventory at the Paleocene-Eocene Thermal Maximum. *Proceedings of the National Academy of Sciences* 117(39):24088–24095.

Haywood, A.M., P.J. Valdes, T. Aze, N. Barlow, A. Burke, A.M. Dolan, A.S. von der Heydt, D.J. Hill, S.S.R. Jamieson, B.L. Otto-Bilesner, U. Salzmann, E. Saupe, J. Voss. 2019. What Can Paleoclimate Modelling Do for You? *Earth Systems and Environment* 3:1–18.

Hebert, J. 2014. Circular reasoning in the dating of deep seafloor sediments and ice cores: The orbital tuning method. *Answers Research Journal* 7:297–309.

Hebert, J. 2018. Tephra and inflated ice core ages. *Journal of Creations* 32(3):4–6.

Hebert, J. 2013. Was there an Ice Age? *Acts and Facts* 42(12).

Hren, M.T., N.D. Sheldon, S.T. Grimes, M.E. Collinson, J.J. Hooker, M. Bugler, and K.C. Lohmann. 2013. Terrestrial cooling in Northern Europe during the Eocene-Oligocene Transition. *Proceedings of the National Academy of Sciences* 110(19):7562–7567.

Inglis, G.N., F. Bragg, N.J. Burls, M.J. Cramwinckel, D. Evans, G.L. Foster, M. Huber, D.J. Lunt, N. Siler, S. Steinig, and J.E. Tierney. 2020. Global mean surface temperature and climate sensitivity of the Early Eocene Climatic Optimum (EECO), Paleocene-Eocene Thermal Maximum (PETM), and Latest Paleocene. *Chemical Geology* 211(1–2):47–69.

Jimenez-Moreno, G.J.N. Perez-Asensio, J.C. Larrasoana, F.J. Sierro, D. Garcia-Castellanos, A. Salazar, J.M. Salvany, S. Ledesma, M.P. Mata, and C. Mediavilla. 2019. Early Pliocene Climatic Optimum, cooling and early glaciation deduced by terrestrial and marine environmental changes in SW Spain. *Global and Planetary Change* 180:89–99.

Jones, S.M., M. Hoggett, S.E. Greene, and T.D. Jones. 2019. Large igneous province thermogenic greenhouse gas flux could have initiated Paleocene-Eocene Thermal Maximum climate change. *Nature Communications* Volume 10.

Jouzel, J., V. Masson-Delmotte, O. Cattani, G. Dreyfus, S. Falourd, G. Hoffman, B. Minster, J. Nouet, J.M. Barnola, J. Chappellaz, H. Fischer, J.C. Gallet, S. Johnsen, M. Leuenberger, L. Loulergue, D. Luethi, H. Oerter, F. Parrenin, G. Raisbeck, D. Raynaud, A. Schilt, J. Schwander, E. Selmo, R. Souchez, R. Spahni, B.

Stauffer, J.P. Steffenson, B. Stenni, T.F. Stocker, J.L. Tison, M. Werner, and E.W. Wolff. 2007. Orbital and millennial Antarctic climate variability over the past 800,000 years. *Science* 317:793–796.

Kasbohm, J., and B. Schoene. 2018. Rapid eruption of the Columbia River flood basalt and correlation with the Mid-Miocene Climate Optimum. *Science Advances* 4(9).

Katz, M.E., K.G. Miller, J.D. Wright, B.S. Wade, J.V. Browning, B.S. Cramer, and Y. Rosenthal 2008. *Nature Geoscience* 1:329–334.

Lauretano, V., K. Littler, M. Polling, J.C. Zachos, and L.J.Lourens. 2015. Frequency, magnitude, and character of hyperthermal events at the onset of the Early Eocene Climatic Optimum. *Climates of the Past* 11(10):1313–1324.

Lawrence, K.T., S. Sosdian, H.E. White, and Y. Rosenthal. 2010. North Atlantic climate evolution through the Plio-Pleistocene climate transitions. *Earth and Planetary Science Letters* 300(3–4):329–342.

Lisiecki, L.E., and Raymo, M.E. 2005. A Pliocene-Pleistocene stack of 57 globally distributed benthic δ18O records. *Paleoceanography* 20(1).

Liu, Z., M. Pagani, D. Zinniker, R. Deconto, M. Huber, H. Brinkhuis, S.R. Shah, R.M. Leckie, and A. Pearson. 2009. Global cooling during the Eocene-Oligocene Climate Transition. *Science* 323(5918):1187–1190.

Lunt, D.J., F. Bragg, W. Chan, D.K. Hutchinson, J. Ladant, P. Morozova, I. Niezgodzki, S. Steinig, Z. Zhang, J. Zhu, A. Abe-Ouchi, E. Anagnostou, A.M. de Boer, H.K. Coxall, Y. Donnadieu, G. Foster, G.N. Inglis, G. Knorr, P.M. Langebroek, C.H. Lear, G. Lohmann, C.J. Poulsen, P. Sepulchre, J.E. Tierney, P.J. Valdes, E.M. Volodin, T.D. Jones, C.J. Hollis, M. Huber, and B.L. Otto-Bliesner. 2021. DeepMIP: Model intercomparison of Early Eocene Climatic Optimum (EECO) large-scale climate features and comparison with proxy data. *Climates of the Past* 17(1):203–227.

McInerney, F.A., and S.L. Wing. The Paleocene-Eocene Thermal Maximum: A perturbation of carbon cycle, climate, and biosphere with implications for the future. *Annual Review of Earth and Planetary Sciences* 39:489–516.

McKay, D.I.A., T. Tyrrell, P.A. Wilson, and G.L. Foster. 2014. Estimating the impact of the cryptic degassing of large igneous provinces: A Mid-Miocene case study. *Earth and Planetary Science Letters* 403:254–262.

Oard, M.J. 1990. *An Ice Age Caused by the Genesis Flood*. Institute for Creation Research, El Cajon, CA.

Oard, M.J. 2005. *The Frozen Record: Examining the Ice Core History of the Greenland and Antarctic Ice Sheets*. Institute for Creation Research, Dallas, TX.

Oard, M.J. 2013. Geology indicates the terrestrial Flood/post-Flood boundary is mostly in the Late Cenozoic. *Journal of Creation* 27(1):119–127.

Oard, M.J. 1984. Ice Ages: The mystery solved? Part II: The manipulation of deep-sea cores. *Creation Research Society Quarterly* 21(3):125–137.

Oard, M.J. 2020. Ice core oscillations and abrupt climate changes: Part 1—Greenland ice cores. *Journal of Creation* 34(3):99–108.

Oard, M.J. 2019. The unique post-Flood Ice Age. *Creation* 41(4):44–47.

Pagani, M., J.C. Zachos, K.H. Freeman, B. Tipple, and S. Bohaty. 2005. Marked decline in atmospheric carbon dioxide concentrations during the Paleogene. *Science* 309(5734):600–603.

Pearson, P.N. 2010. Increased atmospheric CO_2 during the Middle Eocene. *Science* 330(6005):763–764.

Piedrahita, V.A., S. Galeotti, X. Zhao, A.P. Roberts, E.J. Rohling, D. Heslop, F. Florindo, K.M. Grant, L. Rodriguez-Sanz, D. Reghellin, and R.E. Zeebe. 2022. Orbital phasing of the Paleocene-Eocene Thermal Maximum. *Earth and Planetary Science Letters* 598(15).

Raitzsch, M., J. Bijma, T. Bickert, M. Schulz, A. Holbourn, and M. Kucera. 2021. Atmospheric carbon dioxide variations across the Middle Miocene Climate Transition. *Climates of the Past* 17(2):703–719.

Raymo, M.E. 1994. The Himalayas, organic carbon burial, and climate in the Miocene. *Paleoceanography* 9(3):399–404.

Rosman, K.J.R., and P.D.P. Taylor. 1998. Isotopic compositions of the elements (technical report): Commission on atomic eeights and isotopic abundances. *Pure and Applied Chemistry* 70(1):217–235.

Schmidt, Gavin (2014). Can we make better graphs of global temperature history? *Real Climate*. https://www.realclimate.org/index.php/archives/2014/03/can-we-make-better-graphs-of-global-temperature-history/.

Shakun, J.D., and A.E. Carlson. 2010. A global perspective on Last Glacial Maximum to Holocene climate change. *Quaternary Science Reviews* 29(15–16):1801–1816.

Slujis, A., H. Brinkhuis, S. Schouten, S.M. Bohaty, C.M. John, J.C. Zachos, G. Reichart, J.S. Sinninghe Damste, E.M. Crouch, and G.R. Dickens (2007). Environmental precursors to rapid light carbon injection at the Palaeocene/Eocene Boundary. *Nature* 450:1218–1221.

Slujis, A., P.K. Bijl, S. Schouten, U. Rohl, G.J. Reichart, and H. Brinkhuis. 2011. Southern Ocean warming, sea level, and hydrological change during the Paleocene-Eocene Thermal Maximum. *Climate of the Past* 7(1):47–61.

Smith, D.E., S. Harrison, C.R. Firth, and J.T. Jordan. 2011. The Early Holocene sea level rise. *Quaternary Science Reviews* 30(15–16):1846–1860.

Sosdian, S.M., T.L. Babila, R. Greenop, G.L. Foster, and C.H. Lear. 2020. Ocean carbon storage across the Middle Miocene: A new interpretation for the Monterey Event. *Nature Communications,* Volume 11.

Steinthorsdottir, M., H.K. Coxall, A.M. de Boer, M. Huber, N. Barbolini, C.D. Bradshaw, N.J. Burls, S.J. Feakins, E. Gasson, J. Henderiks, A.E. Holbourn, S. Kiel, M.J. Kohn, G. Knorr, W.M.

Kurschner, C.H. Lear, D. Liebrand, D.J. Lunt, T. Mors, P.N. Pearson, M.J. Pound, H. Stoll, and C.A.E. Stromberg. 2020. The Miocene: The future of the past. *Paleoceanography and Paleoclimatology* 36(4).

Tierney, J.E., J. Zhu, M.Li, A. Ridgwell, G.J. Hakim, C.J. Poulsen, R.D.M. Whiteford, J.W.B. Rae, L.R. Kump. 2022. Spatial patterns of climate change across the Paleocene-Eocene Thermal Maximum. *Proceedings of the National Academy of Sciences* 119(42).

Van der Boon, A., K.F. Kuiper, R. van der Ploeg, M.J. Cramwinckel, M. Honarmand, A. Slujis, and W. Krijgsman. 2021. Exploring a link between the Middle Eocene Climatic Optimum and Neotethys continental arc flare-up. *Climate of the Past* 17(1):229–239.

Vardiman, L. 1997. Rapid changes in oxygen isotope content of ice cores caused by fractionation and trajectory dispersion near the edge of an ice shelf. *Journal of Creation* 11(1):52–60.

Vardiman, L. 1996. The sands of time: A Biblical model of deep sea-floor sedimentation. *Creation Research Society Quarterly* 33(3):191–198.

Vincent, E., J.S. Killingsley, and W.H. Berger. 1985. Miocene oxygen and carbon isotope stratigraphy of the tropical Indian Ocean. *The Miocene Ocean: Paleoceanography and Biogeography*. https://pubs.geoscienceworld.org/gsa/books/edited-volume/172/chapter-abstract/3792450/Miocene-oxygen-and-carbon-isotope-stratigraphy-of?redirectedFrom=fulltext.

Westerhold, T., and U. Rohl. 2013. Orbital pacing of Eocene climate during the Middle Eocene Climate Optimum and the Chron C19r Event: Missing link found in the tropical Western Atlantic. *Geochemistry, Geophysics, Geosystems* 14(11):4811–4825.

Willeit, M., A. Ganopolski, R. Calov, and V. Brovkin. 2019. Mid-Pleistocene Transition in glacial cycles explained by declining CO_2 and regolith removal. *Science Advances* 5(4).

Woodruff, F., and S.M. Savin. 1989. Miocene deepwater oceanography. *Paleoceanography* 4:87–140.

Wright, D. 2012. Timeline for the Flood. *Answers in Genesis*. https://answersingenesis.org/bible-timeline/timeline-for-the-flood/

Wright, J.D., K.G. Miller, and R.G. Fairbanks. 1992. Early and Middle Miocene stable isotopes: Implications for deepwater ocean circulation and climate. *Paleoceanography* 7:357–389.

Zachos, J.C., Dickens, G.R., and Zeebe, R.E. 2008. An Early Cenozoic perspective on greenhouse warming and carbon-cycle dynamics. *Nature* 451:279–283.

Zhang, S., W. Ji, H. Chen, L.A. Kirstein, and F. Wu. 2023. Linking rapid eruption of the Linzizong volcanic rocks and Early Eocene Climatic Optimum (EECO): Constraints from the Pana Formation in the Linzhou and Pangduo Basins, Southern Tibet. *Lithos* Volumes 446–447:107159.

Sons of God—Fallen Angels or a Godly Lineage? A Fresh Look

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Key Words: fallen angels, Flood, marriage, Nephilim, Noah, rulers, Sethites

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Accepted for publication November 30, 2024

Abstract

Who are the 'sons of God' in Genesis 6:1–4? This question has intrigued many commentators throughout church history. Were they fallen angels? Mighty rulers and noblemen? According to the Biblical data, they were most likely a dwindling godly lineage of men from Adam to Noah who sinned against God by marrying whosoever they chose, regardless of whether they were in the faith or not. Noah was the last of this lineage, saved from the Flood. Important applications of this view are also discussed.

Simple Summary

The article explores the long-standing mystery of who the 'sons of God' mentioned in Genesis 6:1–4 really were, a question that has interested Bible experts for centuries. It explores three main ideas: that they were powerful kings or rulers, fallen angels (demons) who had children with human women, or a godly line of humans descended from Seth until Noah. The author argues that the idea of kings or rulers doesn't fully explain why God would bring a global flood, and strongly rejects the popular 'fallen angels' view, stating that it contradicts what the Bible teaches about angels (that they don't marry or have children) and how God generally interacts with His people. Instead, the article supports the view that the 'sons of God' were the godly descendants of Seth who chose to marry ungodly women based on their appearance rather than their faith. This choice, the author explains, led to widespread corruption and wickedness among humanity, which ultimately caused God to send the Flood. This interpretation, known as the Sethite view, is presented as the most consistent with the overall narrative of the Bible.

Introduction

Genesis 6 speaks about a peculiar group of people, namely the so-called 'sons of God':

> "Now it came to pass, when men began to multiply on the face of the earth, and daughters were born to them, that the sons of God saw the daughters of men, that they were beautiful; and they took wives for themselves of all whom they chose. And the Lord said, 'My Spirit shall not strive with man forever, for he is indeed flesh; yet his days shall be one hundred and twenty years.' There were giants on the earth in those days, and also afterward, when the sons of God came in to the daughters of men and they bore children to them. Those were the mighty men who were of old, men of renown." (Genesis 6:1–4)

The sons of God have raised the interest of many people all throughout church history. A small group of theologians state that the sons of God refer to kings or rulers. According to a popular modern view, the sons of God are fallen angels who married women on Earth and had sexual relations with

them. Furthermore, some interpreters think that one of the reasons that God brought about the Flood, four verses later, was to eliminate the wicked offspring that originated from these sexual unions.

This popular view has been held by many different groups in modern times. In this paper, I will examine the merits and difficulties of this view in the light of Scripture and church history. Instead, another view with more currency shall be compared to the fallen angel view, which says that the sons of God were a godly lineage of men, leading from Seth to Noah, here referred to as the Sethite view.

Kings or Rulers?

According to some interpretations, the 'sons of God' may refer to rulers, judges, or other types of men in high positions who took women for themselves as they pleased, possibly even multiple wives. Sometimes mighty people are even called gods (Psalm 82:6). Exodus 4:16 says this about Aaron and Moses: "He shall speak for you to the people, and he shall be your mouth, and you shall be as God to him." Exodus 21:6, 22:8, and 22:28 mention judges as gods. For example, Exodus 22:28 says this: "Thou shalt not revile the gods, nor curse the ruler of thy people."

According to this interpretation, these kings or rulers may be what are known as the Nephilim and the Gibborim (the mighty men of renown) in Genesis 6:4. So, for example, Psalm 82 describes how God is chastising the rulers for neglecting the poor and oppressed (verses 2–4). In verse 6, God says "nevertheless, like men you shall die, and fall like any prince" (Bastiaansen, 2012, p. 7).

Genesis 4:17–24 describes the ungodly line of Cain, ending with Lamech, who boasts that he will kill a man if he merely hurts him. Cain built the city of Enoch, indicating that the human population could have increased dramatically by his time. According to one interpretation, these people could have brought forth these mighty kings, who sought renown instead of God's glory, which may have contributed to the growing levels of violence before the Flood (Kline, 1962).

This interpretation doesn't make the best sense of Genesis 6:1–4. The Bible never calls an unrighteous man a son of God. Even prominent figures in Israel's history practiced polygamy, such as Abraham, Jacob, David, and Solomon (Anderson, 2015). Nobles taking lower-class women is nothing out of the ordinary for men of high rank to do, especially during a time when the whole world was plunged into sin (May, 2015). Furthermore, 'the daughters of men' does not imply any class difference, nor is marriage between these two classes particularly forbidden. This would hardly be grounds for the destruction of the world by the Flood. The kings'/rulers' view is non-sequitur, so we shall look at other explanations.

The Fallen Angel View

Proponents of the fallen angel view claim that the 'sons of God' cannot refer to a lineage of men from Adam through Seth until Noah (known as the Sethite view). Rather, they could only refer to a group of angels who had fallen from heaven and then roamed the world (Petrovich, 2020). They say this for two reasons.

First, family heritage does not automatically guarantee piety, which sounds logical. Morris (1976) claims that some of the Sethite lineage perished in the Flood as a sign of unbelief, but this is not actually so. Lamech and Methuselah were the two Sethites closest to the Flood, yet Lamech died five years before, and Methuselah died just before the Flood began (Genesis 5:27). Morris (1976) also claims that these two men also bore strong witness to the people of their day.

Second, according to Genesis 4:25, Seth was a descendant of Adam, הָאָדָם, 'the man.' These men had begun to multiply on the face of the earth, according to Genesis 6:1. Since Seth and his descendants were men, they themselves could not be the sons of God who then went in to the daughters of men, including their own daughters. Seth and his descendants would have to be excluded from these 'sons of God,' named subsequently in Genesis 6:2.

Proponents of the fallen angel view claim that the sons of God refer to fallen angels (demons) who had coveted human daughters for their beauty. They then took human form and married these women, from which they had offspring. Their offspring were called the Nephilim, which, in some versions of this view, became giants before and after the Flood.

According to a variant of the fallen angel view, fallen angels took possession of the bodies of attractive-looking men. These demon-possessed men took for themselves women of equal attractiveness, who had made themselves beautiful using various cosmetics known by that time. The children born to them were also possessed by these demons and fully under their control. The offspring of these unions became giants in stature due to demonic influence on their genetics.

The fallen angels did this to produce a race of hybrid demonized humans who could then oppose the Seed of the woman and prevent their destruction as prophesied in Genesis 3:15. The Flood happened in part to wipe out this evil race of hybrid demonized humans. This view wishes to explain widespread occult phenomena and UFO sightings in the modern day (Morris, 1976).

The author finds fault with many aspects of this view. Therefore, it will

be compared with the Sethite view in the following sections.

The Fallen Angel View in Church History

Proponents of the fallen angel view claim their view is closest to the early church. Authors, such as Chaffey (2019) list several Jewish and early Christian authors in favor of the fallen angel view, starting from the third century BC: Philo of Alexandria (AD 50), Josephus (AD 37–100), Justin Martyr (100–165), Irenaeus of Lyon (115–202), Athenagoras (2nd century), Clement of Alexandria (150–215), Bardesan (154–222), Tertullian (160–225), Commodianus (c. 250), Lactantius (240–320), Eusebius of Caesarea (263–339), Ambrose of Milan (340–397), Jerome (345–420), and Sulpicus Severus (363–420).

Chaffey mentions that the first adherents of the Sethite view arose only later on, such as Rabbi Yochai and Rabbi Jose in the early 2nd century, Symmachus (late 2nd century), Julius Africanus (160–240), Ephrem the Syrian (306–373), John Chrysostom (374–407), John Cassian (360–435), and Augustine (354–430). Alexander, bishop of Constantinople (237/245–337), in his work, writes about the sons of God as being related to the Son of God, Jesus Christ (Schaff, 1910). Alexander of Lycopolis (409–448) writes in a treatise against the Manichaeans that the idea of the giants being the offspring of fallen angels and women is a Jewish fable (Schaff, 1910).

There is some evidence that the fallen angel view is derived from several pagan myths from the surrounding areas. For example, Greek and Canaanite mythology have legends describing how sexually motivated gods interbred with human women, such as the Greek myth of Zeus and Europa (van Gemeren, 1981). Some interpreters even believe that the author of Genesis referred to the 'sons of God' as members of the divine council, the gods of the Near Eastern pantheon (Doedens, 2013). This viewpoint also has some parallels in Book 1 of Enoch, Chapters 3–4.

Afterward, the fallen angel view fell out of favor virtually all throughout the early Middle Ages until the modern era. What should we make of this historical data? Proponents of the fallen angel view say that since the Sethite view came only after the fallen angel view, then it is only a theological innovation. But is this really so clear-cut?

If we follow the logic of the proponents of the fallen angel view, we run into a problem. Their view fell out of favor for around 1,500 years of church history. John 14:16–17 says: "And I will pray the Father, and He will give you another Helper, that *He may abide with you forever*—the Spirit of truth, whom the world cannot receive, because it neither sees Him nor knows Him; but you know Him, for He dwells with you and will be in you." Surely the Spirit of truth would have been able to transmit the truth about Genesis 6:1–4 to His church, especially over a very long period of church history. This indicates that those who were taught by the Holy Spirit adhered to views different from the fallen angel view, such as the Sethite view.

Chaffey's claims about some of these early theologians are debatable. For example, Chaffey quotes Clement of Alexandria, who wrote that "…the angels who had obtained the superior rank, having sunk into pleasures, told to the women the secrets which had come to their knowledge" (Chaffey, 2019). Genesis 6:1–4 states that the sons of God went into the daughters of men and had children by them, so this statement is ambiguous at best. While the Hebrew omits mentioning the specific word 'children,' in some cases the Bible speaks about men representing the entire nation of Israel (for an example, see Numbers 1:1–4). Pseudo-Clementine is also cited by Chaffey: "…and the human race also having multiplied, in the eighth generation, righteous men, who had lived the life of angels, being allured by the beauty of women, fell into promiscuous and illicit connections with those" (Chaffey, 2019, p. 147) If we take Pseudo-Clementine at face value, he is literally talking about righteous men (the line of Seth?) had illicit connections with women. This is evidence contrary to the fallen angel view.

If we look at the history of some other doctrines during church history, we see that there was no clear teaching about them until later on, only after a formative early period when theologians teased out the details. One such important doctrine was the Trinity. It is well known that the church had to wait until the Council of Nicea in 325 AD and even later councils to lay to rest the Christological errors of subordinationism, modalism, Arianism, Eutychianism, Appolinarianism, and Nestorianism. Similarly, even the doctrine of justification was debated in the early centuries leading up to Augustine. According to Berkhof (1937), a form of legalistic moralism made itself known in the early church. Augustine himself also held to a form of justification in which God not only declares the sinner righteous but also makes him such, thereby blurring the lines between justification and sanctification (Berkhof, 1937).

Daniel 12:1–5 is a Biblical example of this. Here God tells Daniel to write down events concerning the end times. Verses 1–4 describe a time of great tribulation that will come upon God's people, who will be protected by the archangel Michael. At the time of the Resurrection, all men, good and evil, will rise, some to everlasting life, but others to everlasting shame. Verse 5 tells us that these words will be sealed until the time of the end, so that those who read them at that time

may understand God's Word concerning them.

If such important doctrines as the Trinity and justification weren't clarified until later, what can we expect from comparatively minor issues, such as the identity of the sons of God in Genesis 6? Just because some of the earliest Jewish and Christian authors may have held to the fallen angel view, followed by a long period of silence, does not seal the argument for the superiority of that view due to proximity, but in some ways argues against it.

What Does the Term 'Son' Mean in the Biblical Languages?

In order to understand what a Biblical word or term means, we must look at all of its occurrences in the Bible. For example, when we look at the New Testament, we see that the term 'sons of God' never refers to angelic beings. Table I lists all the occurrences of the term 'sons of God' in both the Old and New Testaments outside Genesis 6, and whether they reference angels or humans.

The Hebrew word בֵּן (ben) occurs 4,850 times in the Hebrew Bible and has a variety of meanings, which makes it difficult to pinpoint how it is used in Genesis 6. In Hebrew, the context of a word many times determines its meaning. The most common meaning of the word 'ben' is to denote the male offspring of parents, but it can denote any kind of descendant or even an ethnographic distinction, such as the "children of Israel" or the "children of Ammon" (Genesis 19:38).

It may also mean that the individual belongs to or is influenced by something or someone, just like how in English we may call someone a 'son of the South,' or the 'sons of Liberty.' Someone who is a son may be a student (a son of his teacher), a citizen of a city, or even an arrow (Psalm 127:3). To indicate age, Hebrew sometimes even says that someone is "the son of 950 years" (Genesis 5:32) (ISBE).

Similarly, in Greek, the word υἱός (*huios*, Strong's NT 5207) a male offspring, either of men or animals. It may also denote a descendant of a person, for example, Jesus was called the son of David, and the son of Abraham (Matthew 1:1; Matthew 9:27; Matthew 20:30; Mark 12:35; Luke 3:31; Luke 20:41). People can also be sons of a nation, or the followers of a teacher. Jesus is called the Son of God many times in the New Testament. In contrast, Paul calls Elymas the sorcerer a son of the devil in Acts 13:10 because of his wickedness.

The Greek word τέκνον (*teknon*) indicates a child who is physically born into a family. The word is neuter in gender, so only the context helps in elucidating the gender. It stems from the word for giving birth to. However, it may denote spiritual sonship as well. For example, Paul calls Titus his true son (Titus 1:4). The word παῖς (*pais*) also denotes a child or servant, one who has no authority.

Table I. Occurrences of the term 'sons of God' in the Old and New Testaments.

	Angels	Humans
Old Testament	Job 1:6; Job 2:1; Job 38:7, possibly Daniel 3:25	Hosea 1:10
New Testament	—	Matthew 5:9; Luke 3:38; 20:36; Romans 1:4, 8:14–21; Galatians 3:26, 4:4; Hebrews 1:2

What Does the Term 'Sons of God' Really Mean?

In Job 38:7 we read: "When the morning stars sang together, and all the sons of God shouted for joy?" In this part of Scripture, we read about Job's debate with God. Job is silenced when God challenges him as to whether he was there to witness the foundations of the earth? Something that only the created stars and the angels were privy to. Here, the singing of the morning stars is merely a personification of the stars, who, by their very nature, glorify God. Here the term 'sons of God' refers to the angels, who were created good, not fallen ones (Genesis 1:31).

This verse is very important, because, far from supporting the fallen angel view, it contradicts it. Since *all* of the angels were present in heaven during creation, this means that they do not procreate; their number is fixed, and they do not have offspring. In contrast, humans form a race, and they procreate to continue the human kind. This is why Jesus refers to angels as neither marrying nor being given in marriage (Matthew 22:30), one of the goals of which is to procreate. If fallen angels really procreated with women, they would be doing something they were not created to be capable of. While this verse does not explicitly mention fallen angels, it is an argument from silence to suggest that they engage in sexual activity.

Daniel 3:25 describes a fourth being besides Shadrach, Meshach, and Abednego in the fiery furnace, who looked like 'the Son of God.' This being was obviously a benevolent being in that he was there to comfort Daniel's three friends in the midst of the flames. Some commentators say that this is even a reference to Jesus Christ in the flesh before the Incarnation.

Hosea 1:10 is another Old Testament verse that mentions the sons of God: "And it shall come to pass in the place where it was said to them, 'You are not My people,' there it shall be said to them, '*You are sons of the living God*.'" Here, the term 'sons of the living God' refers to humans: members of the nation of Israel, the people of God. This may be the only occurrence of the term 'sons of God' in the Old Testament that refers to humans. But this and similar terms definitely refer to humans in the New Testament, as we shall see in the next section.

Let us also remember that Abraham was the father of not only an ethnic people (the Jewish people), but also to all those who believe (Romans 4:11). John 1:12–13 says that "But as many as received Him, to them He gave the right to become *children of God*, to those who believe in His name: who were born, not of blood, nor of the will of the flesh, nor of the will of man, but of God."

Sons of God as Humans

Matthew 5:9 says, "Blessed are the peacemakers, for they shall be called sons of God." In the genealogy of the Gospel of John, Adam is called a son of God (Luke 3:38). Just as angels are sons of God because they are directly created by God. So, Adam is also a son of God, because he was created by God. Luke 20:34–36: "Jesus answered and said to them, 'The sons of this age marry and are given in marriage. But those who are counted worthy to attain that age, and the resurrection from the dead, neither marry nor are given in marriage; nor can they die anymore, for they are equal to the angels *and are sons of God*, being sons of the resurrection.'" Romans 8:14 says "For as many as are led by the Spirit of God, *these are sons of God*." Verse 19 of the same chapter also says: "For the earnest expectation of the creation eagerly waits for the revealing of *the sons of God*." Lastly, Galatians 3:26 says, "For *you are all sons of God* through faith in Christ Jesus."

Since salvation is the same in both the Old and New Testaments (Genesis 17:7), this means someone can also trust in God and be called a son of God in the Old Testament as well. If we expand the term 'sons of God' to refer to godly men and women in general, we can include even more Bible verses that refer to the children of God, such as Psalm 82:6: "And all of you are *children of the Most High*." In the New Testament, John 1:12 says, "But as many as received Him, to them He gave the right to become children of God, to those who believe in His name." Other New Testament verses include John 11:52; Romans 8:16, 17, 21, 9:8; Philippians 2:15; 1 John 3:1–2, 10, 5:2. Instead of woodenly equating the narrow term 'sons of God' to fallen angels, we can expand this term to refer to sons, or the children of (the living) God, or children of the Most High, thereby taking the context of the entire Bible into consideration.

Jesus Is the Son of God

Though the term 'sons of God' may refer to godly people who trust in God, it is very well known that the term 'Son of God' in the New Testament refers to Jesus Christ numerous times (Bavinck, 2004). For example, Matthew 14:33 says: "Then those who were in the boat came and worshiped Him, saying, 'Truly You are the Son of God.'" Jesus is referred to either as the Son of God or in some other variants (i.e., "Son of the Most High God" in Luke 8:28, or "Son of the Living God" in John 6:69) 61 times in the New Testament. If the term 'sons of God' refers only to angelic beings and never to humans (as per the fallen angel view), this excludes the man Jesus Christ as the Son of God, even though His Spirit may be considered as such. The logical outworking of the fallen angel is that Christ's humanity and His Spirit are separated, leading to the Christological heresy of Nestorianism and breaking the hypostatic union.

To take this a step further, the idea that the 'sons of God' refers only to angelic beings is contradicted by Hebrews 1:1–9. This passage of Scripture describes how the glory of Christ far surpasses that of the angels, since it was He who had accomplished the work of salvation. Christ alone made the worlds and is the brightness of God's glory and the express image of His person (verses 2–3). None is like Christ, and thus the author asks the rhetorical question, "*For to which of the angels did He ever say: 'You are My Son*, today I have begotten You'? And again: 'I will be to Him a Father, and He shall be to Me a Son'?"

The New Testament (as referenced in Table I) refers to the sons of God exclusively as humans. This is strong evidence against the fallen angel view. Nevertheless, proponents of this view still look to three New Testament verses to support their theory. We will examine these verses now. As we shall see, the proponents of the fallen angel view are merely starting out from the vantage point of their theory and are collecting verses here and there that appear to support their view. This contradicts the principle of *Sola Scriptura* and is mere eisegesis.

1 Peter 3:18–20

"For Christ also suffered once for sins, the just for the unjust, that He might bring us to God, being put to death in the flesh but made alive by the Spirit, by whom also He went and preached to the spirits in prison, who formerly were disobedient, when once the Divine longsuffering waited in the days of Noah, while the ark was being prepared, in which a

few, that is, eight souls, were saved through water."

Proponents of the fallen angel view claim that the spirits mentioned in these verses refer to those fallen angels who were punished for their crimes of sexual intercourse with earthly women in the time of Noah. This passage does not describe the particular sin that these alleged fallen angels are being punished for (Kidner, 1967). Therefore, the fallen angel view is ambiguous at best.

Instead, let us look at a more obvious interpretation of these verses. Christ preached by His Holy Spirit to men before the Flood through Noah. The prison that these disobedient spirits are to whom Jesus preached in cannot be located in hell, because in Luke 23:46 Jesus commits His spirit into the Father's hands. Furthermore, Jesus was sent "…to proclaim liberty to the *captives*…" (Luke 4:18) during His earthly ministry. "Spirits in prison" can also be viewed as captives who need to be evangelized. Only humans fit this description. If these spirits in prison were angelic beings, Peter would have described them as such, as he does in 2 Peter 2:4–5, which will also be discussed.

As to the concept that Christ preached through Noah, there are examples from the Old Testament where God is described as speaking through His spokesman. God tells Moses that "And I will be with your mouth" (Exodus 14:15). In Jeremiah 5:14 God makes His words in the prophet's mouth a fire.

Furthermore, the term 'spirit' can also refer to human beings. Numbers 16:22 says "Then they fell on their faces, and said, 'O God, the God of the *spirits of all flesh*, shall one man sin, and You be angry with all the congregation?'" Numbers 27:16 says, "Let the Lord, the God of the *spirits of all flesh*, set a man over the congregation." Proverbs 16:22 says "All the ways of a man are pure in his own eyes, But the Lord weighs the *spirits*." In English, we also talk about how hundreds of souls perished on the Titanic. It is very well possible that the spirits mentioned in these verses are humans and not fallen angels. Indeed, verse 20 refers to Noah and his family as eight *souls* who survived the Flood.

2 Peter 2:4–5

"For if God did not spare the angels who sinned, but cast them down to hell and delivered them into chains of darkness, to be reserved for judgment; and did not spare the ancient world, but saved Noah, one of eight people, a preacher of righteousness, bringing in the flood on the world of the ungodly."

To interpret this verse as referring to fallen angels going in to the daughters of men in Genesis 6 is rather ambiguous. It does not have any direct bearing on the context of Genesis 6:1–4. We know that Satan's demonic host fell after Creation Week. Why would these fallen angels fall a second time? This makes no sense in the broader context of Genesis 1–11 (Leupold, 1942). The fall of Satan and his angels is mentioned in Luke 10:18 and Revelation 12:7–9. It would be mere speculation to assume multiple falls; once after Creation and then again, 1656 years after Creation just before the Flood. Where the Bible is silent, we should do the same.

Jude 1:6–7

"And the angels who did not keep their proper domain, but left their own abode, He has reserved in everlasting chains under darkness for the judgment of the great day; as Sodom and Gomorrah, and the cities around them in a similar manner to these, having given themselves over to sexual immorality and gone after strange flesh, are set forth as an example, suffering the vengeance of eternal fire."

Again, the proponents of the fallen angel view somehow connect those angels who fell from their heavenly home to be kept in chains for eternal punishment. Just as with 2 Peter 2:4–5, why does the fallen angel theory imply a second falling away of these demons before the time of the Flood? This makes no sense. The fallen angel theory is arbitrarily associating the fall of these angels with the sons of God mentioned in Genesis 6:1–4.

According to other variants of this view, these fallen angels then took wives from among the daughters of men for themselves and brought forth demon-possessed offspring, who became the Nephilim, who caused such evil in the world that God had to stop them by bringing the Flood upon the world. But this contradicts Genesis 6:7, which says that God had to destroy all *men and even all animals* on the face of the earth. The destruction of the devil (and apparently his demons) is being held up until Judgment (Revelation 20:10). God already punished the snake in Genesis 3 for tempting Adam and Eve (Major, 1990). Why would God punish men for sins instigated by demons? Such an idea violates divine justice (Binney, 1970). Furthermore, if God intended to wipe out the Nephilim with the Flood, He failed to do so, since the Nephilim remained on the Earth after the Flood (they were definitely not on the Ark), according to Genesis 6:4.

Sons of the Devil

Several verses describe how wicked people, such as the Pharisees were sons of the devil (John 8:44–45). 1 John 3:10 contrasts the children of God and the children of the devil. Judas was called the son of perdition (John 17:12). In Acts 13:10 Paul calls Elymas, the witch, a son of the devil. If there are clear descriptions of people called the sons of the devil, why doesn't

Genesis 6:1–4 describe the fallen angels as such?

Angels and Humans Compared

After examining how the Bible talks about the sons of God, let us compare angels with humans from different aspects. By doing so, we shall see that the fallen angel view runs into even more problems. Seven differences are listed in Table II.

As we can see, angels are invisible spirit beings, although they may temporarily assume a fleshly body (Genesis 19:1–11). However, humans are made up of body and soul, since they stand between the animal world and the spirit world (Genesis 2:7). Angels are a host, whereas humans are a race and multiply by sexual reproduction. We know that angels do not procreate, since they were all present when the foundations of the earth were fastened (Job 38:6–7) during Creation Week. Since the very last angel was created during this time period, we know that their numbers are fixed. Thus, they do not procreate, neither do they marry, as mentioned in Matthew 22:30 and Mark 12:25.

This is especially so since apparently all angels are male. The angel Gabriel is mentioned in Luke 1:19 and 26, and the angel Michael is mentioned in Revelation 12:7. The angels in Genesis 19 who come to Sodom are male, and the angel in Revelation 20:1 with the key to the bottomless pit is also male.

From the individual creation of angels, it follows that their election (salvation) is also individual. Their election is due to God's preventing the majority of the angels from falling into sin. In contrast, a certain subgroup of humans is chosen for salvation; these are the elect (John 6:44; 15:16; 17:9). Each angel fell individually, as opposed to the whole human race, which fell in Adam. Angels fell irreversibly and cannot be redeemed, whereas a Savior was provided for the salvation of men. Jesus became a man, not an angel, and died for men, not for angels.

Lastly, the fall of Satan and his angels occurred sometime shortly after Creation. This is because God declared that all He had created was very good (Genesis 1:31). This would have included the angel Satan in his unfallen state (i.e., Lucifer—Isa. 14:12). However, according to Revelation 12:7–9, Satan was cast out of heaven together with his angels. This places Satan's fall at the latest to the beginning of Genesis 3 and not Genesis 6, which is over a thousand years later. Furthermore, God brought about the Flood, not because He wanted to wipe out the offspring of the union of fallen angels and women, but because "every intent of the thoughts of his [man's] heart was only evil continually" (Genesis 6:5–7). Fallen angels are not mentioned in these verses; they are simply an unwarranted addition to the text.

The idea that the term 'sons of God' really refers to fallen angels relies on several cases of special pleading. The thrust of the early chapters of Genesis deals with human history, not with angelic beings. To suddenly turn the focus on alleged fallen angels who are sons of God takes Genesis 6:1–4 out of its broader context. For this view to be true, demonic spirits would have to acquire the biological bodies of men and then dupe unsuspecting women into marrying them, all the while keeping up this charade for years. This sounds very unusual at the very least. The goal of demonic spirits is not to have a family with women but rather to devour people like a roaring lion (1 Peter 5:8).

By examining the nature of angels and comparing them to humans, we see that angels cannot have been in view as the sons of God in Genesis 6:1–4. Another explanation must be sought.

Table II. Angels and humans compared.

	Angels	Humans	Bible Reference
Created as	a host	a race	Luke 2:13; Genesis 1:28
Marry and reproduce	no	yes	Mt. 22:30; Mk. 12:25
Their number	is fixed	increases through reproduction	Job 38:7; Genesis 1:28
Their fall is	individual, irreversible	as a race, redeemable	Ezekiel 28:13–16; Romans 5:18
Substance	spiritual	physical and spiritual	Job 2:2; Genesis 2:7
Gender	seemingly all male	male and female	Genesis 1:27, 19:1–11; Luke 1:19, 26; Revelation 12:7, 20:1
Election	to prevent fall into sin	elected to salvation	1 Timothy 5:21; Mark 13:27

The Sethite View

The third of the three views says that the 'sons of God' are humans, notably the godly lineage of Seth. Some theologians in the early church held this view, such as the historian Julius Africanus, John Chrysostom, and Augustine (Sarfati, 2015). Luther (Luther, 2018) and Calvin (1578) also held to this view, as well as some Middle Age Jewish scholars (Caputo, 2015) and some Puritan and modern authors (Henry, 2008).

To understand Genesis 6:1–4, we must place it in its wider context. For this, we have to examine the chapters preceding it. Some scholars go so far as to say that Genesis 6:1–4 is only loosely associated with the rest of Genesis 6 and that it is an intrusion into the order of things as God intended (Chaffey, 2019, p. 211). The reason that we do not understand some portions of Scripture has nothing to do with the defectiveness of the Bible, but rather with our own sinful, finite minds. If we take a closer look at the text, we may be able to resolve its seeming "awkwardness" to us.

In Genesis, the beginnings of some of the chapters summarize previous events, after which new material is introduced (Pipa, 2006). These include Genesis 2:1–4, which summarizes the creation narrative. Genesis 5:1–2 summarizes the life of Adam, and thus Genesis 6:1–4 can be tied to Genesis 5, which describes the descendants of Seth. In Genesis 4:26 we read, "To Seth also a son was born, and he called his name Enosh. At that time, people began to call upon the name of the Lord." This verse tells us that starting with Seth, people started invoking God's name, something only believers would do. This would make them God's children—sons of God! Especially at this early point in history, it would have been important to keep the godly seed intact, which started with Eve at the Curse. The purpose of this godly seed was to bring forth the Messiah, who would save His people from sin (Genesis 3:15) (Whitcomb and Morris, 1961).

Some opponents of the Sethite view claim the word 'call' was mistranslated from the Hebrew, and that this word really means 'to profane.' This is unconvincing because even before the time of Seth, men had committed sins such as when Cain murdered Abel (Genesis 4:23). The word for 'call' in the Hebrew is קָרָא, (*kara*) whereas the word for 'profane' is חָלַל (*challel*). The word קָרָא is simply not used in this manner in the Bible.

Let us now look at the line of Seth: Seth, Enos, Cainan, Mahalaleel, Jared, Enoch, Methuselah, Lamech, and finally Noah. About Enoch, we read this: "Enoch walked with God, and he was not, for God took him" (Genesis 5:24). About Lamech we read this: "When Lamech had lived 182 years, he fathered a son and called his name Noah, saying, 'Out of the ground that the Lord has cursed, this one shall bring us relief from our work and from the painful toil of our hands'" (Genesis 5:28–29).

It is true that not every person listed in Seth's lineage could have been truly regenerate. One of Noah's own sons was unregenerate (Genesis 9:22–25). There was a traitor even amongst Christ's disciples (Matthew 26:21). The author personally knows a devout Christian family where out of six children, three became missionaries, and only one did not remain in the faith. But God can still bless families in which some of the children continue the line of faith started by their parents.

Lamech's cry could mean that he and his ancestors were waiting for someone who would bring them relief from the painful toil of their hands, which is part of the curse in Genesis 3:17–19. This indicates that the promise of a Savior who would crush the serpent's head in Genesis 3:15 was kept alive all throughout the lineage of Seth. This information could well have been taught to him by Adam and Eve after they were expelled from the Garden of Eden. Seth could have taught this to his son, Enosh, as well and his descendants, including Lamech, who fathered Noah.

Judges 2:10 describes a generation that knew the Lord that came before a generation that did not. This indicates that large groups of people at once, a whole generation, or at least the great majority, can know God. Let us also consider that during the time of the patriarchs, multiple generations lived contemporaneously, so that the older generations would have been able to pass on their firsthand knowledge of God to their grandchildren and great-grandchildren.

Are the sons of God (the Sethites) the offspring of men? Yes. They are men because they are the sons of Adam. Biologically, they are humans. But they are also the sons of God because they were godly by calling upon God's name. But even though they were men, they didn't belong to the big mass of sinful humanity that was multiplying in their time, but were distinguished from them. For example, in Judges 20:3, the sons of Benjamin are distinguished from the sons of Israel, yet they are still part of Israel (Clines, 1979). The wording itself, 'sons of God' and 'daughters of men,' might be used in such a way as to contrast the divine and the profane.

To better understand this, we have to realize that when the Bible talks about the world, or 'all men,' it doesn't always literally mean every single thing or person. For example, all the families of the Earth will be blessed in Abraham (Genesis 12:3), although not literally all. Cyrus, king of Persia, claims that all the kingdoms of the Earth have been given to him by the Lord God of heaven (Ezra 1:2). In Matthew 3:5, we read that Jerusalem, all Judea, and all the region around the Jordan went out to Jesus. Revelation

13:3 says: "One of its heads seemed to have a mortal wound, but its mortal wound was healed, and the whole earth marveled as they followed the beast." In this verse, we read about how the whole world followed the beast, the ultimate epitome of evil.

What Genesis 6:2 likely means is a kind of distributive inclusiveness: a smaller subset of men, the sons of God (the Sethites), went into the daughters of men in general. Just because these sons of God themselves are men does not preclude them from going in to the daughters of men. Revelation 20:4 says this: "Also I saw the souls of those who had been beheaded for the testimony of Jesus and for the word of God, and those who had not worshiped the beast or its image and had not received its mark on their foreheads or their hands." This second verse from Revelation tells us that even though 'all of humanity' was worshiping the beast, there was a small remnant who did not do so, and who kept themselves clean. Romans 11:5 says, "So too at the present time there is a remnant, chosen by grace." There was a godly remnant in the New Testament and the Old Testament as well—these were the Sethites.

Who Were the Nephilim?

In Genesis 6:4, we read that 'giants' were around in the days of Noah (NKJV translation). The word translated as giant in this verse in Hebrew is נְפִלִים (*nephilim*). Several authors claim that the Nephilim were giants, and even extend this to large-sized animals before Noah's Flood (Whitcomb and Morris, 1961). Numbers 13:33 describes the Nephilim as giants; however, this description is part of a false report to Joshua. Therefore, the term Nephilim does not necessarily refer to giants.

We know that height is a very variable trait, influenced by genetics, nutrition, and general health. It is polygenic, meaning that the result of the expression of many genes (up to 700, according to one study) influences height (Zimmer, 2018). Height follows a bell curve, and in modern times at least, humans have never reached above nine feet in height. These people would not appear as giants to people who were up to a little over six feet tall.

In Hebrew, the word נָפַל (*naphal*) means to fall (Strong's OT 5307). However, its Hiphil form means to cause to fall, as in felling a tree (2 Kings 3:19) or throwing down a wall (2 Samuel 20:15). From this, the word Nephilim is derived. The Nephilim can refer to people who cause others to fall, during military conquest.

The Nephilim of Genesis 6:4 were the named offspring of the sons of God, who became mighty men of old, men of renown. The greatness of these Nephilim may instead be due to their high position as kings or rulers of nations. One such mighty ruler was likely Nimrod, who was a mighty man on the earth (Genesis 10:8–9; 1 Chronicles 1:10). Scant mention is made of these rulers in Genesis, but various pagan legends of mighty rulers or warriors may have their origins in Genesis 6:4. One such pair of mighty men are Hunor and Magor from Hungarian mythology, who were the patriarchs of the Huns and the Magyars. These two mythological figures were hunters like their alleged father, Nimrod himself (Nemeskürty, 1991). These mighty men may well have been the cause of violence, having filled the Earth by the time of the Flood, according to Genesis 6:11, 13.

By this time, apostasy had become so general that the name of the Lord had been practically forgotten by this time. Therefore, Genesis 6:6–7 tells us that God repented of having made man and plans to destroy all mankind for their sin, save Noah and his family. However, these Nephilim were also around after the Flood. Their descendants included the sons of Anak (Numbers 13:33), the wicked inhabitants of Canaan who were to be exterminated by Israel during their conquest.

The Days of Man Reduced to 120 Years

Genesis 6:3 says, "Then the Lord said, 'My Spirit shall not strive with man forever, for he is flesh: his days shall be 120 years.'" A long life is considered a blessing in the Bible (Proverbs 3:2). So, by shortening the lifespan of man, God could have punished mankind for their wickedness before the Flood. There are two ways of interpreting this span of 120 years.

In general, the lengthiest lifespan experienced today by humans is capped at no more than 120 years. However, Noah went on to live until he was 950 years old (Genesis 9:29). Other patriarchs, such as Terah, Abraham, and Jacob, who each lived after the Flood, died when they were well over 120.

The upper limit of human life could have commenced after the Flood. For example, in Genesis 2:17 God tells Adam that if he eats from the tree of knowledge, then on that day he shall surely die, but Adam only died several hundred years later. A similar verse is 1 Kings 2:37–46 where King Solomon tells Shimei that he will die if he crosses the brook at Kidron, but also only does so later. Notably, Moses lives to the age of 120 (Deuteronomy 34:7), Joseph and Joshua both live to be 110 (Genesis 50:22; Joshua 24:29).

Verse 3 could also mean that God is giving mankind a deadline of 120 years to repent until he unleashes the Flood (Whitcomb and Morris, 1961; Waltke, 2001). When God withdraws his Spirit, then man dies. When God said that His Spirit would not abide with mankind could mean that God would no longer walk with men, as he did with Noah (Genesis 6:9). Romans 1:18–32 describes how God abandons people

Figure 1. Artistic depiction of the mixed marriages between the godly Sethite lineage and the daughters of men. Alamy picture #FJR4KF: 1852–60; illustration by Julius Schnorr von Carolsfeld.

to the terrifying consequences of their sins. After the Flood, we read that God withdrew his presence from the Earth. Noah bore his three sons in the 500th year of his life (Genesis 5:32), and the Flood came in his 600th year, making 100 years (Genesis 7:6). Luther rejects the explanation that the remaining 20 years were cut off as a Jewish fable. It is not mentioned when God gave this decree to Noah, so Luther explains that it could have come when Noah was 480 years old and still unmarried and did not yet have children (Luther, 2018).

Godly and Ungodly Marriage

The godly lineage would have begun to wane with the generations after Seth. There were fewer and fewer people who believed in God and called upon His name. This also happened in the Middle Ages when true faith was almost extinguished. It could be that since the number of faithful people was getting so depleted, it was getting ever harder for them to find a godly wife. This is true nowadays in some parts of the church when a young man or woman cannot wait for the right spouse and marries an unbeliever, thereby sinning against God. Thus, the godly Sethites may have sinned by taking for themselves the daughters of men without regard to marrying a godly woman only (Figure 1). Although the explicit command not to marry an unbeliever was not stated before Genesis 6, we may assume that since human nature was the same before the Flood as well as after, it would have been contrary to God's will for godly people to intermarry with the ungodly. Some argue that since the Gospel was first proclaimed in the Garden of Eden, Adam may have believed, and passed on his faith to his children, including his son Seth.

After Satan had successfully tempted Eve in the Garden of Eden, he wasn't finished, since the devil prowls around like a roaring lion, seeking someone to devour (1 Peter 5:8). According to Genesis 3:15, there was to be enmity between the devil's offspring and the woman's [Eve's] offspring. Satan's second big strike against godly humanity was inspiring Cain to kill Abel (Genesis 4:8). Satan's next attempt to extinguish the godly line was to tempt the godly line into mixed marriages. This explanation also gives a natural flow to the storyline of Genesis 11 instead of invoking fallen angels having sexual intercourse with humans (Currid, 2003, pp. 174–175).

Genesis 6:1–4 is about human history, embedded into the wider context of Genesis 1–11. The sin mentioned in this passage of Scripture is a mixed interfaith marriage, something that God always warned His people against. Marriage between an angel and a human is impossible, since it crosses two kinds with one another.

The Lust of the Eyes

In Genesis 13:10 we read, "And Lot lifted up his eyes and saw that the Jordan Valley was well watered everywhere like the garden of the Lord, like the land of Egypt, in the direction of Zoar. (This was before the Lord destroyed Sodom and Gomorrah)." Just as Lot lifted up his eyes and beheld the lush Jordan Valley, well-watered like the garden of the Lord, Lot did so because even though he was a godly man, he was focused on worldly advancement. But so also "…the sons of God saw that the daughters of men were beautiful" (Genesis 6:2a). And so, sadly, they sinned against God by taking for themselves wives according to their own choosing, and not particularly in the Lord. Life went on without seeking God's will. This also makes sense of a verse from the New Testament, Matthew 24:38, where Jesus says: "For as in those days before the flood they were eating and drinking, marrying and giving in marriage, until the day when Noah entered the ark."

According to one contrary interpretation, the word for beautiful in Hebrew is טֹב (*tov*), which could also mean morally good or virtuous (Grossman, 2018). This is one of the definitions of the word טֹב in Hebrew, but טֹב can mean a whole range of things. טֹב may mean that something is pleasant to the sight, taste, or smell, or that it is of excellent quality, or that it is good, kind, appropriate, or benign. So also in Genesis 6:2, the sons of God saw (וַיִּרְאוּ: and they saw) that the daughters of men were good (כִּי טֹבֹת). The verb יִרְאוּ has to do with sight. Just as in Genesis 3:6: "So when the woman saw that the tree was good for food, and that it was a delight to the eyes, and that the tree was to be desired to make one wise, she took of its fruit and ate." Here also Eve saw that the fruit was good (טֹב). We might say that the sons of God fell into sin just as Eve did in the garden of Eden by taking a different kind of forbidden fruit—marrying whosoever they

pleased. Believers must marry only in the Lord (1 Corinthians 7:39).

The Result of Bad Choices

A godly heritage does not equate with automatic regeneration. It only takes one single generation for a people to depart from the Lord (Judges 2:10). This happened many times during Israel's history, but it started early on in primeval history with the godly lineage of the Sethites, as well. The Israelites often sinned against God when they married women from pagan countries (Genesis 24:3; Ezra 9:1–2; Nehemiah 13:23–28). This also led to Solomon's apostasy (1 Kings 11:1–4). This way, apostasy from the true faith would have accelerated. Murray writes that with the breakdown of godly marriages, the gates are open to all sorts of vice (Murray, 1957, p. 246).

It is important to note that this apostasy did not happen overnight. But eventually, it got to the point where only Noah was found to be righteous before God (Genesis 6:18). Because of mixed marriage and subsequent apostasy, the ranks of the ungodly swelled up. Noah and his family were the only ones who walked with the Lord at his age. The world had to have been so full of violence and sin that even the longsuffering God decided that it was enough.

Why did God wait for so long before He unleashed the Flood? According to 2 Peter 3:9, "The Lord is not slow to fulfill his promise as some count slowness, but is patient toward you, not wishing that any should perish, but that all should reach repentance." God is a patient God who is slow to anger and abundant in lovingkindness (Numbers 14:18). This is why God waited 120 years until only Noah and his family were left. When Abraham intercedes for Sodom in Genesis 18:22–33, he keeps asking God how many righteous men must there be in the city for God to spare it? By verse 32, Abraham stops asking at ten. But in Genesis 19 we read that besides Lot and his family, no one righteous was left in Sodom, and therefore God destroyed the city because of its wickedness.

Therefore, God finally destroyed the world with the Flood. It was a sign of God's judgment on the Earth, because all flesh had become corrupt (Genesis 6:11–13). But the main goal of the Flood was to cleanse the Earth and save the righteous seed of the Sethites through Noah. Noah was the last of the Sethites.

Summary and Conclusion

Of the three views describing the identity of the sons of God, the view that they were rulers is underwhelming and has little explanatory power.

The currently popular view that the sons of God are fallen angels contradicts several parts of the Bible (Job 38:7; Hebrews 1:5) and its outworking leads to a denial of the hypostatic union. It breaks the main thrust of Genesis 1–11, which covers the unfolding of early human history. It needs several unusual circumstances to occur (demons taking the bodies of men for a long period of time to dupe women in marriage) for it to be viable. Though some early Jewish and Christian scholars held to this view (some held it to be a Jewish fable), the Holy Spirit did not teach it to the church for 1500 years.

Consequently, the sons of God must refer to a godly lineage of men, likely starting with Seth, who began to call upon the name of the Lord. The Old and New Testaments refer to godly men as sons of God. In the broader context of the early chapters of Genesis, we see that as evil spread, so the godly lineage of Seth began to wane, to the point that godly men no longer found godly women to marry or even cared about this non-negotiable aspect of a godly marriage, as we unfortunately see in many places today.

Acknowledgements

The author would like to thank Martin Emmrich for his helpful comments and advice in improving the text of the manuscript.

References

Anderson, L. 2015. Is the 'sons of God' passage in Genesis 6 adapted pagan mythology? *Answers Research Journal* 8:261–271.

Bastiaansen, N. 2012. The sons of God, the daughters of men, and the Nephilim in Genesis 6:1–4, course paper (Radboud University, The Netherlands). academia.edu/3814939/sons_of_god; accessed April 14, 2020.

Bavinck, Herman. 2004. *Reformed Dogmatics*. Baker Academic, Grand Rapids, MI.

Berkhof, Louis. 1937. *The History of Christian Doctrines*. The Banner of Truth Trust, Carlisle, PA.

Binney, B. 1970. An exegetical study of Genesis 6:1–4. *Journal of the Evangelical Theological Society* 13:43–52.

Calvin, J. 1578. *Commentary on Genesis—Volume I*. Christian Classics Ethereal Library, Grand Rapids, MI.

Caputo, N. 2015. Sons of God, daughters of men, and the formation of human society in Nahmanides's exegesis, in Szpiech, R. (editor), *Medieval Exegesis and Religious Difference: Commentary, Conflict, and Community in the Premodern Mediterranean*. Fordham University Press, New York, NY.

Chaffey, T. 2019. *Fallen: The Sons of God and the Nephilim*. Risen Books, Burlington, KY.

Clines, D.A. 1979. The significance of the 'sons of God' episode (Genesis 6:1–4) in the context of the 'Primeval History' (Genesis 1–11). *Journal for the Study of the Old Testament* 13:33–46.

Currid, J.D. 2003. *Genesis: Volume 1*, Genesis 1:1–25:18 Evangelical Press, Webster, NY.

Doedens, J.J.T. 2013. *The Sons of God in Genesis 6:1–4*. Kapitális Printing House, Debrecen, Hungary.

Grossman, J. 2018. Who are the sons of god?—A new suggestion. *Biblica* 99:1–18.

Henry, M. 2008. *Matthew Henry's Commentary on the Whole Bible*. Hendrickson Publishers, Inc., Peabody, MA.

Kidner, D. 1967. *Genesis*. InterVarsity Press, Downers Grove, IL.

Leupold, H.C. 1942. *Exposition of Genesis, Volume 1*. Baker Books, Grand Rapids, MI.

Luther, M. 2018. *Commentary on Genesis*. Musaicum Books. https://www.overdrive.com/publishers/musaicum-books

Major, T.J. 1990. *The meaning of 'sons of God' in Genesis 6:1–4*. Apologetics Press, Inc., Montgomery, AL.

May, D. 2015. Interpretive question 1: Who are the sons of God?, course paper (Liberty University, Lynchburg, VA). academia.edu/11891800/Who_Are_the_Sons_of_God; accessed April 22, 2020.

Morris, H. 1976. *The Genesis Record*. Creation-Life Publishers, San Diego, CA.

Murray, J. 1957. *Principles of Conduct: Aspects of Biblical Ethics*. William B. Eerdmans Publishing Co., Grand Rapids, MI.

Nemeskürty, I. 1991. *The Biblical Heritage: The History of Hungarian Sense of Destiny*. Szabad Tér Publishers, Debrecen, Hungary.

Petrovich, D.N. 2016. Identifying the "sons of God" in Genesis 6:1–7.academia.edu/28667618/_2016_Identifying_the_Sons_of_God_in_Genesis_6_1_7; accessed April 4, 2020.

Sarfati, J. 2015. *The Genesis Account: A theological, historical, and scientific commentary on Genesis 1–11*. Creation Book Publishers, Powder Springs, GA.

Schaff, P. 1910. The Complete Works of the Church Fathers. Patristic Publishing, Riverside, CA.

Van Gemeren, W.A. 1981. The sons of God in Genesis 6:1–4 (An example of evangelical demythologization?). *Westminister Theological Journal* 43:320–348.

Waltke, B.K. 2001. *Genesis—A Commentary*. Zondervan, Grand Rapids, MI.

Whitcomb, J.C., and Morris, H.M. 1961. *The Genesis Flood—The Biblical Record and Its Scientific Implications*. Presbyterian & Reformed Publishing, Phillipsburg, NJ.

Zimmer, C. 2018. *She Has Her Mother's Laugh—The Powers, Perversions, and Potential of Heredity*. E.P. Dutton, New York, NY.

Creation Research Society Quarterly 2025 62:114–128

Isotopic and Molecular Preservation in Cretaceous Fossils

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Key Words: carbon isotopes, dinosaur bone, Hell Creek Formation, molecular preservation, primary isotopes, stable isotopes

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Accepted for publication November 30, 2024

Abstract

Molecular, and even whole tissue preservation, including bone collagen sequences and blood vessels from Cretaceous bone samples, are described in a growing body of technical literature. Separate studies also describe primary isotopes from many of the same geological formations as those that have fossils with molecular preservation. To investigate what might have led to the co-occurrence of molecular and isotopic preservation, we collected and analyzed fifteen stable carbon isotope results from three bone fractions (organic collagen, inorganic bioapatite, and a mixture of both in "bulk"), each isolated from six Cretaceous dinosaur bone specimens. Assessments of preservation evaluated the endogeneity of our isotope ratios. Broad offsets between bioapatite and collagenous extracts were inconsistent with secondary isotope ratios (i.e., contamination), and largely consistent with biological ratios (i.e., ratios expected in fresh bone). Our results include the first stable carbon isotope ratios from collagen extracts of dinosaur bone. Co-occurrence of primary carbon isotope ratios and biomolecules suggest two aspects of their diagenetic history. Firstly, it appears that any ancient hydrothermal fluids failed to facilitate the total decay of organics, nor to totally randomize carbon isotopes. This result is consistent with a relatively recent burial. Lastly, given that the well-characterized decay of bone collagen even under ideal conditions limits it to fewer than a million years at 10°C, these fossils likely experienced a much more brief burial history than mainstream sources cite.

Simple Summary

This scientific paper investigates why dinosaur fossils from Cretaceous System strata (like those from the Hell Creek and Lance Formations) sometimes contain both original biological materials and likely original carbon-isotope ratios. The researchers collected and analyzed six dinosaur bone specimens. They measured carbon isotopes from different parts of the bone: organic collagen, inorganic bioapatite, and a mixture of both. Their analysis showed carbon isotope ratios that reflect to some degree those ratios the dinosaurs had when they died. The study authors found consistent differences in isotope signatures between the collagen and bioapatite parts within each bone. This consistency suggests that most of the measured isotopes did not result from contamination, but from the dinosaurs, even though the difference between collagen and bioapatite was larger than what is typically seen in modern animals. The study concludes that the co-occurrence of preserved biomolecules and original isotope ratios suggest a unique burial history. This preservation, especially the presence of fragile collagen, implies that these fossils likely experienced a much shorter burial time than commonly believed, and this matches the idea that a relatively recent global flood buried these creatures.

Introduction

Primary fossil biomaterials, including proteins, carbohydrates, lipids, and nucleic acids, encounter limited reception in certain circles despite dozens of reported techniques that independently confirm biomolecular and/or morphological preservation (Thomas and Taylor, 2019). Investigation of the mineral fraction of bone offers a new route to evaluate this fossil biochemical controversy and related diagenetic options. We therefore describe stable isotope analyses of the mineral fraction (bioapatite) of Cretaceous samples and compare these with two preparations that include organic fractions (mostly collagen) from the same fossil bone samples (Brock et al., 2012).

Reports abound of molecular preservation in fossils. The number of such publications, and especially the specificity of molecular identification, has increased significantly in recent years, as our review revealed (Thomas, 2019). Several of the more impactful molecular preservation reports, including those that describe the vertebrate-specific protein collagen, originate in the Hell Creek Formation (HCF), which outcrops mostly in Montana. These sources of molecular and/or morphological preservation in, for example, *Tyrannosaurus rex* (Acera et al., 2007), *Triceratops horridus* (Armitage and Anderson, 2013), and *Edmontosaurus* (Tuinstra et al., 2025) offer new views of Cretaceous paleobiology (Hartman et al., 2014). Some HCF samples have even furnished enough molecular integrity for collagen protein sequencing (Acera et al., 2007; Schroeter et al., 2017). Literature also reveals a growing list of geologic strata that contain molecular preservation in fossils. These include, from North America, the HCF-equivalent Lance Formation (Fm). Underlying these, the Cretaceous Judith River Fm., Dinosaur Park Fm., and the Niobrara Chalk Fm. with outcrops in Kansas (Lindgren et al., 2010) also contain material with published organics. Elsewhere, the Ciply Phosphatic Chalk of Belgium (Lindgren et al., 2011), the Jurassic Lower Lufeng Fm. of China (Reisz et al., 2013), and the Triassic Lower Gogolin Fm. in Poland (Surmik et al., 2016), among others, retain molecular preservation. These strata, commonly labeled Mesozoic, also belong to the Zuni Megasequence. Clarey (2020, pp. 284–285) interpreted these as deposits from near the high-water mark of Noah's Flood. Reports of biomolecular and morphological tissue preservation do not include stable isotope data. To our knowledge, this paper is the first in this regard.

However, stable isotope ratios, including $^{13}C/^{12}C$ ratio measurements from bioapatites, have been used to convey meaningful paleodietary data from Cretaceous strata (Fricke et al., 2008). Results are typically reported in $\delta^{13}C$, where

$\delta^{13}C = (R_{sample}/R_{standard} - 1) \cdot 1000‰$,

where $R = {}^{13}C/{}^{12}C$, and

the standard for carbon isotope values derive from the Vienna Pee Dee Belemnite (VPDB). (Faure and Mensing, 2012)

Research questions about original isotope ratios for ancient samples supply meaningful data only if they reflect at least some primary isotopes. Establishing the presence of primary carbon is a necessary step for $\delta^{13}C$-based reconstructions to evaluate either the hypothesis of primary Cretaceous organics or diagenetic scenarios. Secondary isotope alteration of bone bioapatite can occur by metamorphism, hydrothermal action, or groundwater percolation. These processes would facilitate dissolved carbonate interactions as well as chemical decay of organics (Lee Thorp and van der Merwe, 1987). Within-bone indicators of secondary isotopes include:

- mismatches between stable isotope ratios found in fossil versus modern bone,
- randomized between-species or within-bone fraction offsets, and
- homogeneity between fossil bones of different taxa within a site or microsite.

Thus, primary bioapatite and biomolecular carbon sources should show

- isotopic heterogeneities consistent with modern biological patterns,
- bone fraction and taxon-specific isotopic offsets, and
- bone fractionation patterns between taxa or microsites that resemble those from comparable modern bone samples and ecosystems. (Tütken, 2011)

If dinosaur bone bioapatite and bone protein remnants preserve primary carbon isotope ratios, then both fractions should contain largely original carbon. We therefore evaluate (1) biological ratios and (2) bone fraction ratios for six Cretaceous fossils.

Finally, similar diageneses may accompany any co-occurrence in fossils of primary protein remnants with primary carbon isotopes. Such co-occurrence must be established prior to investigating possible diagenetic causes. We therefore took two steps toward investigating the co-occurrence of primary molecules and isotopes. First, we collated disparate literature that might reveal patterns of co-occurrence. Second, we assessed the possibility of primary carbon isotopes in Hell Creek and Lance Formation bone fossils. One assessment compared newly acquired stable carbon isotope ratios from dinosaur bone bioapatite against 73 isotope ratios taken from published dinosaur tooth enamel and dentine. In another assessment, we compared 15 isotope ratio measurements from three within-bone fractions in our six bone samples. If indeed hydrothermal fluids have erased isotopic signals, then have they also erased organics since the bones were buried?

Background: Stable Carbon Isotope Ratios

Many factors influence stable isotope ratios in modern biologies and ecologies. Marine environments are enriched in ^{13}C compared to terrestrial environments (Hoefs, 1987, p. 35). Terrestrial plants that use the more common C3 photosynthetic pathway are more depleted in ^{13}C than C4 plants. Animal bones, therefore, reflect isotopic signals that reflect their various diets. Trophic levels, taxon or age-specific bodily processes such as hibernation or weaning (Bochrens et al., 1994), or a particular mix of dietary components such as marine and terrestrial sources (Lee-Thorp et al., 1989) can generate $\delta^{13}C$ offsets in differing body tissue fractions, including the biomineral and organics fractions of teeth and bones. These biological differences provide isotopic offsets to which fossil data can be compared.

Several studies have explored links between stable carbon isotope ratios and biome variances within extant (Grey and Jones, 1999) and extinct ecosystems (Kohn and Cerling, 2002). Unfortunately, no purely objective test exists to verify the primary origin of isotope ratios, especially for fossil samples. Differences in geologic settings, such as matrix permeability and lithology, diagenetic processes such as hydrothermal circulation and possible crystallite reorganization during permineralization, metamorphic processes, and time since burial, likely have effects on isotopic exchange in different tissue components. Although they are not strictly empirical, several strategies have been developed to help assess the degree of primary versus secondary sourcing of isotopes. After applying appropriate sample cleaning and treatment protocols, these strategies include comparing isotope ratios from different taxa in one location, comparing different isolated fractions from one body part, and comparing fossil isotope fractionations with biological fractionations. Such comparisons are preferably done with known parallels in extant biomes (Fricke et al., 2008).

Experiments show that $\delta^{13}C$ values in bone or tooth apatite are higher (enriched) compared to collagen sampled from the same organism. Krueger and Sullivan (1984) modeled this offset as a product of dietary carbohydrate carbons entering bone apatite and dietary proteins entering bone collagen. If undisturbed, ^{13}C content in organic versus inorganic bone fractions preserves food source signals plus isotope partitioning effects. Such differences between $\delta^{13}C$ values in apatite and collagen may be observed even after presumed diagenetic processes have occurred. As an example, Lee-Thorp et al. (1989) found that bone collagen in herbivore remains from southern Africa and Malawi represents a fractionation of ~+5‰, and herbivore bone apatite ~+12‰, relative to the vegetation source.

Stable carbon and oxygen isotopes in apatite of dinosaur and other fossil reptile femurs and teeth, plus several shells and other bones, supplied sufficient data to begin reconstruction of East Asian dinosaur environments, including a regional paleoclimate (Amiot et al., 2015). Tütken's (2011) $\delta^{13}C$ analysis of sauropod biominerals and extant plus extinct plant matter concluded that sauropods from the Morrison Fm. and the Tendaguru Beds of Tanzania preferred terrestrial C3 plants. Stable isotope analysis of an organic fraction of a 10-cm-long, sauropod coprolite revealed a mean $\delta^{13}C$ value of -24.1‰, also consistent with preservation of C3 plant matter (Ghosh et al., 2003). Closer to the context of this present study, Fricke and Pearson (2008) reconstructed dinosaur and garfish niche partitioning in the HCF using $\delta^{13}C$ and $\delta^{18}O$ ratios, respectively. Similarly, Fricke et al. (2008) interpreted fossil ^{13}C signatures from Canada's Cretaceous Dinosaur Park, Two Medicine, and Judith River Formations as primary.

If similar assessments of our samples likewise conclude some degree of primary sourcing and are found also to include molecular preservation, then it would become appropriate to propose similar causal explanations of both fossil features. Thus, Cretaceous specimens from geologic formations containing fossils with already published descriptions of original biochemistry were obtained and evaluated for $\delta^{13}C$ ratios.

Geologic Setting and Materials

The HCF shows siliciclastic lithology containing laminar and cross-bedded sandstones, mudstones, and ironstones, as well as coal seams and coal lenses of various purities. Figure 1 shows the general location of the HCF material used herein. Cretaceous fauna are generally preserved in its impure sandstones. These characteristic lithologies and paleofaunas also outcrop in the Williston Basin and Bighorn Basin in Wyoming to comprise the Lance Formation, for which reason the two formations are considered equivalent (See references in Clarey, 2015). Figure 2 correlates the main strata included in this study. It reveals, for example, that the Lance and Hell Creek Formations correlate in lithology, paleontology, and relative positioning both with each other and with the Edmonton Group that outcrops further north. If fossils in these strata retain both original organics and original isotopic ratios, then the correlations of their strata offer a third observation that a model of origins should explain.

In many areas, for example, the HCF type locality in Flag Butte, north of Jordan, Montana, these equivalent formations contain a K-Pg boundary signature of two thin lignite beds near an iridium anomaly (Hartman

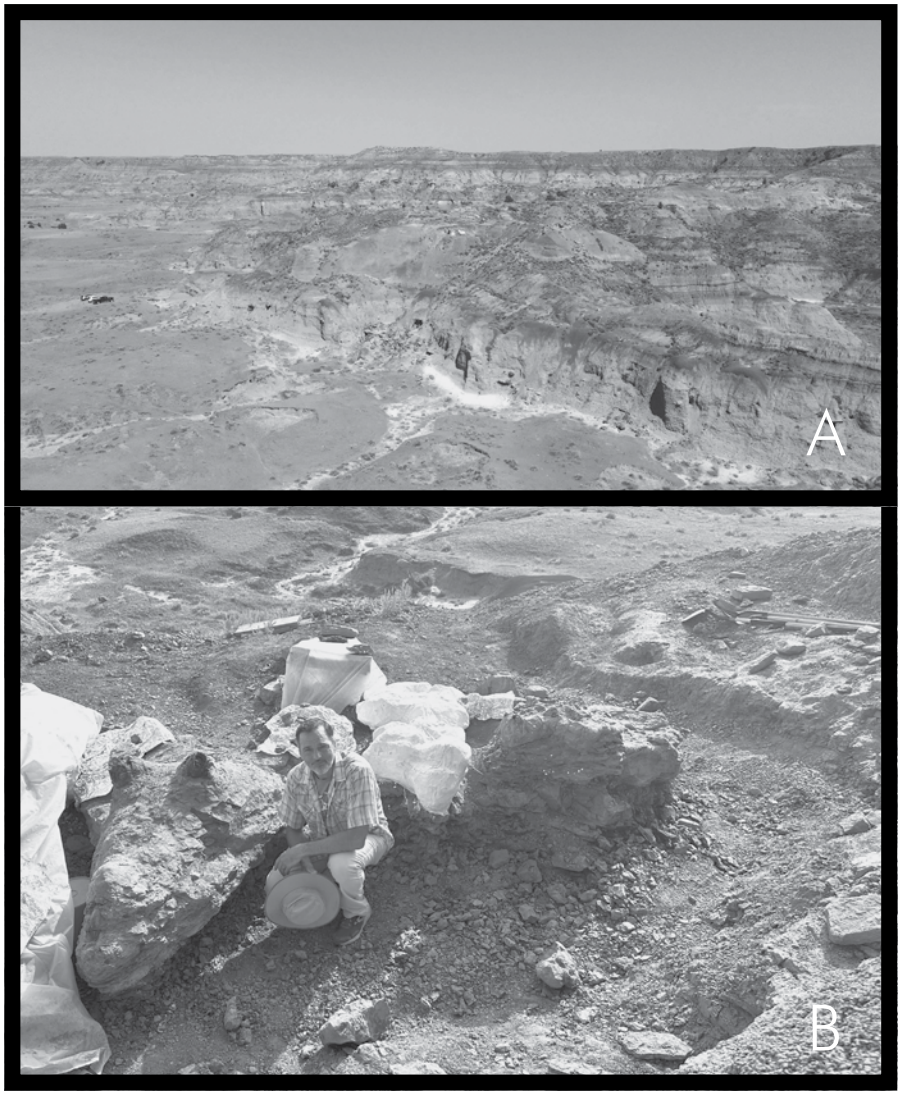


Figure 1. Geologic context for samples used in this study. (A) Drone image of the Montana private ranch from which all GDFM plus HTCH06 (See Table II) specimens were excavated. Abundant Hell Creek Formation badlands expose various intermixed sediment types. (B) Author (Thomas) beside an *in situ Triceratops* on the same ranch, illustrating Hell Creek excavation settings.

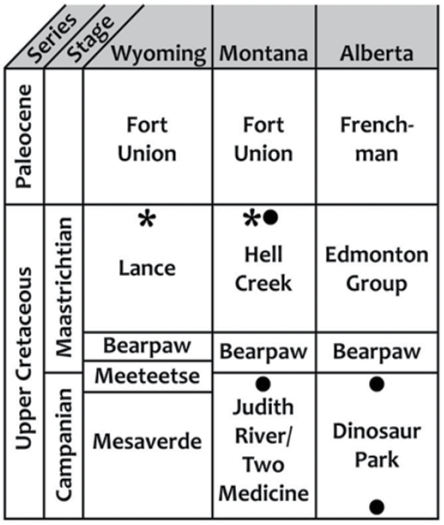


Figure 2. Correlation chart of geologic formations. Asterisks mark approximate positions of fossils sampled in this study. Dots mark positions of fossils sampled by Fricke and Pearson (2008) and Fricke et al. (2008). Formations and Stages adapted from Rogers et al. (1993) and Finn (2010).

et al., 2014). Fossils from the HCF in this study included two *Triceratops horridus* femora and one hadrosaur femur collected from a private ranch near Glendive, Montana, 7.6 m below the narrow K-Pg coal seam marking the upper boundary of the HCF at that location. These fossils belong to the Glendive Dinosaur and Fossil Museum (GDFM) repository. A small portion of the *Triceratops* brow horn described in Armitage and Anderson (2013) as HTCH06 was tested alongside a separately catalogued fragment of the same horn core, GDFM 12001. The sandstone layer from which these samples were extracted, approximately 3 m below the surface, was poorly cemented.

The HRS fossils from the Lance Fm. used in this study came from a private ranch near Roxson, Wyoming, and belong to the Hansen Research Station (HRS), with full repository data catalogued and freely available at https://fossil.swau.edu/. An unidentified dinosaur limb bone fragment from Rose quarry and a *Lambaeosaurus* long bone fragment from the Southwest quarry are two of well over twenty thousand dinosaur and other bones and fragments from the poorly cemented and poorly sorted Maastrichtian Lance sandstone lenses. Historically, the Lance has been interpreted as a vast collection of ancient fluvial deposits (Clemens, 2014), but more recently, a subaqueous debris flow has been well-defended (Snyder et al., 2020). The latter interpretation is more friendly to the Creation/Flood model, which holds to a single, recent, and total water coverage of the globe.

Here we present additional carbon isotope signatures from Hell Creek fossils and new results from two Lance Formation dinosaur bone fossils. We

Table I. Literature survey reporting geologic formations with both primary stable carbon isotopes and endogenous biomolecular remnants.

	Geologic formation and Megasequence	Fossil feature with primary ^{13}C signature	Organic material
1	Green River, Tejas	Stromatolite laminae (Frantz et al., 2014)	Lizard keratin (Edwards, 2011)
2	Messel, Tejas	Intraleaf structures (Grein et al., 2010)	Insect cuticle (McNamara et al., 2012)
3	Hell Creek, Zuni	Dinosaur tooth enamel, gar scale enamel (Fricke et al., 2008)	*T. rex* bone collagen (Asara et al., 2007, v. 316), hadrosaur blood vessels (Ullmann et al., 2020), and Edmontosaurus collagen (Tuinstra et al., 2025)
4	Dinosaur Park, Zuni	Dinosaur tooth enamel (Fricke et al., 2008)	Theropod bone collagen (Bertazzo et al., 2015; Schweitzer et al., 2005)
5	Judith River, Zuni	Dinosaur tooth enamel (Fricke et al., 2008)	Dinosaur bone amino acids (Ostrom et al., 1990) Brachylophosaur collagen, elastin, etc. (Schweitzer et al., 2009)
6	Jehol Biota, Zuni	Dinosaur, crocodile, and turtle tooth and bone apatites (Amiot, 2015)	*Psittacosaurus* sp. probable integument proteins (Vinther, 2016), feather proteins (Slater et al., 2023)
7	Morrison, Zuni	Lacustrine carbonates (Dunagan and Turner, 2004)	Seismosaur protein (Gurley et al., 1991)
8	Emu Bay Shale, Sauk	Cyanobacteria (Hall et al., 2011)	*Gloeocapsomorpha prisca* (cyanobacterium) N-alkanes (Hall et al., 2011)
9	Gunflint Chert, pre-Sauk	Microfossil components (Willifort et al., 2013)	Cyanobacteria amide functional groups (Alleon et al., 2016)

compare these signatures to published results on fossils from HCF, Judith River, and Dinosaur Park Formations. We hypothesize that since original organics should preserve primary isotope indications, strata that have fossils with original organics are more likely than other strata to also contain fossils with primary isotope ratios.

Fossil sites were selected based on a high likelihood of verifying both primary, largely unaltered organic material (OM) and primary carbon isotopes as described in the literature. Lithology and paleofauna identify formation name equivalences shown in Figure 2. The Dinosaur Park Formation from eastern Montana and southeastern Alberta, Canada, would stratigraphically underlie the Hell Creek and Lance Formations if present in one geographic location. All three formations, plus Judith River, have already shown remarkable preservation of primary carbon sources. Fossil site selection included consideration of similarities in lithology (i.e., rock type and depth from surface to fossil) (Asara, 2007) with the assumption that lithology may contribute to both molecular and isotopic preservation.

Results and Discussion

Literature Search for Molecular and Isotopic Co-occurrence

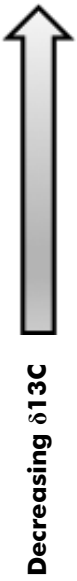
As a first step toward investigating any co-occurrence of primary molecules and isotopes in fossils, we compared literature describing primary stable carbon isotopes to reports of primary OM from the same geologic settings. Table I shows nine previously published co-occurrences of primary carbon and OM. They represent, from early Flood to late Flood deposits, pre-Sauk, Sauk, Zuni, and Tejas, from three continents. This observation suggests that whatever factors contributed to the preservation of both isotopes and biomolecules, they did so throughout depositional history and on a possibly worldwide basis. More co-occurrences will probably emerge from additional literature searches and data collections.

Sample Treatments

Seven Upper Zuni dinosaur bones were collected and portioned into 15

Table II. $\delta^{13}C$ measurements of stable carbon isotope ratios in ‰ (parts per thousand) for three chemically separated fractions of six Cretaceous System dinosaur bones identified in the table: 1) GDFM 08.027, 2) GDFM 04.001, 3) GDFM 03.001, 4) GDFM 12.001, 5) HRS 08267, 6) HRS 19114, and 7) GDFM 08.027. HTCH 06 represents a fragment of the same *Triceratops* horn core as GDFM 12001. Bone collagen extraction as per Arslanov and Svezhentsev (1993) yields mostly collagenous residue mixed with trace proteinaceous remnants. HRS samples were sourced from Wyoming's Lance Formation, and all others from Montana's Hell Creek Formation. "GDFM" samples are curated at Glendive Dinosaur and Fossil Museum, "HCTC" is taken from the literature (Armitage and Anderson, 2013), "HRS" samples are curated by Hansen Research Station, "UGAMS" sample numbers derive from the University of Georgia Accelerator Mass Spectrometer facility, and GX sample numbers derive from Geochron Laboratories.

(Numbered bone) Taxon, Description	Apatite $\delta^{13}C$	Bulk $\delta^{13}C$	Collagen $\delta^{13}C$		Lab Number
Triceratops femur GDFM 08.027			-23.8		UGAMS-03228b
Hadrosaurid femur GDFM 04.001			-22.7		UGAMS-01937
Triceratops 1 femur GDFM 03.001			-20.1		GX-32372
Hadrosaurid femur GDFM 04.001		-18.4			GX-32678
Triceratops horn GDFM 12.001		-17.1			UGAMS-11752
Triceratops 1 femur GDFM 03.001		-16.6			GX-32647
Hadrosaurid femur GDFM 04.001		-16			GX-32739
Hadrosaurid femur GDFM 04.001		-15.7			UGAMS-01936
Triceratops 1 femur GDFM 03.001	-7.24				UGAMS-17386
Hadrosaurid femur GDFM 04.001	-6.4				UGAMS-01935
Triceratops horn HCTH 06	-5.51				UGAMS-17387
Triceratops femur GDFM 08.027	-4.7				UGAMS-03228a
Triceratops horn GDFM 12.001	-4.3				UGAMS-11752a
Dinosaur HRS 08267	-2.6				UGAMS-20476
Lambeosaurus HRS 19114	-2.4				UGAMS-20477



samples. Taxa included eight samples from *Triceratops horridus*, one unknown taxon, and two hadrosaurids including a *Lambeosaurus lambei*. From these, 15 $^{13}C/^{12}C$ ratio measurements from commercial laboratories are reported in $\delta^{13}C$ and shown in Table II. $\delta^{13}C$ results from three different chemical preparation procedures were performed in order to isolate and compare within-bone fractions. One preparation isolated bone protein remnants (mostly collagen), a second isolated bioapatite carbon, and a third "bulk bone" extraction results in carbon from a mixture of bioapatite plus protein. Stable carbon isotopes from each fraction were compared to end members from corresponding biological bone fractions, expectations from diagenesis, and previously published data.

Archaeological practice has, over several decades, established decontamination procedures for bone radiocarbon analyses (Wood et al, 2010). In particular, acid plus alkaline washes (Arslanov and Svezhentsev, 1993) have demonstrated effectiveness in removing organics—humic substances for example—that may have adsorbed onto microsurfaces of the organic fraction, and thus in isolating primary collagen. Similarly, established protocols (Cherkinsky, 2009) were used to remove contaminants from the mineral fractions of our dinosaur samples. The caption for Table II lists the six specimens investigated and their extracted fractions, as well as the names of fossil repositories and laboratories used in this study.

The commercial laboratories were directed to follow updated versions of the collagen extraction protocol of Arslanov and Svezhentsev (1993), for ex-

ample, adding ultrafiltration (Brock et al., 2013). Our samples were measured beginning in 2007 and ending in 2016, thus prior to the very recent dispersion of hydroxyproline dating protocols across commercial and academic AMS facilities. In any case, this basic Arslanov method recovered no collagen in four of our seven specimens. The three that did contain collagen showed high levels of decay, with average yields of only 0.275% by weight. This falls below the minimum that most labs require for carbon dating, but since the present study is unconcerned with age-dating, the extraction of any collagenous remnants is of use for the present comparison purpose. Further, the consistency of our results across samples supports the validity of our data. For that matter, Cretaceous System collagen found here is consistent with the reports of collagen sequence from these fossils as noted above.

Evaluation of Primary Sourcing

To assess the degree of primary versus secondary carbon isotope ratios, results were first compared to known biological end members. One near proxy in the literature that compared bioapatite to collagen within the same ancient bone came from mammalian bones that showed an ~+7‰ offset (Lee-Thorp et al., 1989). Cherkinsky et al. (2023) compared collagen with bioapatite fractions from dozens of the same samples. Thirteen of various taxa excavated from arid or semiarid climates showed an average $\Delta\delta^{13}C_{apat\text{-}coll}$ of +8.39‰. Six excavated from underwater averaged +10.82‰. The authors argued that apatite dates are more reliable from arid settings, with collagen being the more reliable fraction from wet environments. In any case, our average of +17.7‰ exceeds even their 10.82, and this deserves explanation, which we attempt below.

A second assessment of our results included a comparison of our $\delta^{13}C$ measurements with those of Fricke and Pearson (2008) and Tütken (2011). Fricke and Pearson totaled 67 Hell Creek $\delta^{13}C$ enamel and dentine bioapatite measurements from ceratopsian and hadrosaurian teeth found at several microsites. They ranged from approximately -1.0‰ (their -0.4‰ outlier was removed from the data set) to -9.4‰, finding a roughly Gaussian distribution with a mean of -5.2‰. We combined Fricke and Pearson's dinosaur enamel results into one large bin. This permitted a generalized comparison between their tooth and the present bone bioapatites. Zooming out in this way also enabled visualization of the large offsets between our bone bioapatite and organic components, as shown in Figures 3 and 4. We found a lower depleted minimum for collagen of -20.1‰ and for bone bioapatite of -2.4‰, giving a $\Delta\delta^{13}C_{apat\text{-}coll}$ of +17.7‰, shown in Figure 3. Our data in Figure 4 show an upper depleted maximum for collagen of -23.8‰ and for bone bioapatite of -7.24‰, giving a $\Delta\delta^{13}C_{apat\text{-}coll}$ of +16.56‰.

Our seven dinosaur bone bioapatite $\delta^{13}C$ results, shown as the same black bars on both figures 3 and 4, ranged in Table II from -2.4‰ to -7.24‰ with a mean of -4.3‰. Fricke and Pearson (2008) took steps to demonstrate primary isotope ratios in enamel bioapatites—steps we mirrored and show in the next section. Figure 3 shows that our bone bioapatite results correspond to Fricke and Pearson's (2008) Hell Creek tooth bioapatite $\delta^{13}C$ range. Also, reports discussed below show that some burial environments appear to better preserve bone apatites than tooth apatites. Therefore, the overlap between our bone and their tooth $\delta^{13}C$ could signify that similar diageneses helped preserve primary isotopes in certain Hell Creek fossils.

Comparison of $\delta^{13}C$ in Tooth Versus Bone Bioapatite

No procedure can empirically separate diagenetic (i.e., secondary) from primary (original) carbonate from ancient or fossil bone, since burial history always remains unobserved. However, fossils contain clues to reasonable inferences. For example, Fricke and Pearson (2008) argued that diagenetic alteration would have homogenized isotope ratios from various taxa. In order to discern whether or not isotope ratios preserve at least some original signals, "it is simply enough to know that isotopic offsets and differences in correlation coefficients [e.g. $\delta^{13}C_{apat\text{-}coll}$] among animals can be preserved only if isotopic alteration does not obscure original isotopic information" (Fricke and Pearson, 2008). Their results revealed exactly these isotopic offsets and differences in correlation coefficients. Next, they found that the offset between dietary $\delta^{13}C$, inferred from organic matter extracts from sedimentary matrix, and herbivore enamel $\delta^{13}C$ from eight microsites ranging from upper Campanian to upper Maastrichtian and from western Montana to North Dakota consistently held to ~18‰. Since no known diagenetic process would manufacture such a consistent signal across such time and space, they concluded that their Hell Creek fossil carbonates retain and express primary isotopic information.

The mean apatite value from Fricke and Pearson (2008) of -4.7‰ and the bone apatite mean value of -5.9‰ differ by only 1.2‰. (Inclusion of one outlier would raise this offset to 2.1‰.) Similar arguments made by Fricke and Pearson (2008) for the primary origin of their enamel $\delta^{13}C$ signals (grey bars in Figure 3) should apply to the present bone apatite $\delta^{13}C$ values (black bars in Figure 3). In sum, the considerable overlap of our bone apatite within their tooth $\delta^{13}C$ range, as revealed in Figure 3, suggests that Hell Creek bone $\delta^{13}C$

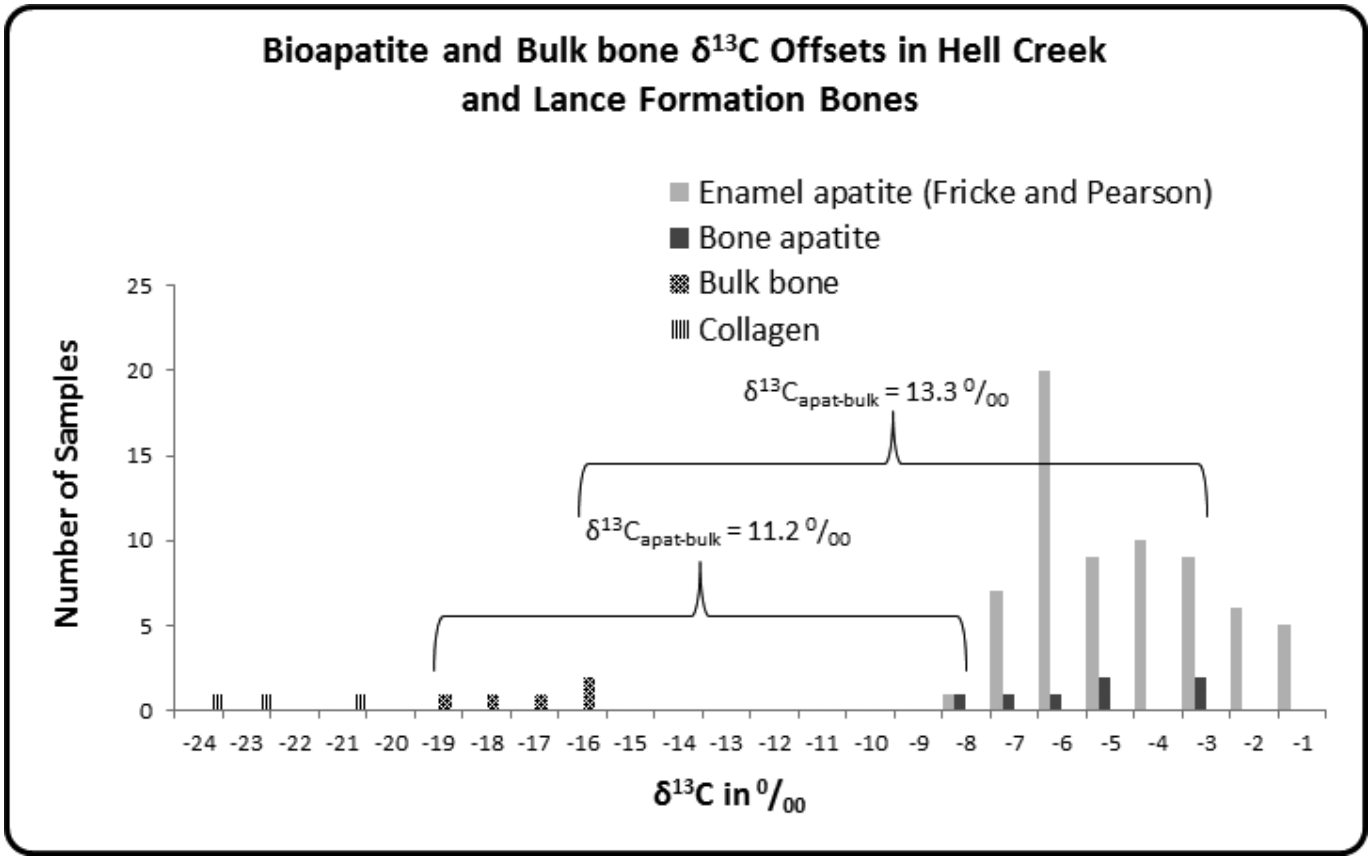


Figure 3. $\delta^{13}C$ measurements from Table II plotted with those from Fricke and Pearson (2008). Light gray bars show 67 measurements of Hell Creek ceratopsian and hadrosaur enamel and dentine bioapatite reported by Fricke and Pearson (2008). Black bars show seven measurements of hadrosaur and ceratopsian bone bioapatites. Grey bars show that one hadrosaur and two ceratopsian collagen extracts contain heavily depleted $\delta^{13}C$ levels relative to bioapatite, inconsistent with contamination through isotopic exchange (see text). Hatched bars show five results from bulk bone extracts that contain a mixture of mineral and organic bone fractions. Brackets indicate upper and lower end member offsets between apatite and bulk bone fractions.

may also preserve original isotopic signal.

Tütken (2011) found an overlap in 64 Jurassic System sauropod long-bone bioapatite and 19 tooth enamel results. We chose to plot Fricke and Pearson's but not Tütken's data in our figures because the former came from bone and the latter from enamel, and we wished to remove any variables that enamel might introduce into an already variable-rich analysis. Sauropods had a mean enamel $\delta^{13}C$ of -8.0 ± 1.2‰ (ranging from -9.1 to -4.1‰), and a mean bone bioapatite of -7.1 ± 1.4‰ (ranging from -10.9 to -4.7‰). We note, thus, that Tütken's (2011) argument for endogeneity of signal based on overlapping ranges matches our argument above. However, his argument challenges the widespread belief that tooth enamel preserves both its original protein and isotope ratios with higher fidelity than does bone.

Bone or Teeth?

The smaller crystal size of bone apatite is thought to be linked to increased susceptibility to recrystallization and diagenetic alteration. Bone bioapatites occur as flattened rods of roughly 30Å X 400Å, whereas enamel crystallites range one or two orders of magnitude larger (Wopenka and Pasteris, 2005). However, Zazzo and Saliege (2011) and Hollund et al. (2015) found evidence of isotopic exchange in archaeological tooth enamel in certain contexts. One rigorous assessment of isotope data from about 150 bone and tooth samples concluded that "the information provided by the carbon isotopic analysis of bone apatite is

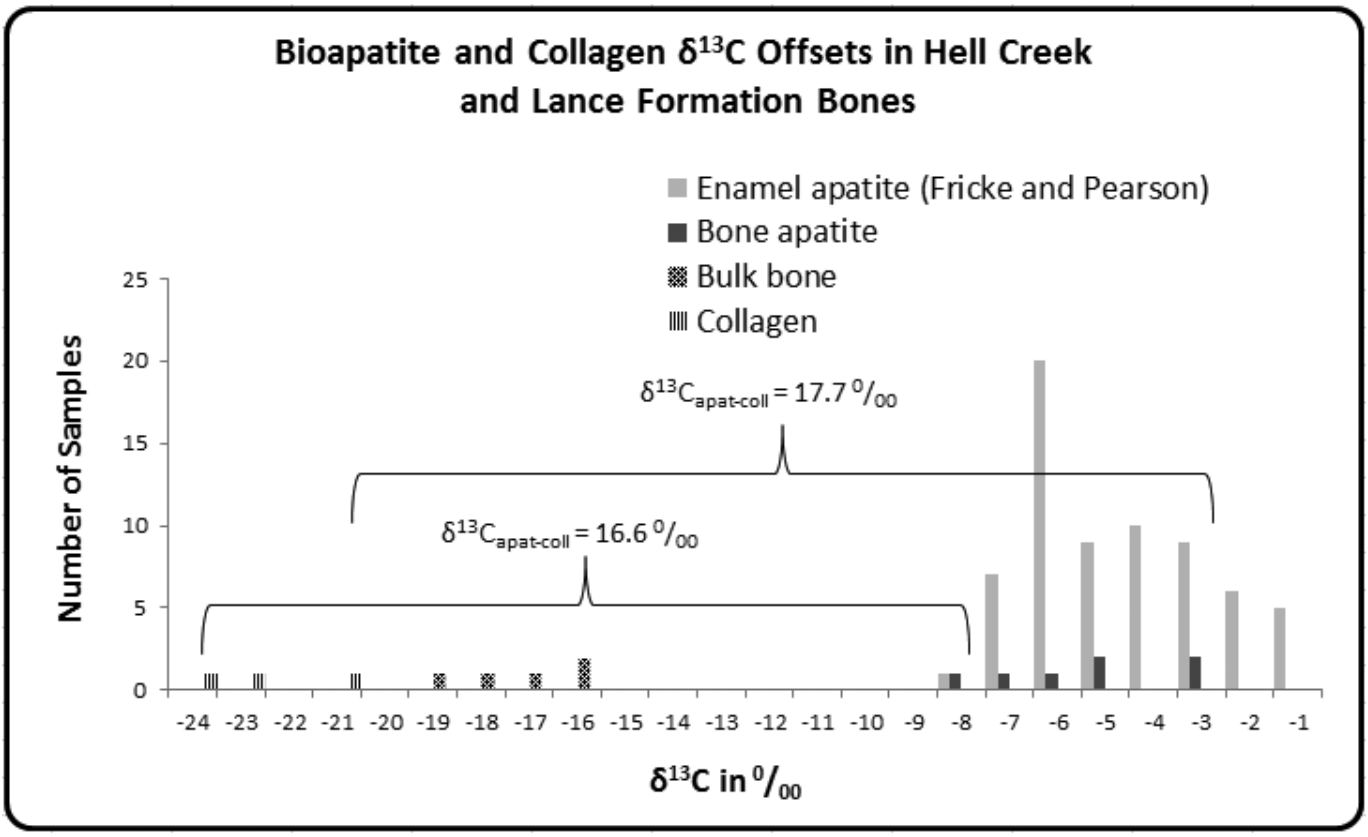


Figure 4. $\delta^{13}C$ measurements from Table II plotted with those from Fricke and Pearson (2008), as in Figure 2. Brackets indicate upper and lower end member offsets between apatite and collagen (apat-coll) bone fractions.

potentially as reliable as in enamel at least for the past 40,000 yr," a result that "seems to challenge more than 30 yr of bone and enamel diagenesis research" (Zazzo, 2014). This refers to carbon years, not calendar years. His archaeological samples of that "age" overlap 23/43 similar "ages" reported from Flood fossils (Thomas and Nelson, 2015). Thus, it appears reasonable to extend Zazzo's reliability from archaeological to paleontological bone.

Other studies lend additional support to the possibility of some preserved isotopic signal in fossil bone. For example, Lee-Thorp and van der Merwe (1987) observed that the increase of diagenetic $\delta^{13}C$ signal is "initially rapid, then slowing" toward paleontological timescales. Elsewhere, Lee-Thorp (2002) speculated regarding the variable alteration effects of burial conditions on archaeological bone: "Could the crucial difference be that the [heavily altered] specimens used in the former studies are on a pathway to destruction rather than fossilization, whereas those from Die Kelders, Klasies and Border Cave are buried in environments conducive to fossilization with minimal chemical alteration?" She observed that minimal isotopic alteration implies that recrystallization has not incorporated exogenous carbonates in the crystal structure. Instead, "Structural changes may have merely involved the rearrangement (Ostwaldian ripening) and/or incorporation of in situ 'raw material'" (Lee-Thorp, 2002). Similarly, Cherkinsky et al. (2023) made a data-derived case that isotopic exchange occurs in wetter climates. The $\delta^{13}C$ data for bone apatite presented in the current study and published reports may indicate that protection in archaeological environments "conducive to fossilization" could also apply to paleontological settings. However, these idealized conditions already approximate those used in collagen decay kinetics measurements, which, after all, represent "an optimal burial environment" (Buckley and Collins, 2011). Our results, along with others such as Tütken (2011), align with the hypothesis that paleontological bone sources may preserve more primary isotopic information than typically suspected.

Collagen and Bioapatite Comparison

The non-random and internally consistent pattern of dinosaur bone fraction offsets shown in Figure 2 matches the hypothesis that these bones preserve primary $\delta^{13}C$ ratios. Otherwise, an unlikely scenario would have to be invoked whereby a single diagenetic process altered separate bone fractions to produce the observed non-random heterogeneity between collagen and bioapatite. Similarly, bulk bone preparations supply a cross-check of the degree to which an isotope signal is primary versus secondary in origin. Bulk bone incorporates both OM and mineral bone components. Therefore, primary bulk $\delta^{13}C$ values should indicate a mixture of the isotope ratios from each fraction. Their positions in Figure 2 show values between bioapatite and collagen, as expected if the bone retains both primary isotope values and primary OM.

However, our observed dinosaurian $\delta^{13}C_{apat\text{-}coll}$ value (17‰) exceeds offsets based on modern biological bone values. The nearest proxy to our $\delta^{13}C_{apat\text{-}coll}$ offset that we could discover in the literature was biological bone fractions for (Lee-Thorp et al. 1989). They reported a ~+7‰ offset in mammalian herbivores. Our extinct reptilian herbivores exceed this by ~10‰—a significant difference. One way to explain this difference would be to invoke isotopic exchange, but that would fail to explain the consistent offsets between bone fractions, as already seen. We therefore consider instead paleobiological explanations for this difference. Fricke and Pearson (2008) offered several possibilities to account for biological carbon enrichment, including:

- Extinct hadrosaurian and ceratopsian digestive systems differed from extant mammals and birds in ways that enabled them to acquire sufficient nutrients from the tough, fibrous plant matter in their diets. Their unknown metabolic systems may have selectively incorporated heavy carbon isotopes that then enriched their bioapatites.
- Different environments, including uniquely antediluvian microhabitats, and unique dinosaurian behaviors, including competition for available resources, may have affected dietary uptake of $\delta^{13}C$.
- Marine influences could favor an abundance of C3 plants enriched in $\delta^{13}C$. Mainstream literature invokes slow changes in sea level along widespread tidal flats, whereas creation literature cites marine mixing from Flood processes. The former scenario predicts sloping shorelines that are not apparent in the strata. The latter scenario has room to speculate that pre-Flood dinosaurs may have lived near ancient seas and consumed more C3 plants back then.
- Available food may have comprised leaves exposed to direct sunlight. This canopy effect causes up to 10‰ higher $\delta^{13}C$ values compared to understory foliage. Other authors have suggested or measured additional factors that influence carbon isotope fractionation.
- Wang et al. (2014) suggested that the higher partial pressure of CO_2 indicated by Cretaceous System fossils, possibly associated with a greenhouse effect, may affect carbon isotope ratios in plant tissues.
- Fernandes et al. (2012) found that body size may positively correlate with $\delta^{13}C_{bioapat\text{-}diet}$, with pigs showing a larger apatite-diet offset than rats, and rats larger than mice. Possibly, the larger dinosaur body sizes also increased their $\delta^{13}C_{bioapat\text{-}collagen}$ ratios.
- Tütken (1987) noted known $\delta^{13}C$ differences that arise from soil moisture, water use efficiency, plant growth cycles, different plant organs, and substrate salinity.
- Jim et al. (2004) discovered a controlled isotope diet that generated a +11‰ offset between bone apatite and collagen in mice. They wrote, "On diets in which the $\delta^{13}C_{prot\text{-}engy}$ is negative, e.g. …where protein is C3 and energy is C4, $\delta^{13}C_{coll\text{-}bchol}$ [bone collagen-bone cholesterol offset] will be small (~+3‰) and both $\delta^{13}C_{apat\text{-}bchol}$ [bone apatite-bone cholesterol offset] and $\delta^{13}C_{apat\text{-}coll}$ [bone apatite-bone collagen offset] will be large (~+14 and +11‰, respectively…)."

This final scenario would explain Hell Creek herbivorous dinosaur apatite-collagen offsets if not for the fact that C4 flora are not known in Cretaceous deposits. However, possibly some dinosaurian plant sources and/or metabolisms led to uptake of protein from C3 plant sources. For example, seagrasses from inland salt marshes might be invoked, although the only known Cretaceous seagrass fossil is in the Netherlands (Voigt, 1981). In any case, a combination of some or all of these eight factors could have caused part or all of the observed 17‰ apatite-collagen offset. These paleobiological considerations do not rule out the possibility of some level of isotope exchange, but they do permit our data to remain consistent with the hypothesis of primary within-bone isotopic heterogeneities.

Cretaceous Bone Protein

Given the relative rarity of bone collagen preservation in Mesozoic sources, little to no recovery was initially expected. However, tiny amounts were recovered in three of the seven Hell Creek dinosaur bones included in this analysis. The alternative scenario to the recovery of primary proteins would be difficult to defend: i.e., that exogenous protein remnants were transported to the interior of these bones and survived

Table III. Isotopic and organic remnants correlate within the Hell Creek and Lance Formations, including the present results listed here.

	Geologic formation and Megasequence	Fossil feature with primary ^{13}C signature	Organic material
1	Hell Creek, Zuni	Dinosaur tooth enamel, gar scale enamel (Fricke et al., 2008) Dinosaur bone apatite (Thomas et al, 2019; this study)	*T. rex* bone collagen (Asara et al., 2007, v. 316), hadrosaur blood vessels (Ullmann et al., 2020), and Edmontosaur collagen (Tuinstra et al., 2025)
2	Lance, Zuni	Dinosaur bone apatite (Thomas et al, 2019; this study)	Dinosaur bone collagen (Pawlicki et al., 1966; Schweitzer, 2011; Bertazzo et al., 2015; Lee et al., 2017)

the now-rigorous industry standards for decontamination and purification to finally masquerade as endogenous collagen. On the other hand, recovery of proteinaceous vestiges aligns with the many other descriptions of dinosaur bone protein remnants reviewed above and listed in Table I. Table III shows our results alongside others from the same geologic formations and in a similar format as results summarized in Table I.

A Flood Model Explanation

On the whole, the literature demonstrates primary isotope ratios that co-occur with primary fossil organics in at least nine geologic settings, including certain Upper Cretaceous sites in Western North America. The $\delta^{13}C$ results reported here appear to add a tenth co-occurrence—this one in the Lance Fm. These observations are consistent with the suggestion of Zazzo (2014) that certain taphonomic and diagenetic conditions favor preservation of stable isotopes in bone. Future research might find that some or all of those conditions also favor molecular preservation. For example, for bone samples with apparently primary stable isotope ratios, one could predict that original organics could also be found. However, time since decay presents another qualifying factor, since primary biomaterials must be relatively young. A younger age assignment, for example, the thousands of years that attend the Flood model, would harmonize the foregoing observations:

- Broad extent of geologic formations that contain these fossils
- Rapid deep burial of fossils with apparently primary organics and isotopes
- Original (at least in part) stable carbon isotope ratios in Cretaceous System fossils
- Traces of original biomolecules that include collagen in the same
- Diagenesis that favors preservation, namely, a relative rarity of hydrothermal percolation and relatively short time available for isotopic exchange
- Relatively short half-life of bone collagen (Buckley and Collins, 2011)

The Flood models would have produced large-scale, hydrological catastrophic effects such as these broadly spread sedimentary formations. Flood models also assign most of Earth's fossiliferous sediments to a single year of rapid and successive deposition instead of billions of years. This aspect of the model is consistent with the observation that even fossils from the lowest layers contain some large degree of primary isotopes and organics. The Flood also supplies a time since burial that is three orders of magnitude more brief than mainstream expectations, which accommodates primary isotopes and organic remnants.

Conclusions

Literature examples of unaltered biological material are increasing with descriptions of apparently original molecular and even whole tissue preservation in fossil bone, including bone collagen sequence and blood vessels from Cretaceous System samples. This study adds to that trend by presenting the first report of $\delta^{13}C$ values taken directly from collagen extracts of dinosaur bone, shown in rows 1–3 of Table II. Separate studies also describe co-occurrences of primary isotopes and molecular preservation. The present study compares these heretofore disparate reports for the first time, suggesting a common cause for this observation. Next, we assessed both the co-occurrence already described in fossil bone from Hell Creek Fm. and similar co-occurrence in the equivalent Lance Fm.

In one assessment, primary $\delta^{13}C$ from dinosaur teeth was compared to dinosaur bone bioapatites from

HCF, showing congruent signals. A second assessment found broad offsets between bioapatite and collagenous extracts. Since secondary replacements should have erased such offsets, they are better explained as primary (i.e., original bone) rather than secondary (i.e., isotopic exchange) isotope signals. However, some degree of isotopic alteration cannot be eliminated in light of the challenge in accounting for the large (~+17‰) collagen-apatite offset, which would be rare in modern biological scenarios. Therefore, a further literature search was undertaken to explore paleobiological scenarios. Half a dozen of them could have produced either all or some of these large offsets that our data reveal. Recovery of sufficient collagen from which *any* isotope data could be measured, and which occurred in three of seven samples, seems to require recent burial.

A third and final assessment of isotopic endogeneity involved carbon isotope ratios from bulk bone extracts. They revealed $\delta^{13}C$ values between those of the collagen and apatite end-members, as expected if the bulk extraction indeed represents a mixture of isotopes from those two endogenous fractions. These offsets are consistent with the hypothesis that HCF and Lance Fm. bone samples preserve mostly primary isotopes. The results of these three assessments, therefore, suggest that molecular and isotopic preservations also co-occur in Lance Fm. fossils.

These conclusions lead to two outcomes. Firstly, the co-occurrence of primary carbon isotope ratios and molecular preservation can inform future investigations into preservation modes that preserve both primary isotopes and molecules. In particular, bone samples that preserve both original molecular and original isotopic remnants must have undergone a diagenetic history that favored preservation, for example, relative rarity of hydrothermal percolation. Lastly, given the biochemical barrier to the survival of original organics over deep time, even under ideal diagenetic scenarios, as well as the increasing likelihood of isotopic homogenization over time, the persistence of organics and isotopic heterogeneity found in our samples is consistent with the recent deposition of Cretaceous System fossils as deposits from Noah's Flood.

Acknowledgements

Thanks to Otis Kline and Robert Canen of the Glendive Dinosaur and Fossil Museum for supplying HCF samples. Thanks to anonymous donors who supported the radiocarbon testing costs.

References

Alleon, J., S. Bernard, C. Le Guillou, J. Marin-Carbonne, S. Pont, O. Beyssac, K.D. McKeegan and F. Robert. 2016. Molecular preservation of 1.88 Ga Gunflint organic microfossils as a function of temperature and mineralogy. *Nature Communications* 7:11977.

Amiot, R., W. Z. Zhou, X. Wang, C. Lécuyer, E. Buffetaut, F. Fluteau, Z. Ding, N. Kusuhashi, J. Mo., M. Philippe, V. Suteethorn, Y. Wang, and X. Xu. 2015. Environment and ecology of East Asian dinosaurs during the Early Cretaceous inferred from stable oxygen and carbon isotopes in apatite. *Journal of Asian Earth Sciences* 98:358–370.

Armitage, M.H., and K.L. Anderson. 2013. Soft sheets of fibrillar bone from a fossil of the supraorbital horn of the dinosaur *Triceratops horridus*. *Acta Histochemica* 115(6):603–608.

Arslanov, K.A., and Y.S. Svezhentsev. 1993. An improved method for radiocarbon dating fossil bones. *Radiocarbon* 35(3):387–391.

Asara, J.M., J.S. Garavelli, D.A. Slatter, M.H. Schweitzer, L.M. Freimark, M. Phillips, and L. C. Cantley. 2007. Interpreting sequences from mastodon and *T. rex*. *Science* 317(5843):1324–1325.

Asara, J.M., M.H. Schweitzer, L.M. Freimark, M. Phillips, and L.C. Cantley. 2007. Protein sequences from mastodon and *Tyrannosaurus rex* revealed by mass spectrometry. *Science* 316(5822):280–285.

Bertazzo, S., S.C.Maidment, C. Kallepitis, S. Fearn, M.M. Stevens, and H.N. Xie. 2015. Fibres and cellular structures preserved in 75-million-year-old dinosaur specimens. *Nature Communications* 6:7352.

Bocherens, H., M. Fizet, and A. Mariotti. 1994. Diet, physiology, and ecology of fossil mammals as inferred from stable carbon and nitrogen isotope biogeochemistry: Implications for Pleistocene bears. *Palaeogeography, Palaeoclimatology, Palaeoecology* 107(3–4):213–225.

Brock, F., V. Geoghegan, B. Thomas, K. Jurkschat, and T.F.G. Higham. 2013. Analysis of bone "collagen" extraction products for radiocarbon dating. *Radiocarbon* 55(2):445–463.

Brock, F., R. Wood, T.F.G. Higham, P. Ditchfield, A. Bayliss, and C.B. Ramsey. 2012. Reliability of nitrogen content (%N) and carbon:nitrogen atomic ratios (C:N) as indicators of collagen preservation suitable for radiocarbon dating. *Radiocarbon* 54(3–4):879–886.

Buckley, M., and M.J. Collins. 2011. Collagen survival and its use for species identification in Holocene-lower Pleistocene bone fragments from British archaeological and paleontological sites. *Antiqua* 1(1):e1.

Cherkinsky, A. 2009. Can we get a good radiocarbon age from "bad bone"? Determining the reliability of radiocarbon age from bioapatite. *Radiocarbon* 51(2):647–655.

Cherkinsky, A., G.V.R. Prasad, H. Pan, and H. Sheng. 2023. AMS 14C dating of bioapatite: Advantage and disadvantage. *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms* 537:77–80.

Clarey, T. 2015. The Hell Creek Formation: Last gasp of the pre-Flood dinosaurs.

Creation Research Society Quarterly 51(4):296–298.

Clarey, T. 2020. *Carved in Stone*. Institute for Creation Research, Dallas, TX.

Clemens, W. A. and J. H. Hartman. 2014. From Tyrannosaurus rex to asteroid impact: Early studies (1901–1980) of the Hell Creek Formation in its type area. In *Through the End of the Cretaceous in the Type Locality of the Hell Creek Formation in Montana and Adjacent Areas*. Wilson, G. P. et al. (editors). Geological Society of America Special Paper 503, 1–87.

Dunagan, S.P., and C.E, Turner. 2004. Regional paleohydrologic and paleoclimatic settings of wetland/lacustrine depositional systems in the Morrison Formation (Upper Jurassic), Western Interior, USA. *Sedimentary Geology* 167(3):269–296.

Edwards, N.P., H.E. Barden, B.E. van Dongen, P.L. Manning, P.L. Larson, U. Bergmann, and R.A. Wogelius. 2011. Infrared mapping resolves soft tissue preservation in 50-million-year-old reptile skin. *Proceedings of the Royal Society B: Biological Sciences* 278(1722):3209–3218.

Faure, G., and T.M. Mensing. 2005. Chapter 27: Carbon in *Isotope Principles and Applications*, 3rd edition. Wiley, Hoboken, NJ.

Fernandes, R., M.-J. Nadeau, and P.M. Grootes. 2012. Macronutrient-based model for dietary carbon routing in bone collagen and bioapatite. *Archaeological and Anthropological Sciences* 4(4):291–301.

Frantz, C.M., V.A. Petryshyn, P.J. Marenco, A. Tripati, W. M. Berelson, and F.A. Corsetti. 2014. Dramatic local environmental change during the Early Eocene Climatic Optimum detected using high-resolution chemical analyses of Green River Formation stromatolites. *Palaeogeography, Palaeoclimatology, Palaeoecology* 405:1–15.

Fricke, H.C., and D.A. Pearson. 2008. Stable isotope evidence for changes in dietary niche partitioning among hadrosaurian and ceratopsian dinosaurs of the Hell Creek Formation, North Dakota. *Paleobiology* 34(4):534–552.

Fricke, H.C., R.R. Rogers, R. Backlund, C.N. Dwyer, and S. Echt. 2008. Preservation of primary stable isotope signals in dinosaur remains, and environmental gradients of the Late Cretaceous of Montana and Alberta. *Palaeogeography, Palaeoclimatology, Palaeoecology* 266(1–2):13–27.

Ghosh, P., S.K. Bhattacharya, A. Sahni, R.K. Kar, D.M. Mohabey, and K. Ambwani. 2003. Dinosaur coprolites from the Late Cretaceous (Maastrichtian) Lameta Formation of India: Isotopic and other markers suggesting a C3 plant diet. *Cretaceous Research* 24(6):743–750.

Grein, M., A. Roth-Nebelsick, and V. Wilde. 2010. Carbon isotope composition of middle Eocene leaves from the Messel Pit, Germany. *Palaeodiversity* 3:1–7.

Grey, J. and R.I. Jones. 1999. Carbon stable isotopes reveal complex trophic interactions in lake plankton. *Rapid Communications in Mass Spectrometry* 13(13):1311–1314.

Gurley, L.R., J.G. Valdez, W.D. Spall, B.F. Smith, and D.D. Gillette. 1991. Proteins in the fossil bone of the dinosaur, *Seismosaurus*. *Journal of Protein Chemistry* 10(1):75–90.

Hall, P.A., D.M. McKirdy, G.P. Halverson, J.B. Jago, and J.G. Gehling. 2011. Biomarker and isotopic signatures of an early Cambrian Lagerstätte in the Stansbury Basin, South Australia. *Organic Geochemistry* 42:1324–1330.

Hartman, J.H., R.D. Butler, M.W. Weiler, and K.K Schumaker. 2014. Context, naming, and formal designation of the Cretaceous Hell Creek Formation lectostratotype, Garfield County, Montana. *Geological Society of America Special Papers* 503:89–121.

Hoefs, J. 1987. *Stable Isotope Geochemistry*. Springer-Verlag, Berlin, Germany.

Hollund, H., N. Arts, M. Jans, and H. Kars. 2015. Are teeth better? Histological characterization of diagenesis in archaeological bone–tooth pairs and a discussion of the consequences for archaeometric sample selection and analyses. *International Journal of Osteoarchaeology* 25(6):901–911.

Jim, S., S.H. Ambrose, and R P. Evershed. 2004. Stable carbon isotopic evidence for differences in the dietary origin of bone cholesterol, collagen, and apatite: Implications for their use in palaeodietary reconstruction. *Geochimica et Cosmochimica Acta* 68(1):61–72.

Kohn, M.J., and T.E Cerling. 2002. Stable isotope compositions of biological apatite. *Reviews in Mineralogy and Geochemistry* 48(1):455–488.

Krueger, H.W., and C.H. Sullivan. 1984. Chapter 14: Stable Isotopes in Nutrition, pp. 205–220. In *Models for Carbon Isotope Fractionation Between Diet and Bone*. Turnlund, J.R., and P.E. Johnson (editors). https://pubs.acs.org/doi/10.1021/bk-1984–0258.ch014.

Lee, Y.C., C.C. Chiang, P.Y. Huang, C.Y. Chung, T.D. Huang, C.C. Wang, and R.R. Reisz. 2017. Evidence of preserved collagen in an Early Jurassic sauropodomorph dinosaur revealed by synchrotron FTIR microspectroscopy. *Nature Communications* 8:14220.

Lee-Thorp, J.A. 2002. Preservation of biogenic carbon isotopic signals in Plio-Pleistocene bone and tooth mineral. In Ambrose, S.H., and M.A. Katzenbert (editors). *Biogeochemical Approaches to Paleodietary Analysis*: *Advances in Archaeological and Museum Science*, Volume 5, pp. 89–115. Springer, Boston, MA.

Lee Thorp, J., and N.J. van der Merwe. 1987. Carbon isotope analysis of fossil bone apatite. *South African Journal of Science* 83(11):712–715.

Lee-Thorp, J.A., J.C. Sealy, and N.J. Van der Merwe. 1989. Stable carbon isotope ratio differences between bone collagen and bone apatite, and their relationship to diet. *Journal of Archaeological Science* 16(6):585–599.

Lindgren, J., M.W. Caldwell, T. Konishi, and L.M. Chiappe. 2010. Convergent evolution in aquatic tetrapods: insights from an exceptional fossil mosasaur. *PLoS One* 5(8):e11998.

Lindgren, J., P. Uvdal, A. Engdahl, A.H. Lee,

C. Alwmark, K.E. Bergquist, E. Nilsson, P. Ekström, M. Rasmussen, D.A. Douglas, and M.J. Polcyn. 2011. Microspectroscopic evidence of Cretaceous bone proteins. *PLoS One* 6(4):e19445.

McNamara, M.E., D.E. Briggs, and P.J. Orr. 2012. The controls on the preservation of structural color in fossil insects. *Palaios* 27(7):443–454.

Nelson, P.H., S.M. Ewald, S.L. Santus, and P.K. Trainor. 2010. Gas, oil, and water production from Jonah, Pinedale, Greater Wamsutter, and Stagecoach Draw Fields in the Greater Green River Basin, Wyoming. *USGS Open-File Report 2009–1290.*

Ostrom, P.H., S.A. Macko, M.H. Engel, J.A. Silfer, and D. Russell. 1990. Geochemical characterization of high molecular weight material isolated from Late Cretaceous fossils. *Advances in Organic Geochemistry* 276:106365.https://www.sciencedirect.com/science/article/abs/pii/S1367912024003602.

Pawlicki, R., A. Dkorbel, and H. Kubiak. 1966. Cells, collagen fibrils, and vessels in dinosaur bone. *Nature* 211(5049):655–657.

Reisz, R.R., T.D. Huang, E.M. Roberts, S. Peng, C. Sullivan, K. Stein, A.R. LeBlanc, D. Shieh, R. Chang, C. Chiang, and C. Yang. 2013. Embryology of Early Jurassic dinosaur from China with evidence of preserved organic remains. *Nature* 496(7444):210–214.

Rogers, R.R., C.C. Swisher III, and J.R. Horner. 1993. $^{40}Ar/^{39}Ar$ age and correlation of the nonmarine Two Medicine Formation (Upper Cretaceous), northwestern Montana, USA. *Canadian Journal of Earth Sciences* 30(5):1066–1075.

Schroeter, E., C.J. DeHart, T.P. Cleland, W. Zheng, P.M. Thomas, N.L. Kelleher, M. Bern, and M.H. Schweitzer. 2017. Expansion for the *Brachylophosaurus canadensis* collagen I sequence and additional evidence of the preservation of Cretaceous protein. *Journal of Proteome Research* 16(2):920–932.

Schweitzer, M.H., W. Zheng, C.L. Organ, R. Avci, Z. Suo, L.M. Freimark, V.S. Lebleu, M.B. Duncan, M.G. Vander Heiden, J.M. Neveu, and W.S. Lane, J. S. Cottrell, John R. Horner, L. C. Cantley, R. Kalluri, J. M. Asara. 2009. Biomolecular characterization and protein sequences of the Campanian hadrosaur *B. canadensis*. *Science* 324(5927):626–631.

Schweitzer, M.H., W. Zheng, C.L Organ, R. Avci, Z. Suo, L.M. Freimark, and V.S. Lebleu. 2009. Biomolecular characterization and protein sequences of the Campanian hadrosaur *B. canadensis*. *Science* 324(5927):626–631.

Schweitzer, M.H. 2011. Soft tissue preservation in terrestrial Mesozoic vertebrates. *Annual Review of Earth and Planetary Sciences* 39(1):187–216.

Schweitzer, M.H., and M. Marshall. 2012. Claws, Scales, Beaks, and Feathers: Molecular Traces in the Fossil Record. In Brett-Surman, M.K, T.R. Holtz, and J.O Farlow (editors). *The Complete Dinosaur, Second Edition*, p. 281. Indiana University Press, Bloomington, IN.

Schweitzer, M.H., J.L Wittmeyer, J.R. Horner, and J.K. Toporski. 2005. Soft-tissue vessels and cellular preservation in *Tyrannosaurus rex*. *Science* 307(5717):1952–1955.

Slater, T.S., N.P. Edwards, S.M. Webb, F. Zhang, and M.E. McNamara. 2023. Preservation of corneous Beta-proteins in Mesozoic feathers. *Nature Ecology and Evolution* 7:1706–1713.

Snyder, K., M. McLain, J. Wood, and A. Chadwick. 2020. Over 13,000 elements from a single bonebed help elucidate disarticulation and transport of an Edmontosaurus thanatocoenosis. *Plos One* 15(5):e0233182.

Surmik, D., A. Boczarowski, K. Balin, M. Dulski, J. Szade, B. Kremer, and R. Pawlicki. 2016. Spectroscopic studies on organic matter from Triassic reptile bones, Upper Silesia, Poland. *PLoS One*. 11:e0151143.

Thomas, B., and V. Nelson. 2015. Radiocarbon in Dinosaur and Other Fossils. *Creation Research Society Quarterly* 51(4):299–311.

Thomas, B. 2019. Collagen Remnants in Ancient Bone. Ph.D. Thesis, University of Liverpool.

Thomas, B., and S. Taylor. 2019. Proteomes of the Past: The Pursuit of Proteins in Paleontology. *Expert Review of Proteomics* 16(11–12):881–895.

Tuinstra, L., B. Thomas, S. Robinson, K. Pawlak, G. Elezi, K. F. Faull, and S. Taylor. 2025. Evidence for endogenous collagen in *Edmontosaurus* fossil bone. *Analytical Chemistry* 97(5):2618–2628.

Tütken, T. 2011. The diet of sauropod dinosaurs: Implications from carbon isotope analysis of teeth, bones, and plants. In *Biology of the Sauropod Dinosaurs: Understanding the Life of Giants*, pp. 57–79. Indiana University Press, Bloomington, IN.

Ullmann, P.V., S.H. Pandya, and R. Nellermoe. 2019. Patterns of soft tissue and cellular preservation in relation to fossil bone tissue structure and overburden depth at the Standing Rock Hadrosaur Site, Maastrichtian Hell Creek Formation, South Dakota, USA. *Cretaceous Research* 99(3):1–13.

Vinther, J.R. Nicholls, S. Lautenschlager, M. Pittman, T.G. Kaye, E. Rayfield, G. Mayr, and I.C. Cuthill. 3D camouflage in an ornithischian dinosaur. *Current Biology* 26(18):2456–2462.

Voigt, E. 1981. Upper Cretaceous bryozoan-seagrass association in the Maastrichtian of the Netherlands. In *Recent and Fossil Bryozoa*, pp. 281–298. Olsen & Olsen, Fredensborg, New Zealand.

Wang, Y., C. Huang, B. Sun, C. Quan, J. Wu, and Z. Lin. 2014. Paleo-CO_2 variation trends and the Cretaceous greenhouse climate. *Earth-Science Reviews* 129:136–147.

Williford, K.H., T. Ushikubo, J.W. Schopf, K. Lepot, K. Kitajima, and J.W. Valley. 2013. Preservation and detection of microstructural and taxonomic correlations in the carbon isotopic compositions of individual Precambrian microfossils. *Geochimica et Cosmochimica Acta* 104:165–182.

Wood, R.E., C.B. Ramsey, and T.F.G Higham. 2005. Refining background

corrections for radiocarbon dating of bone collagen at ORAU. *Radiocarbon* 52(2):600–611.

Wopenka, B., and J.D. Pasteris. A mineralogical perspective on the apatite in bone. *Materials Science and Engineering C* 25(2):131–143.

Zazzo, A., and J.-F. Saliège. 2011. Radiocarbon dating of biological apatites: A review. *Palaeogeography, Palaeoclimatology, Palaeoecology* 310(1):52–61.

Zazzo, A. 2014. Bone and enamel carbonate diagenesis: A radiocarbon prospective. *Palaeogeography, Palaeoclimatology, Palaeoecology*. 416:168–178.

Exegetical Notes on Genesis 2: God Is Glorified in Creating Mankind in His Own Image

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Key Words: creation, Garden of Eden, Genesis 2, historical narrative, mankind

Accepted for publication December 12, 2024

Abstract

This article provides an in-depth analysis of Genesis, Chapter 2, asserting its nature as chronology-sensitive, historical narrative rather than poetry, allegory, or myth. It explains that Genesis 2 summarizes God's completed creation work and then recapitulates Day 6 of Creation Week, focusing specifically on the creation of humanity. The text details how God created Adam from dust and later Eve from Adam's rib to be his "fitting helper," establishing the original pattern for marriage. It describes the Garden of Eden as a real, geographical location planted by God, watered by a unique mist system, and featuring four rivers. A key point is God's commandment to Adam not to eat from the Tree of the Knowledge of Good and Evil, which served as a crucial moral test of his loyalty with serious consequences for disobedience. Through detailed examination of Hebrew grammar and word meanings, the author reinforces the historical reliability of these events, emphasizing God's glory as the Creator.

Simple Summary

This article offers a detailed study of Genesis, Chapter 2, emphasizing that it is historical narrative rather than poetry, allegory, or myth. It explains that this chapter summarizes God's creation work, specifically recapitulating Day 6 of Creation Week when God created Adam and then Eve, both in His own image, giving them purpose and instructions. The article highlights God's completion of Creation and His rest on Day 7. It describes the Garden of Eden as a real, God-planted place, detailing its unique, mist-based watering system and the four rivers that flowed from it. A central point is the commandment given to Adam not to eat from the Tree of the Knowledge of Good and Evil, which served as a crucial moral test of his loyalty, with disobedience leading to death. The study also covers God's creation of Eve from Adam's rib to be his fitting helper, thereby establishing the original pattern for marriage. The author uses a deep analysis of Hebrew grammar and word meanings to reinforce the idea that Genesis 2 reports genuine, chronology-sensitive, historical events that glorify God as the Creator.

Introduction

Genesis 2 continues the first segment of Genesis, which introduces readers to God, with special attention to His role as the Creator of all creation. Chapter 1 of Genesis provides a big-picture panorama of Days 1 through 6 of the Creation Week, reporting the sequence of God's creative acts during those six (literal) days. Chapter 2 of Genesis, resuming at Day 7 of the Creation Week, summarizes the Creation Week as God's work in the heavens and Earth, with a recapitulation of the part of Day 6 when God made humanity, first creating Adam (the first man) and thereafter creating woman (the first woman, who is later re-named "Eve"). God created mankind in His own image, providing mankind with purpose and instructions on how to live life on Earth.

Genesis, Chapter 2, is narrative prose—as is virtually all of the book

of Genesis. The small exception, where Hebrew poetry occurs, is Genesis 4:23–24, where the polygamist Lamech composes a poetic boast of his killings (Johnson, 2011, pp. 8–9). Accordingly, Genesis should not be confused with "Hebrew poetry" (which has a different literary structure). As historical narrative, Genesis 2 reports historical highlights of God's creative works that are important to understanding the "generations" of the heavens and the Earth, as well as the origins of life-forms that God made for the Earth, climaxing with how God created mankind, as male and female, on Day 6. Thus, after mentioning God's rest on Day 7, Genesis, Chapter 2, returns to God's work on Day 6, regarding how He made mankind.

Genesis 2 is like an enormous gold mine (or, because it's so powerful, maybe "uranium mine" is a better simile) for studying God's truth about beginnings—starting with observations of Chapter 2's text, including grammar (noun forms, prepositional prefixes, verb forms—especially *waw* consecutives—etc.), syntax (nota accusativi-signaled direct objects, preposition-facilitated objects, contextualizing and intensifying adverbs, etc.), literary structure (narrative prose, as well as theme introduction, development, and conclusion), literary devices (repetition, metonymy, etc.), and lexical components (concordance-facilitated word studies, root verb-based etymology insights), etc. (Baughman, 1965, pp. 75–88; Johnson, 2011, 2012).

Because Genesis 2 is chronology-sensitive, narrative prose, its literary structure frequently includes serial sentences, featuring *waw* consecutive-prefixed verbs. The *waw* consecutive is also called the *waw* conversive (Pratico and Van Pelt, 2001, pp. 192–205). It is important to recognize that Genesis is historical narrative—including Chapters 1 through 11—not some kind of allegorical, literary "framework" or cosmogonical, etiology "myth" (Johnson, 2019b, p. 21).

The historical information reported in Genesis, Chapter 2, bridges the Genesis 1's history (of Creation Week's first six days) to the Edenic temptation and failure of Adam (reported in Genesis 3, which is later interpreted in Romans, Chapter 5). The original condition of mankind, before Adam's sin, is presented in Genesis, Chapter 2, in conjunction with the original mandate that God gave to mankind, as stewards entrusted with care of the Earth (see also Psalm 8).

Exegetical Observations and Lexical Analysis

Verse 1.

This verse announces that God's Creation Week works "were completed"—that completed work is indicated by *wayekūllû*a (*waw*-consecutive-prefixed, Pual imperfect, 3rd person, masculine plural form of *kâlâh* "to complete," "to finish"), indicating intensive passive action. Specifically, the heavens and the Earth, "and all their hosts" (*wekâl* şeb'ââm) were completed within the initial six days of Creation Week. This description of God's completed work clashes with the contrary notion promoted by OECs ("old-Earth creationists"), e.g., Vern Poythress, John C. Collins, Hugh Ross, Norm Geisler, etc.—and this author thanks Dr. Jeff Tomkins for that insight.

Verse 2.

Verse 2 reports two major facts, highlighted by verbs (*wayekal* & *wayyišbōt*), that occurred on Day 7 of Creation Week:

1. "and He finished" (*wayekal* = *waw*-consecutive-prefixed, Piel imperfect, 3rd person, masculine singular form of *kâlâh*, "to complete" or "to finish"), denoting that God completely "finished" His creative workings [of Days 1 through Day 6], on Day 7; and
2. "and He rested" (*wayyišbōt* = *waw*-consecutive-prefixed, Qal imperfect, 3rd person, masculine singular form of *šâbat*, "to complete" or "to finish"), denoting that God completely "rested" on Day 7, from "from all His work" that God had done on Days 1 through Day 6 [of Creation Week].

The other verb (in Verse 2) is *'âśâh* ("He had done"), used twice (both times in the Qal perfect, 3rd person, masculine singular form, indicating completed action), refers back to God's work that He "had done" (*'âśâh*) during Day 1 through Day 6 of Creation Week.

Verse 3.

Day 7 is sanctified by God—God declares it special, holy, different—by blessing it (*wayebârek* = *waw*-consecutive-prefixed, Piel imperfect, 3rd person, masculine singular form of *bârak*, "to bless") and hallowing it (*wayeqarōš* = *waw*-consecutive-prefixed, Piel imperfect, 3rd person, masculine singular form of *qâdaš*, "to sanctify"). This is the Bible's first usage of the verb *qâdaš*, demonstrating the importance of God's role as Creator of the heavens and Earth, plus all that is therein (see, accord, Exodus 20:8–11).

The end of Verse 3 uses a combination of verbs that highlights two major categories of action that God accomplished during Creation Week: God "created" (i.e., He called into being something new *from nothing* preëxisting) and God "made" (i.e., He worked pre-existing material into a new form, according to a purposeful design). Notice that these same verbs, used by Moses in Genesis 2:2–3, are recalled in Exodus 20:11 ("made," "rested," "blessed," "hallowed," and "created"). In summarizing God's creation work, Exodus 20:11 includes usage of the verb *bârâ'* ("He created") that Moses used in Genesis 1:1 (physical

matter-energy created from nothing), 1:21 (non-physical animal *nepheš*-life created from nothing, inserted into physical animal bodies), and 1:27 (non-physical, human-bearing, God's-image life created from nothing, inserted into physical human bodies). For more discussion of how *bârâ'* is used in the Old Testament, see 'New from Nothing': Is God Still Creating Today? (Johnson, 2013b, pp. 10–11). Specifically, those two aspects of God's activities, i.e., "creating" and "making" (during Days 1 through 6 of Creation Week) are teleologically linked in the phrase *bârâ' 'elōhîm la'aśôt* ("God created to make"), combining God's completed action of creating (Qal perfect, 3rd person, masculine singular of *bârâ'*) with the purposed action of God making His creation to fulfill His ultimate designs therefore (*'aśôt* = preposition-prefixed, Qal infinitive construct form of *'âśâh*).

Verse 4.

This verse first announces a record of "beginnings" (*tôledôt*), a noun derived from the root verb *yâlad* ("to beget," "to generate"). Some opine that this announcement *concludes* a just-reported (chapter-like) record of "generations" (i.e., summarizing Genesis 1:1–2:3 as a unit of "generations"); others think it summarily *introduces* such a record (i.e., introducing Genesis 2:4–4:26, after which another *tôledôt* follows (in Genesis 5:1). (Thankfully, the analysis of that interpretive question is beyond the scope of this present work.) Verse 4 refers back to God's Creation Week deeds that included creating and making the heavens and the Earth, plus all that is therein. The heavens and the Earth did *not* evolve themselves into existence, so the verb *bârâ'* ("to create") does not appear in a Hithpael or Hithpolel form; rather, Verse 4 uses a preposition-prefixed, Niphal infinitive construct form of *bârâ'* (indicating that the heavens and the Earth were *passive* recipients of God's creative actions). Specifically, the Creator of the heavens and Earth was (and is) "the LORD God," i.e., *YHWH 'elōhîm*.

Verse 4 concludes with the summary statement, matching Genesis 1:1, that "in [the] day" that "YHWH God made earth and heavens," omitting definite articles for the nouns "earth" and "heavens." Due to how the noun "day" (*yôm*) is previously used in Genesis, it seems Genesis 2:4 is alluding to the action of Genesis 1:1 as occurring on Day 1 of Creation Week, i.e., the physical matter-energy "stuff" (that God created on Day 1) is the topic of the first *tôledôt*; God generated all derivative material entities (including animal and human bodies) from that Day 1 "stuff."

Verse 5.

Verse 5 continues to describe the condition of the physical matter-energy "stuff" that God made on Day 1, with original Earth conditions lacking agriculture-friendly crop plants, due to a difference in the Earth's water cycle (i.e., different from what it would later involve)—Moses specifically notes that God had not yet (then) caused rainfall—"because" (*kî*) "not" (*lō'*) yet He [*YHWH 'elōhîm*] "had caused it to rain" (*himeṭîr* = Hiphîl perfect, 3rd person, masculine singular form of *mâṭar*, "to rain"). Rainfall would later become a major recurring process in the world's global water cycle, but at this early stage of Earth history, God watered "the earth" (i.e., the ground of the Day-3 supercontinent) using "mist" ('ēd) that arose from underground, enough to water all of the world's land surfaces (see Genesis 2:6).

Verse 6.

The pre-Flood "mist" ('ēd), that continually rose (*ya'aleh* = Qal imperfect, 3rd person, masculine singular for of *'âlâh* ["to arise," "to go up"], indicating continuing action) from underground, "watered" (*wehišeqâh* = *waw*-consecutive-prefixed, Hiphîl perfect, 3rd person, masculine singular form of *šâqâh*, "to give drink," "to water," "to pour water/drink," etc.) the land, indicating that the original "mist"-provided watering was a continual activity, upon "all the surfaces of the ground" (*kâl penê hâ-'adâmâh*). This is the first usage of the verb *šâqâh* ("to water"), a verb that is later used to refer to Earth's post-Flood water cycle (e.g., in Psalm 104:11, 13). See also Ecclesiastes 2:6 and Ezekiel 17:7 for examples of artificial irrigation (Wigram, 1874, p. 1323).

Verse 7.

The LORD God (*YHWH 'elōhîm*) made (*wayyîṣer* = *waw*-consecutive-prefixed, Qal imperfect, 3rd person, masculine singular form of *yâṣar*, "to form," "to shape," "to structure") Adam, by taking preëxisting physical matter—"dust from the ground" (*'âphâr min-hâ-'adâmâh*), i.e., the same "ground" (*'adâmâh*) that the prior verse notes as continually watered by mist—and God breathed (*wayyîpaḥ* = *waw*-consecutive-prefixed, Qal imperfect, 3rd person, masculine singular form of *nâphaḥ*, "to blow [air]") into the human body's nostrils, so Adam became a "living soul" (*nepheš ḥayyîh*). Thus, from Day 6, the created nature of Adam—and from him, all mankind, including his own wife!—is a God-combined unity of the physical (body) and the non-physical (soul/spirit). This is the first usage of the noun *'âphâr*, translated "dust" (Wigram, 1874, p. 968). The root verb *'âphar* means "to dust" (e.g., see 2nd Samuel 16:13).

Verse 8.

Being a finite creature (of space and time), Adam (man) needed a geographical place to be—Eden is described as a botanical garden/park-like "garden in Eden" (*gan-be 'ēden*), located "in [the] east" (*mi-qedem*), that the LORD God "planted" (*wayyîṭa'* = *waw*-consecutive-prefixed, Qal imperfect, 3rd person,

masculine singular form of *nâṭa‘*, "to plant," "to fasten," "to affix") for Adam's occupation, so God promptly "put" (*śûm*) Adam there. "Eden" (*‘ēden*) is a masculine noun that means delight, pleasure, pleasantness, etc.—see 2nd Samuel 1:24; Psalm 36:8(9); Jeremiah 51:34. A similar feminine noun, *‘edenâh*, appears in Genesis 18:12 (meaning "pleasure" or "delight"). A related adjective, *‘âdîn*, means "given to pleasures," appearing in Isaiah 47:8. The root verb (of these etymologically related words) is *‘âdîn*, meaning "to delight" or "to please," appearing as a Hithpael imperfect, plural construct in Nehemiah 9:25 ("delighted themselves").

God's Creatorship is emphasized by noting Man (literally, "the Adam" = *hâ-’âdâm*) as one whom God had formed (*yâṣâr*). The nota accusativi (direct object signal) before *hâ-’âdâm* (i.e., the man) emphasizes that it was God Who, as the subject noun, actively did the work of making Adam and of planting a delightful garden that Adam was "put" (inserted) into by God. Adam is the direct object of this divine action, passively receiving God's caring handiwork.

Verse 9.

The LORD God "made to grow" (*wayyaṣmaḥ* = *waw*-consecutive-prefixed, Hiphîl imperfect, 3rd person, masculine singular form of *ṣâmaḥ*, "to grow," "to bud," "to spring forth," "to sprout"), from out of "the ground" (*hâ-’adâmâh*), "every tree" (*kâl ‘ēṣ*), pleasant to look at (literally, "for sight" = *lemare’eh*) and "good for food" (*ṭôb lema’akâl*), as well as the "Tree of Life" (*‘ēṣ ha-ḥayyîm*) in the garden's midst—plus the "Tree of the Knowledge of Good and Evil" (*‘ēṣ ha-da‘at ṭôb wara‘*). God's making of vegetation, including trees (with fruit and seeds), on Day 3, was already reported (Genesis 1:11–12), but this is the Bible's first mention of "evil" (*ra‘*)—specifically, here we first read of the potential of "knowing" that which is "evil," i.e., bad, wicked, wrong, anti-good, etc. (Wigram, 1874, pp. 1177–1181). The Hebrew word *ra‘* is an adjective, denoting "evil" as a qualitative characteristic/trait of something morally or otherwise bad.

Verse 10.

Eden's geographic features are reported in this verse—from out of Eden a "river" (*nâhâr*) was "flowing" (*yōṣē’* = qal active participle form of *yâṣâ’*, "to issue forth," "to flow from").

This is the first mention of a "river" (*nâhâr*) in Scripture (Wigram, 1874, pp. 798–799). The Hebrew noun *nâhâr* (here translated "river")—is usually translated as "river" (e.g., see also Genesis 2:13–14, 15:18, 24:10; Deuteronomy 1:7, 11:24; Joshua 1:4; 2nd Kings 5:12; etc.), but also as "stream" (e.g., see Exodus 7:19)—derives from the root verb *nâhar*, meaning "to flow," i.e., "to move in a flowing motion," yet not being limited to waterflow—because traffic movements of humans can also "flow" (e.g., see Isaiah 2:2, 60:5; Jeremiah 31:12, 51:44; Micah 4:1). This noun can be compared to *peleg*, which appears to refer to major river-dividing, i.e., what might be called dendritic tributary-system "riverization" (Johnson, 2019a, pp. 4–16).

Two common Hebrew nouns, *nâhâr* and *naḥal*, are both translated "river"—this is illustrated in 2nd Kings 24:7, where Egypt's "river" is a form of *naḥal*, whereas the "river" Euphrates is a form of *nâhâr*. The noun *naḥal* refers more to a river valley, i.e., the entire drainage basin or delta that may be seasonally full, shallow, or even dry.

The purpose of Eden's river was "to water" (*lehašeqôt* = preposition-prefixed, Hiphîl infinitive construct form of *šâqâh*, "to give drink," "to water," "to pour water/drink," etc.) the garden there, and from there that river "was [continually] divided" (*yipārēd* = Niphal imperfect, 3rd person, masculine singular form of *pârad*, meaning "to divide," "to separate"), such that it then was "unto four heads" (*wehâyâh le’arbâ‘âh râ’šîm*).

Verse 11.

Eden's main-source river splits into four distributaries—Pîshôn, Gîḥôn, Hiddekel (a/k/a Tigris), and Euphrates (Genesis 2:11–14). "Distributaries" are the geographical opposite of "tributaries." When upstream freshwater streams merge together into a larger river, the component streams are called "tributaries." However, when a stream splits off of the main river and continues downstream without rejoining the original river, the split-off stream is called a "distributary."

The verb *pârad* ("divide") is the same verb used to describe the divisions of Gentiles in their lands (Genesis 10:5), according to their language-divided, ethnic people-groups (Genesis 10:32), but a different verb (*pâlag*) is used to describe how "the earth was divided" during the days of Peleg (Genesis 10:25).

For further analysis of this verbal distinction, see the philological analysis in "Rightly 'Dividing' the Word About Peleg: Was Earth's Unusual 'Division' During Peleg's Lifetime a Linguistic Event or a Geological Event?" (Johnson, 2019a, pp. 4–16).

The river Pîshôn is "the one flowing around" (*ha-sōbēb* = article-prefixed, Qal-act part of *sâbab*) all of "the land of the Havilah" *(ereṣ ha-ḥawîlâh*), where there is "the gold" (*ha-zâhâb*). The verb *sâbab* denotes the cyclic action of circling, arcing around, compassing, or rhythmic oscillating—e.g., see Joshua 6:3–4 (circling Jericho); 1st Samuel 7:16 (travel circuit); Ecclesiastes 9:14 (surrounding for a siege); Job 40:22 (riparian willows bordering freshwater stream); Jeremiah 31:22 (expectant mother envelopes her unborn manchild), Proverbs 26:14 (door turning and returning on its hinges), etc.

Verse 12.
Havilah-land's gold (*zâhâb*) is noted as especially "good" (*ṭôb*), plus Havilandland has "the bdellium" (*ha-bedōlaḥ*) and "the stone of the onyx" (*'eben ha-šōham*). "Bdellium" is later compared—perhaps as to its color/color-pattern—to the "heavenly bread" that God provided to the wilderness-wandering Israelites after the exodus from Egypt (see Numbers 11:7). The "onyx" stone is a gem that later appears in jewelry settings (*pardon the pun*), including the sacred ephod and priestly breastplate of Aaron (see Exodus 25:7; 28:9,20; 35:9,27; 39:6,13; etc.).

Verse 13.
The second distributary "river" (*nâhâr*) is *the* Gîḥôn, "the one that flows around" (*ha-sōbēb* = article-prefixed, Qal-act part of *sâbab*) all of the land of Cush (*kûš*), corresponding to whatever was the pre-Flood version of Africa's landmass (since post-Flood Africa = "land of Cush").

Verse 14.
The third distributary "river" (*nâhâr*) is Hidekkel (*ḥiddeqel*), "the one that goes" (*ha-hōlēk* = article-prefixed, Qal-act part of *hâlak*, "to go," "to travel," "to walk," etc.) east of Assyria (*'ašûr*), and the fourth "river" (*nâhâr*) is Euphrates (*perât*). Often a last-named item (or person) in a series is of special importance, introducing and linking to subsequent events or information—in this case the Euphrates River (in its post-Flood version) will be linked to the Tower of Babel (Genesis 11) and later political establishments in the same area, i.e., the kingdoms/empires of Babylon.

Verse 15.
This verse resumes the action reported in Verse 8, of God placing His newly-created creature, man, into Eden's garden. This verse reports the LORD God's immediate purpose—for which the LORD God "took him [i.e., Adam]"—and "put him [i.e., Adam]" into Eden's garden: "to dress it and to keep it," literally, "to work it and to protect it" (*le'âbdâh ûlešâmrâh* = preposition-prefixed, Qal infinitive construct [of *'âbad*, "to work," "to serve," "to labor," etc.] with 3rd person, feminine singular suffix, followed by conjunction-and-preposition-prefixed, Qal infinitive construct [of *šâmar*, "to safeguard," "to care for," "to be responsible for," etc.] with 3rd person, feminine singular suffix).

Within Genesis 2:15, "and He took him" = *wayyiqqaḥ* (*waw*-consecutive-prefixed, Hiphîl imperfect, 3rd person, masculine singular form of *lâqaḥ*, with 3rd person, masculine singular suffix). Within Genesis 2:15, "and He put him" = *wayyanniḥēhû* (*waw*-consecutive-prefixed, Hiphîl imperfect, 3rd person, masculine singular form of *nûaḥ*, with 3rd person, masculine singular suffix).

Verse 16.
Verses 16 and 17 report one commandment: the general rule is recorded in Verse 16; the exception is reported in Verse 17. In Verse 16, "and He commanded" = *wayeṣâw* (*waw*-consecutive-prefixed, Piel imperfect, 3rd person, masculine singular form of *ṣâwâh*, "to command"). In Verse 16, the directive "thou shalt eat" from Eden's trees (except for one to be noted as an exception in 2:17) is a double verb, *'âkōl tō'kēl* (Qal infinitive, absolute form of *'âkal*, followed by Qal imperfect, 2nd person, masculine singular form of *'âkal*).

This two-part commandment was Adam's critical test of loyalty and obedience: the LORD God (*YHWH 'elōhîm*), after inserting Adam into Eden's garden, "commanded" (*wayeṣâw*) Adam to "thou shalt eat"—with the sole exception of one forbidden tree-fruit (to be specifically banned in Genesis 2:17)—from all of the food of the various trees within Eden's garden.

Verse 17.
Only one tree's fruit is forbidden for Adam to eat: "thou shalt not eat" (*lō' tō'kal* = negative particle, followed by Qal imperfect, 2nd person, masculine singular form of *'âkal*) from the "Tree of the Knowledge of Good and Evil" (*'ēṣ ha-da'at ṭôb wara'*)!

The warning is clear—disobedience produces death (because if Adam disobeyed "in that day…to dying thou shalt die"). The divine warning's double verb is *mût tâmût* (Qal infinitive, absolute form of *mût*, followed by Qal imperfect, 2nd person, masculine singular form of *mût*).

This verse reports one of the most amazing events in the history of the universe: the LORD God gave Adam, His image-bearing creature, a moral test—with serious consequences—to try (i.e., test/prove) Adam's moral character and loyalty. The testing of Adam's character (and free will) was rightly linked to *just* consequences, because God is holy and deserves to be obeyed. Adam was genuinely put on trial: to obey would be moral, with good consequences (continued life and innocence)—but to disobey would be immoral, with bad consequences (a death sentence, applied over time).

Regarding how Genesis, Chapters 2 & 3, are genuine reports of real human history, that should not be revisionistically "backdated" by humans who dislike the historical facts and/or the moral theology presented in Scripture (John 5:45–47; Romans 5:8, 12–21) (Johnson 2013a, p. 10).

Verse 18.
After the warning of Verse 17 (i.e., warning that death will result if Adam disobeys the prohibition against eating one specific tree's fruit), God notes Adam's need for a proper companion. God evaluates the situation: it's "not good" (*lō' ṭôb*) for Adam to be alone, so the LORD God announces His so-

lution: "I shall make for him [i.e., for Adam] a helper."

This announcement, by God, "I shall make for him a helper" = *'e'eśeh-lô 'ēzer* (Qal imperfect, 1st person, singular form of *'âśâh*, with preposition-prefixed, 3rd person, masculine singular pronoun/suffix, followed by masculine singular noun, *'ēzer*).

The noun *'ēzer* ("helper") is derived from the root verb *'âzar*, "to help," used of God helping humans (e.g., 1st Samuel 7:12; 1st Chronicles 12:18; Psalm 10:14), and of humans helping other humans, such as allies (e.g., Joshua 10:33; 2nd Samuel 8:5; 1st Chronicles 18:5). Also, Adam does not need just any "helper"—Adam needs a helper who is a proper match, i.e., a "fit for him," one who complements Adam, as is further noted below in discussing Verse 20.

Verse 19.

For Adam to recognize his need for a fellow-human partner in life, and to appreciate her (when God gives her to Adam), God shows Adam how animals were created in pairs—specifically male-and-female pairs, which were phenotypically recognized (by Adam) as male-and-female pairs. God sent (literally, "caused-to-go" = *wayyâbē'*) animal pairs, of land-based beasts and birds, to Adam, so that Adam could see and name each "kind" (*minâh* – see Genesis 1:24–25) of land-beast and bird. This male-and-female pair universality is emphasized later in Genesis, during the Flood, as reported in Genesis 6–9 (e.g., 6:19–20; 7:3; 7:9; 7:14–16). In Verse 19, the verb "and He brought" = *wayyâbē'* (*waw*-consecutive-prefixed, Hiphîl imperfect, 3rd person, masculine singular form of *bô'*, "to go").

Whatever "he [i.e., Adam] would call it" (*yiqrâ' lô* = Qal imperfect, 3rd person, masculine singular form of *qârâ'* ["to call" or "to speak"], followed by preposition-prefixed, 3rd person, masculine singular pronoun/suffix), that would be its name.

Verse 20.

While naming all the animal pairs, which appeared before Adam two-by-two (for naming), Adam could see the universal pattern in both land-beasts and birds, and thus Adam saw his own lack of a "fit" (i.e., matching) partner. The English phrase "fit for him" translates the compound word *kenegedô* (= preposition + noun [3rd person, masculine singular pronoun/suffix]).

Thus, within the Hebrew word *kenegedô* the noun is *neged*, which denotes the idea of being in front of, i.e., facing or opposing, like a mirror's image. Thus, Adam needed a "helper" who would be his opposite, who would be facing him, i.e., who would complement him.

Verse 21.

Now that Adam recognizes his need, his lack, the LORD God provides the solution: Woman. God "caused to fall" (*wayyapēl* = *waw*-consecutive-prefixed, Hiphîl imperfect, 3rd person, masculine singular form of *nâphal*, "to fall") a deep-sleep (*tarerēmâh*) upon Adam, while God performed the first thoracic surgery! The root verb *râdam* appears in Daniel 8:18 and 10:9, where Daniel was put into a deep-sleep (Young, 1879, pp. 899–900).

God took "one" (*'aḥat*) from his [Adam's] side/ribs (*mişale'ōtâyw*), then closed Adam's body. Some have wondered how Biblical Hebrew can be used to express what in English is called an "indefinite article," since Hebrew can be anarthrous (i.e., having no article) or it can use a definite article—but it has no "indefinite article" (as English does). However, this verse illustrates the grammatical equivalent, because "one" (yet which one is not definitely specified) of Adam's side/ribs was taken by God, i.e., a specific one was taken but that one is not identified specifically, the equivalent of an indefinite article (Johnson, 2013c).

Girolamo Zanchi (1515–1590) suggested that this fact of history had Messianic-typological importance: Adam's deep sleep symbolically foreshadowed Christ's life-giving death as the Last Adam (1 Corinthians 15:45b; see Ephesians 5:30)—because out of Christ's side flowed blood and water (John 19:34), to redemptively make Christ's bride, the Church (Zanchi, 2021, pp. 13–30).

Verse 22.

God's work in making woman (*'išâh*) was a construction project: God "built" (*wayyiben* = *waw*-consecutive-prefixed, Qal imperfect, 3rd person, masculine singular form of *bânâh*, "to build") the rib (taken from Adam) into woman (*le'išâh* = preposition-prefixed, feminine singular noun). Earth's first wedding then occurred, when the LORD God "brought her to the man" (*wayebi'eha* = *waw*-consecutive-prefixed, Hiphîl imperfect, 3rd person, masculine singular form of *bô'*, followed by preposition *'el*, plus definite article-prefixed, masculine singular noun *hâ-'âdâm*).

Verse 23.

Adam awakens to woman—"at last" (*ha-pa'am*)! Perhaps our idiomatic equivalent would be "spot on!"—God's solution (to Adam's lack) had struck the target's bull's-eye! Woman was "bone of [Adam's] bone" and "flesh of [Adam's] flesh," literally. Because woman was taken from out of "man" (*'îš*), her name would be "Woman" (*'îšâh*), i.e., the female version of mankind. (Of course, she is to be re-named "Eve" [life] in Genesis, Chapter 3, Verse 20, but that is another matter.)

Verse 24.

This verse (2:24) is quoted by the Lord Jesus Christ as the defining norm for marriage (Matthew 19:3–9; Mark 10:6–12; see also Ephesians 5:28–31; 1 Corinthians 6:16–17), with three essential elements: (a) leaving one's parents; (b) cleaving to one's spouse; and (c) becoming/being one flesh.

The verb *'âzab* ("to leave") is used in contexts involving some kind of movement or changes that cause leaving people behind, or emigrating from land formerly lived in, or forsaking God (or His covenant), or forsaking the poor by ignoring their needs, etc. (Wigram, 1874, pp. 915–917).

The verb *dâbaq (*"to cleave") is used in contexts of joining, staying joined to, being stuck to, i.e., the union of two or more parts, caused by joinder and continued attachment (Wigram, 1874, pp. 318–319).

Ironically, the mention of "father" (*'âb*) and "mother" (*'ēm*) in this verse did not literally fit Adam or Woman (a/k/a Eve), because neither had any human parents.

Verse 25.

As a married couple (with no neighbors), then unfallen, Adam and Woman were "naked" (*'arûmmîm* = masculine plural adjective), yet "not ashamed" (conjunction-prefixed negative particle, followed by Hithpolel imperfect, 3rd person, masculine plural form of *bôš*).

Regarding the first couple's pristine nakedness, it is likely that Adam and Woman, before they sinned, were quasi-clothed in a glowing aura of God's favor, somewhat like the glow that Moses gained while fellowshipping with God, for 40 days, on Mount Sinai (Exodus 34:29–35).

Interestingly, the action of a Hithpolel is like an emphatic mix of Piel intensity, Hithpael reflexivity, and Polel continuity—such that the original human couple's pre-Fall condition of confident unashamedness might be expressed as: "they were [then] very much [confidently] unashamed of themselves."

But this emphatic and innocent confidence was not to last.

References

Baughman, Ray E. 1965. *Seeking Bible Treasures*. Emmaus Bible School, Oak Park, IL.

Johnson, James J.S. 2011. Genesis Is History, Not Poetry: Exposing Hidden Assumptions about What Hebrew Poetry Is and Is Not. *Acts & Facts* 40(6):8–9; posted at https://www.icr.org/article/genesis-history-poetry-exposing-hidden.

Johnson, James J.S. 2012. The Gap Theory: A Trojan Horse Tragedy. *Acts & Facts* 41(10):8–10; posted at www.icr.org/article/gap-theory-trojan-horse-tragedy.

Johnson, James J.S. 2013a. No Backdated Punishment in Eden. *Acts & Facts* 42(1):10; posted at https://www.icr.org/article/no-backdated-punishment-eden/.

Johnson, James J.S. 2013b. 'New from Nothing': Is God Still Creating Today? *Acts & Facts* 42(5):10–11. https://www.icr.org/article/new-from-nothing-god-still-creating/.

Johnson, James J.S. 2013c. Does *Bereshit*h Mean 'In a Beginning'? *Creation Matters* 18(3):6–7.

Johnson, James J.S. 2019a. Rightly 'Dividing' the Word About Peleg: Was Earth's Unusual 'Division' During Peleg's Lifetime a Linguistic Event or a Geological Event? *Creation Research Society Quarterly* 56(1):4–16.

Johnson, James J.S. 2019b. Genesis Is Not a Sanitized Myth. *Acts & Facts* 48(8):21; posted at https://www.icr.org/article/genesis-is-not-a-sanitized-myth.

Pratico, Gary D., and Miles V. Van Pelt. 2001. *Basics of Biblical Hebrew Grammar*. Zondervan, Grand Rapids, MI.

Wigram, George V. 1874. *The Englishman's Hebrew Concordance to the Old Testament,* 3rd edition; reprinted in 2001. Hendrickson Publishers, Peabody, MA.

Young, Robert. 1879. *Young's Analytical Concordance to the Bible;* reprinted in 1984. Peabody, MA: Hendrickson Publishing, Peabody, MA.

Zanchi, Girolamo. 2021. *The Spiritual Marriage between Christ and His Church and Every One of the Faithful*; translation by Patrick J. O'Banion. Reformation Heritage Books, Grand Rapids, MI.

Extensive Messianic Prophecy Corruptions and Flood-Related Chronology Errors Disqualify the Septuagint (LXX): Revisited and Expanded*

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Key Words: Alexandrinus, Apocrypha, Biblical chronologies, LXX, Masoretic Text, Messianic Prophecy, Septuagint, Sinaiticus, Vaticanus

* This manuscript is adapted from a previous paper: Tomkins, J.P., D.W. Daniels, and J.J.S. Johnson. 2019. Extensive Messianic Prophecy Corruptions and Flood-Related Chronology Errors Disqualify the Septuagint (LXX) as a Reliable Source for Creationist Research. *Creation Research Society Quarterly* 56:40–47.

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Accepted for publication June 12, 2025

Abstract

There has been an increasing interest in the creation science community to promote what is today called the Septuagint (LXX), a controversial Greek translation of the Old Testament (OT) that also contains the noncanonical Apocrypha. Parties promoting this meme also falsely claim that the LXX closely follows the Masoretic Hebrew outside of a few minor word-choice and chronological differences. In reality, the modern version of the LXX often differs significantly from the providentially preserved Hebrew text of the OT. We reported previously that our analyses of key Messianic prophecies in the LXX, compared to the Hebrew text, reveal a disturbing trend of translational corruption in the Greek, which we now bolster with the addition of more key sabotaged OT passages. We also include the concurring analysis of highly respected post-Reformation Protestant theologians who arrived at the same conclusions that our study verifies. This present research, along with the witness of leading theologians of the past, shows that pivotal OT Messianic prophecies have been purposely altered in the LXX so as to remove their otherwise clear connection to the New Testament messianic mission and divinity of the Lord Jesus Christ.

Simple Summary

The article argues that the Septuagint (LXX), a Greek translation of the Old Testament, should not be considered a reliable source for Biblical study, especially within the creation science community, due to extensive errors. The authors claim that modern LXX versions differ significantly from the providentially preserved Hebrew Masoretic Text (MT). A major concern is the purposeful alteration of key Messianic prophecies in the LXX, which removes their clear connection to the New Testament mission and divinity of Jesus Christ. Examples of these changes include altering "bruise" to "watch" in Genesis 3:15, omitting the "Sceptre" in Numbers 24:17, changing "Kiss the Son" in Psalm 2:12, removing specific divine titles for Christ in Isaiah 9:6, and corrupting references to Christ's blood atonement in Isaiah 52:15. The article also highlights Flood-related chronology errors in the LXX, such as Methuselah being shown to survive the Flood by over a decade, which contradicts the Genesis account. Furthermore, the LXX contains noncanonical, apocryphal writings that the Roman Catholic Church uses to support doctrines rejected by orthodox Protestants. The authors assert that the Septuagint versions available today were likely first written in the first century AD and periodically modified, with various codices like Vaticanus and Alexandrinus showing significant variations, and that the popular ancient account of its origin is a fable. Post-Reformation theologians, whose analyses the study verifies, also found the LXX to be corrupted and supported the Masoretic Text. Therefore, the authors strongly recommend that the LXX be abandoned as a reliable source of Biblical scripture, emphasizing that the carefully transmitted and providentially preserved Hebrew Masoretic Text should be used as the authoritative source for Old Testament research.

Introduction

The Septuagint (LXX), in the forms now available to us, is a Greek and often loose and inaccurate (compared to the Hebrew Masoretic Text [MT]) translation of the Old Testament Scriptures. The LXX also contains the noncanonical, apocryphal writings sprinkled throughout. The Roman Catholic Church has been one of the largest advocates of the LXX over the years because the Apocryphal books can be used as prooftexts for promoting prayers for the dead, purgatory, prayers to deceased saints and/or angels, earning merits toward salvation through alms and indulgences, and other extra-Biblical doctrines that orthodox Protestants have traditionally rejected.

However, many ecumenical evangelicals have been promoting the LXX in recent years, as well as a small and fairly recent contingent of young-Earth creationists (Sexton, 2015; Smith, 2018, replying to Cosner and Carter, 2018). In doing so, many of these individuals conveniently omit the embarrassing fact that the LXX contains the apocryphal writings, which are central to the Counter-Reformation agenda (Daniels, 2017).

Other LXX advocates, like S. Douglas Woodward (Woodward, 2018, 2019), assert a bolder agenda to "reboot the Bible," promoting the Septuagint, claiming it is superior to the Protestant Bible's preserved Hebrew text. This idea purports that the LXX is needed to back-translate and rehabilitatively "restore" portions of the Old Testament text, and to thus harmonize the Genesis chronology data with ancient Egyptian and Mesopotamian chronologies, as if doing that would somehow improve the credibility of Genesis and of the Bible itself. Woodward also advocates the Apocrypha books, as if they should be added to those belonging to the Protestant Bible.

Various legends surround the original creation of the LXX, none of which completely agree with each other, place it as being translated by Alexandrian Jews about 280 BC (Daniels, 2017). However, recent research has shown that none of these alleged ancient accounts and documents that purport a BC Septuagint exhibit any credibility when compared to the historical and logistical facts surrounding their provenance claims (Daniels, 2017). In fact, most contemporary LXX researchers consider the account of the origin of the LXX as described in the Letter of Aristeas to be a fable. Lanier and Ross, in a recent book on the LXX, say, "Scholars now regard the Letter of Aristeas as mostly, if not entirely fictitious" (2021, p. 48).

A historical analysis of ancient documents indicates that what we call the Septuagint was most likely first written during the first century AD (after some of the New Testament books were written, such that some LXX texts contain quotations from New Testament books—*not vice versa*) and then periodically modified in multiple versions thereafter (Daniels, 2017).[1] This freehanded editing, generation after generation, is one of the reasons why the spurious Septuagint-based codices of Vaticanus, Alexandrinus, and Sinaiticus vary significantly from one another (Daniels, 2017).

At present, there are basically two different versions of the LXX available to modern readers. Lancelot Brenton compiled one version in 1851 primarily from Codex Vaticanus with supplemental text taken from Codex Alexandrinus, where Vaticanus was lacking sections (Brenton, 1851). Brenton's LXX with English translation is readily available as a modern work by Hendrickson Publishers (Brenton, 1986). Another key modern version is the Rahlfs-Hanhart Septuaginta from 2007, which is a slightly updated version of the original 1935 edition (Rahlfs, 2007). This LXX version is a blending of three different codices: Alexandrinus, Vaticanus, and Sinaiticus.

All of the codices that these two LXX versions are based on were developed no less than three centuries after the time of Christ, not before (Daniels, 2017).[2] Forensically speaking, this is very important for evaluating the reliability (versus unreliability) of the LXX as a textual transmission source in contrast to the Masoretic scribe-transmitted Hebrew Bible (Johnson, 2012).

The relevance of this problematic provenance is critical to the preliminary analysis herein, because most who have written about the LXX, have uncritically assumed that what we today call the Septuagint is a Greek text that can be forensically traced to "before-Christ" documents—yet no such "before-Christ" documents exist (Daniels, 2017). There is no Biblical promise that God would preserve the verbal text of any particular Scripture

1 In the known Old Testaments in Greek, that of Aquila, Symmachus, and Theodotion, the Hebrew Old Testament was translated. But in Origen's 3rd century version (200s AD), the New Testament words are copied into the Old Testament text marked "O" for Origen.

2 The actual oldest is Alexandrinus, with a date still accepted of about 450 AD. There is no evidence for Vaticanus before the 1400s (British Library, both Scot McKendrick and J. Neville Birdsall in *The Bible as Book: The Transmission of the Greek Text*, edited by Scot McKendrick and Orlaith O'Sullivan (The British Library, London, UK, 2003), p. 34: "In short, we cannot be certain of the exact date nor the place of origin of Codex Vaticanus, nor, in spite of scholarly efforts, can its history before the fifteenth century by traced." It showed up in the Vatican Library in the 1475 and 1481 catalogs. Sinaiticus, as in two books by David W. Daniels, *Is the 'World's Oldest Bible' a Fake?* and *Who Faked the 'World's Oldest Bible'?*, was written between 1839 and 1843, with changes until 1859.

translation, as opposed to God having promised to preserve His original words as given (i.e., in the Old Testament, as to every "jot" and "tittle"), when God committed His prophetic "oracles" unto the Jews (Romans 3:2). The "let's-get-back-to-the-Bible" Protestant Reformation champions (Wycliffe, Tyndale, Luther, Calvin, etc.) were peerless Bible scholars that trusted the Masoretic Text, not the LXX-Apocrypha codices given by Rome.

Not only is the LXX being heavily promoted among Christians, but the spurious idea that Masoretic scribes tampered with the Old Testament chronologies to remove the possibility of Jesus Christ being the Messiah has also been put forth to justify the preferential use of the LXX (Smith, 2018). Sanders (formerly Cosner) and Carter presented a variety of very cogent arguments against Smith and his unfounded MT conspiracy proposition by thoroughly debunking this claim, which we will not repeat here for brevity (Cosner and Carter, 2018; Sanders and Carter, 2019). In addition to these previously published counter-arguments, we would like to add another key point that is relevant to the research topic of this current paper. If any nefarious Jew or Gentile Bible corrupter was seeking to alter Scripture in order to push the Lord Jesus Christ out of the equation, would they not have tampered with Messianic prophecies, rather than supposedly shrinking complicated chronologies and genealogies? Indeed, Messianic prophecies are the chief means of apologetically authenticating the Messiah and His redemptive mission, and thus authenticating the Gospel of Christ. Notice that 1 Corinthians 15:3–4 twice qualifies the redemptive work of Christ as being "according to the [OT] Scriptures." And the Ethiopian eunuch was evangelized by Isaiah 52:13–53:12, not some debatable chronology.

In this research and report, we show that rather than the MT being altered, it is the Greek translation of the LXX that provides a contrived corruption of at least 12 key Old Testament scriptures wherein the alterations remove the obvious prophetic connection to the New Testament mission and divinity of the Lord Jesus Christ. We also show that these LXX messianic prophecy corruptions and sources were well-known by a variety of highly respected scholars and theologians during the post-Reformation era.

Methods

Key messianic prophecies were selected from the list provided of "Prophecies Fulfilled at the First Coming of Christ" in the Henry Morris Study Bible (Morris II, 2012) on page 2123 and from the extensive book by Rydelink and Blum (2019). A comparison of the LXX and MT was first done through the side-by-side English translation of Lancelot Brenton's 1851 version (Brenton, 1986) versus the King James Version (a/k/a Authorized Version of AD 1611) using the Accordance Bible software (version 14). For the original Hebrew text of the Old Testament books, the Biblia Hebraica Stuttgartensia BHS 5 (BHS) was used, including its textual comparison apparatus. Regarding the Greek texts of the variant forms of what is today called the "Septuagint" or "LXX," we have used Lancelot Brenton's 1851 Greek text (Brenton, 1986), Rahlfs-Hanhart Septuaginta (Rahlfs, 2007), and Henry Barclay Swete's, *The Old Testament in Greek According to the Septuagint* (1909–1922) represented in Accordance Bible Software via the LXX Advanced Studies Add-On Bundle (also containing electronic versions of the Rahlfs-Hanhart and Brenton texts). In this paper, Brenton's translation will be used along with the KJV, which, as noted, follows the Hebrew closely. If the Greek of the Vaticanus-based Brenton translation differs significantly from that of the multi-text Rahlfs, that will be documented.

Results

Genesis 3:15: Protoevangelium Corruption

LXX

*And I will put enmity between thee and the woman and between thy seed and her seed, he shall **watch** against thy head, and thou shalt **watch** against his heel.*

MT

*And I will put enmity between thee and the woman, and between thy seed and her seed; it shall **bruise** thy head, and thou shalt **bruise** his heel.*

The obvious discrepancy between these two translations is the word "watch" versus "bruise." In the LXX, "watch" corresponds to the Greek verb, "τηρέω" (*tēreō*), which is used to mean "keep, watch, or guard." The inflected form of the first use of the verb in this passage is τηρήσει (future, active, indicative, 3rd person, singular) while the second instance is τηρήσεις (future, active, indicative, 2nd person, singular).

In Genesis 3:15, twice, the MT uses Qal imperfect forms of the verb *šûp*, translated "bruise" in our English Bible. The verb *šûp* is used in two other places in the MT in a fashion that indicates severely inflicting injury or covering an individual with *darkness* (negative connotation). Job 9:17 says, "For He breaketh (*šûp*) me with a tempest, and multiplieth my wounds without cause," and Psalm 139:11 says, "If I say, Surely the darkness shall cover (*šûp*) me; even the night shall be light about me."

Excluding the Apocrypha, the Greek verb τηρέω (*tēreō*) is used 14 times in the LXX. Eleven times it is translated as "keep," "watch," or "look" and its

English gloss imparts the standard Greek meaning and usage of the term. In no instance is it ever used to give the impression of bruising or inflicting harm. Thus, the authors of the LXX translation in Genesis 3:15 were consistent with this same usage of *tēreō* throughout the rest of the LXX. The Greek translators could easily have chosen the verb συντρίβω (*syntribō*) or θραύω (*thrauō*), both of which have been translated as "bruise" in the New Testament and indicate the action of bruising, wounding, or destruction.[3] The Greek verb that is translated "bruise" in Romans 16:20 is συντριψει, a form of the verb συντρίβω. Moreover, it is noteworthy that Romans 16:20 ("And the God of peace shall bruise [*syntribō*] Satan under your feet shortly") links to the content of Genesis 3:15 only if the MT text is relied upon, as opposed to the very different meaning given in the LXX version of Genesis 3:15.

There is a clear discrepancy and even an opposite meaning between *tēreō* in the LXX and *šûp* in the MT. The LXX usage means to "keep/keepeth," "watch out for," or "be on guard against," while the use of "bruise" means to "strongly injure or afflict." Clearly, the enemies of God, and Satan himself, would be actively watching out for, keeping, and guarding against the fulfillment of this prophecy—but to no avail, as we are told in 1 Corinthians 2:8, "for had they known it, they would not have crucified the Lord of glory." We shall also briefly look at the importance of the phrases "bruise thy head" and "bruise His heel," each in turn, thus showing their scriptural relevance and illustrating why their corruption in the LXX should not be lightly regarded.

In stating "bruise thy head," we know that Satan inflicted a wound on the woman's Seed (Jesus Christ) at Calvary, but Christ, in turn, inflicted a mortal wound upon the Serpent (crushing his head) in His atoning death, burial, and resurrection. The first part of this key Biblical prophecy was realized at Calvary, and the fullness of it will culminate when the triumphant Lord Jesus Christ casts Satan into the lake of fire (Revelation 20:10).

In stating, "bruise his heel," Henry Morris II, noted, "This primeval prophecy made such a profound impression on Adam's descendants that it was incorporated, with varying degrees of distortion and embellishment, in all the legends, mythologies, and astrologies of the ancients, filled as they are with tales of mighty heroes engaged in life-and-death struggles with dragons and other monsters. Mankind, from the earliest ages, has recorded its hope that someday a Savior would come who would destroy the devil and reconcile man to God" (Morris, 2012).

Numbers 24:17 LXX Corruption of Christ's Authority

LXX

***I will point to him**, but not now; **I bless him**, but he draws not near: a star shall rise out of Jacob, **a man shall spring out of Israel**; and shall crush the princes of Moab, and shall spoil all the sons of Seth.*[4]

MT

***I shall see him**, but not now: **I shall behold him**, but not nigh: there shall come a Star out of Jacob, and **a Sceptre shall rise out of Israel**, and shall smite the corners of Moab, and destroy all the children of Sheth.*

Multiple key words in this prophecy are different between the LXX and the MT. First let us list them in the MT/KJV. They are "see" (*râ'â*), "behold" (*šûr*), and "Sceptre" (*šêḇeṭ*). These Hebrew words are all accurately rendered in the KJV's English translation. In contrast, the Greek choice of words in the LXX clouds, lowers, and degrades the Messianic impact of the text. This is done by removing the kingship aspect of the prophecy, by virtue of omitting the mention of the "scepter" that belongs to this future champion of Israel. It is noteworthy that the same Hebrew noun "Sceptre" (*šêḇeṭ*) appears in a prior Messianic prophecy in Genesis 49:10, which indicates that the tribe of Judah would be the authoritative/royal tribe in Israel. In the New Testament we are told in Revelation 5:5, "Weep not: behold, the Lion of the tribe of Judah, the Root of David, hath prevailed to open the book, and to loose the seven seals thereof."

Starting at the beginning of the verse's corruptions, the obvious Greek verbs that should have been chosen for "see" (*râ'a*) should have been either ὁράω (*horaō*), βλέπω (*blepō*), ὀπτάνομαι (*optanomai*), or θεάομαι (*theaomai*).[5] The Greek verb that was

3 In Origen's *Hexapla*, Aquila (about 125 AD) wrote προστριψει (*prostripsei*), from προστρίβω (*prostribo*), "inflicted, worn down by rubbing." Symmachus (about 175 AD) wrote θλιψει (*thlipsei*), "afflict, make to suffer." Origen (writing 225–240 AD) was the one who wrote τηρησει (*teresei*), "watch," copied into the later Alexandrian Greek Old Testaments. See Origen's Hexaplorum quae supersunt; sive Veterum interpretum Graecorum, in totum Vetus Testamentum fragmenta, Tomus I, *Prolegomena, Genesis-Esther*, edited by Fridericus Field (Oxonii, Typographeo Clarendoniano, 1875), p.16. [In English, *The Surviving Fragments of Origen's Hexapla; or, The Fragments of the Ancient Greek Interpreters on the Entire Old Testament*, Volume I, *Prolegomena, Genesis-Esther*, edited by Fridericus Field (Clarendon Press, Oxford, UK, 1875), p. 16.]

4 This is Origen's reading. Aquila translated the Hebrew.

5 Aquila (125 AD) actually wrote "οψομαι αυτόν," "I will see him," indicative, future, middle, 1st person singular from ὁράω (*horaó*). Symmachus has ορω (*oro*), "I see," like the Hebrew.

actually used was δείξω (*deixō*)[6] followed by the personal pronoun αὐτῷ (*autôi*, dative, singular, masculine/neuter). The phrase literally means "I will show him." Not only is the Greek translation corrupted, but the English translation of the Greek is somewhat muddled as well. The clear meaning of the Hebrew text is that the Messiah emphatically will be seen, not merely just pointed to or shown.[7]

The corruption of the second phrase in the MT of "I shall behold him" is altered to "I bless him." The Greek verb used is "μακαρίζω" (*makarizō*) which literally means to bless, not behold. The obvious potential choices for a Greek translation for "behold" are rather abundant, yet none were chosen by the LXX translators. Greek words for "behold" are θεάομαι (*theaomai*), and θεωρέω (*theōreō*). Alternatively, even ὁράω (*horaó*), βλέπω (*blépō*), or ὀπτάνομαι (*optanomai*) could have been used. The clear choice to avoid anything with the meaning of "behold," despite the abundant options available, showing that the prophecy was beheld and fulfilled**,** is obvious and disturbing.

The third phrase in the MT, "a Sceptre shall rise out of Israel" clearly means that a noble rod/staff of correction, rule, and authority would arise out of Israel, not merely just "a man" as stated in the LXX. In fact, the Greek noun used in the LXX is ἄνθρωπος (*anthrōpos*); a generic noun typically used to describe a basic human or humankind.[8] And there was not even a modifying adjective to indicate that it was any special type of person other than just an ordinary human. In fact, an even more specific Greek noun for a man/male, ἀνήρ (*anér*), was not used, much less any noun coming close to the Hebrew for "sceptre" (*šēḇeṭ*) which literally means an authoritative rod for ruling and correction. The Greek word for scepter that should have been used is ῥάβδος (*rhabdos*) and refers to a rod or staff. In the context of this Messianic prophecy, it provides a direct link and parallel to Hebrews 1:8 in the New Testament which says, "But unto the Son he saith, Thy throne, O God, is for ever and ever: a **sceptre** of righteousness is the **sceptre** of thy kingdom"—a reference to Psalm 45:6 that uses *šēḇeṭ* for scepter as does Numbers 24:17.

In this LXX verse, the first two phrases that were corrupted muddle the fact stressed in two affirming statements used for emphasis in the MT, that we will, for a surety, see the Messiah appear and behold Him. The last phrase in this LXX passage portrays the subject of the prophecy as some ambiguous human, not as the Messiah, Ruler, and King.

Psalm 2:12 LXX Corruption of Christ the Son as Eschatological Messiah

LXX

***Accept correction**, lest at any time the Lord be angry and ye should perish from the righteous way; whensoever his wrath shall be suddenly kindled, blessed are all they that trust in him.*

MT

***Kiss the Son,** lest he be angry, and ye perish from the way, when his wrath is kindled but a little. Blessed are all they that put their trust in him.*

While the doctrine of the trinity of the Godhead is not represented overtly in any OT texts, it is clearly supported in many places in the OT. The first place where God the Son as Messiah is specifically mentioned is in Psalm 2:12, which is here also connected to the destruction of all those who do not place their faith in Him. The phrase "kiss the Son" (*Našqŵ-bar*) is omitted and replaced with "Accept correction" (δράξασθε παιδείας) in the LXX.[9] Even worse, the Hebrew verb "to kiss" (*našaq*) is in the Piel stem and in the imperative form, which denotes an exceedingly intensive and strong command. Thus, the LXX sabotage of this verse is painfully obvious, being completely altered to prevent people from placing their faith in the Messiah (Son of God) and not suffering eternal destruction.

Proverbs 30:4 LXX Corruption of Christ the Son of God

LXX

Who has gone up to heaven, and come down? who has gathered the winds in his bosom? who has wrapped up the waters in a garment? who has dominion of all the ends of the earth? what is his name? ***or what is the name of his children?***

MT

Who hath ascended up into heaven, or descended? who hath gathered the wind in his fists? who hath bound the waters in a garment? who hath established all the ends of the earth? what is his name, ***and what is his son's name****, if thou canst tell?*

As noted above, the doctrine of the Trinity is clearly supported in the OT, including several overt witnesses to God the Son—the first being as noted above in the LXX corruption of Psalm 2:12. And here in Proverbs 30:4, the second overt OT witness to God the Son is also sabotaged. The Hebrew for

6 By Origen (writing 220–250 AD).

7 Even the Latin reads, "Video eum, sed non nunc; intueror cum, sed no propinquum." "I see him, but not now; I behold him, but not near" (Field, 1875, p. 256). [See footnote #3 for full citation of this source.]

8 Used by Origin in the LXX. Symmachus has σκηπτρον (*skeptron*), scepter, like the Hebrew.

9 Replaced by Origen. Aquila has καταφιλησατε (*kataphilesate*), "kiss," and Symmachus put προσκυνησατε "worship, prostrate before."

"and what is his son's name" (*wmah-šem-bnŵ*) is exactly rendered in the KJV. However, the LXX states "or what is the name of his children" (ἢ τί ὄνομα τοῖς τέκνοις αὐτοῦ). The Greek noun used here (τέκνον *teknon*), is for "child/children" and in the New Testament is used as a term of kindly address by teachers towards their disciples.[10] Furthermore, the noun and the article is clearly given in the dative plural (τοῖς τέκνοις) in the LXX not singular as in the MT. Not only is this an obviously absurd corruption, but the Greek word for son (υἱός *huios*) denoting kinship, closely corresponding to the Hebrew, is intentionally avoided in the LXX.

Isaiah 4:2 LXX Christ as "the Branch of the Lord" Purged

LXX

And in that day God shall shine gloriously in counsel on the earth, to exalt and glorify the remnant of Israel.

MT

In that day shall ***the branch of the LORD*** *be beautiful and glorious, and the fruit of the earth shall be excellent and comely for them that are escaped of Israel.*

The corruption here is a simple removal of this title for the Messiah "the branch of the Lord" (*ṣemaḥ Yəhōwā*). The noun for "branch" (*ṣemaḥ*) is used as common title for Christ in messianic prophecy phrases in other places in the OT; Jeremiah 23:5 ("righteous Branch"), Jeremiah 33:15 ("Branch of righteousness"), Zechariah 3:8 ("my servant the Branch"), and Zechariah 6:12 ("the man whose name is The Branch"). In Jeremiah 23:5 a more subtle LXX corruption is employed in which the standard Greek noun for branch (κλάδος *klados*), used eleven times in the NT to denote "branch," is swapped out for a noun describing "a rising/proceeding" or "East" (ἀνατολὴ *anatolē*) which in the NT does not describe a branch but a directional rising, coming forth, or simply "East"; e.g., Matthew 8:11 ("And I say to you that many will come from east [ἀνατολὴ] and west [δυσμῶν]"). For Jeremiah 33:15 in the LXX, the entire verse is missing as part of the complete missing section of Jeremiah 33:14–26. The two instances in Zechariah appear to be intact in the LXX.

Isaiah 9:6 LXX Corruption of Christ's Deity

LXX

For a child is born to us, and a son is given to us, whose government is upon his shoulder: ***and his name is called the Messenger of great counsel: for I will bring peace upon the princes, and health to him.***[11]

MT (numbered as 9:5)

For unto us a child is born, unto us a son is given: and the government shall be upon his shoulder: ***and his name shall be called Wonderful, Counsellor, The mighty God, The everlasting Father, The Prince of Peace.***

In the incarnation, Christ, as God the Son, took on humanity as truly human (Christ the God-Man). The phrase "mighty God" corresponds to the MT's *Êl gibbôr*, which is an obvious indication of the Messiah's deity, yet this indication of incarnate deity is deleted in the LXX's Greek rendering of this verse. Likewise, the phrase "everlasting Father" or "Father of eternity" represented by the compound word *abi-'ad*, has no Greek counterpart in the LXX version of this verse. Finally, the Prince of Peace (*śar-šalŵm*)—the "ruler" or "prince" of shalom-peace is sabotaged.

The corruption and completely absurd altering of the prophetic text in this LXX passage involves a blatant demeaning of the deity of the Lord Jesus Christ, Who is not merely just a "Messenger of great counsel" as stated in the LXX. The Lord Jesus Christ is "The mighty God, The everlasting Father, The Prince of Peace." These descriptive words for the divinity of the Lord Jesus Christ have been blatantly omitted in the LXX. Since all of the words for these omitted phrases in the Greek of the LXX are clearly present in the Hebrew text, there is no need for any detailed exegesis regarding this corruption.

Isaiah 52:15 LXX Corruption of Christ's Blood Atonement

LXX

Thus shall many nations wonder at him*; and kings shall keep their mouths shut: for they to whom no report was brought concerning him, shall see; and they who have not heard shall consider.*

MT

So shall he sprinkle many nations*; the kings shall shut their mouths at him: for that which had not been told them shall they see; and that which they had not heard shall they consider.*

The clear corruption is the glaring discrepancy of "Thus shall many na-

10 Origen in the LXX states this. Both Aquila and Symmachus say υιω (*huio*), "son."

11 Aquila wrote θαυμαστος συμβουλος, ισχυρος δυνατος, πατερ ετι, αρχων ειρηνης ("wonderful counselor, mighty strong one, everlasting father, prince of peace"). Symmachus has παραδοξασμος, βουλευτικος, ισχυρος, δυνατος, πατερ αιωνος, αρχων ειρηνης ("marvelous, counselor, mighty, powerful, everlasting father, prince of peace"). Theodotion wrote θαυμαστως βουλευων, ισχυρος, δυναστης, πατηρ, αρχων ειρηνης ("Wonderfully counseling, mighty, powerful leader, father, prince of peace").

tions wonder at him" in the LXX vs. "So shall he sprinkle many nations" in the MT.[12] In Greek, the phrase "οὕτως θαυμάσονται ἔθνη πολλὰ επ αυτω" has as its subject, the many nations (ἔθνη πολλὰ) that are doing the action of the verb θαυμάσονται (future, middle, indicative, 3rd plural, θαυμάζω), which is wondering at some nebulous "him" (the Messiah). The verb θαυμάζω (*thaumazó*) means to wonder or to marvel and is not even remotely close to representing the Hebrew word for "sprinkle."

In the Hebrew of this verse, the subject is the Messiah who "shall sprinkle many nations." The Hebrew verb for sprinkle is, *nâzâ*. It is used 24 times in the Hebrew and is always translated "sprinkle" in the KJV. In prophetic relation to its presence in Isaiah 52:15, the use of *nâzâ* refers to the priest sprinkling the blood of the sacrifice for the iniquity of the people (Israel). It is used repeatedly in Exodus, Leviticus, and Numbers in this manner. For example, Leviticus 4:6 says, "And the priest shall dip his finger in the blood, and *sprinkle* of the blood seven times before the Lord, before the vail of the sanctuary" and Leviticus 17:19 says, "And he shall *sprinkle* of the blood upon it with his finger seven times, and cleanse it, and hallow it from the uncleanness of the children of Israel."

There is no excuse for this corruption in the LXX as the verb for sprinkle in the Greek, ῥαίνω (*rhainō*) is employed 13 times in the LXX where 11 times it is used appropriately to refer to the sprinkling of sacrificial blood in Exodus 29:21, Leviticus 4:17, 5:9, 8:11, 14:16, 14:27, 16:14,15,19, and Numbers 19:4.[13] The noun cognate of the verb ῥαίνω is ῥαντισμός (*rhantismos*) and is directly linked to the scriptural acknowledgment of the fulfillment of Isaiah 52:15 in the New Testament as noted in 1 Peter 1:2 that says, "Elect according to the foreknowledge of God the Father, through sanctification of the Spirit, unto obedience and *sprinkling* of the blood of Jesus Christ" and Hebrews 12:24 that says, "And to Jesus the mediator of the new covenant, and to the blood of *sprinkling*, that speaketh better things than that of Abel."

Why is this prophetic description of the Lord Jesus Christ so important, and why should we take this LXX corruption so seriously? The simple matter is that our eternal salvation is through the blood of Christ. In the fulfillment of this prophecy we are told in the New Testament, "Much more then, being now justified by his blood, we shall be saved from wrath through Him (Romans 5:9), "In whom we have redemption through his blood, the forgiveness of sins (Ephesians 1:7), and "the blood of Jesus Christ his Son cleanseth us from all sin (1 John 1:7)—just to list a few of the many verses on this subject. Furthermore, these scriptures were notably written concerning Gentile believers representing the ἔθνος (*ethnos*) or nations of Isaiah 52:15.

Isaiah 53:2 LXX Corruption of Incarnate Christ Growing Up on Earth

LXX

We brought a report as of a child before him; *as a root in a thirsty land: he has no form nor comeliness; and we saw him, but he had no form nor beauty.*[14]

MT

For he shall grow up before him as a tender plant*, and as a root out of a dry ground: he hath no form nor comeliness; and when we shall see him, there is no beauty that we should desire him.*

In the first part of this LXX verse, the Greek states, "ἀνηγγείλαμεν ἐναντίον αὐτοῦ ὡς παιδίον" which is literally rendered in English as, "we reported before him as [a] child." Brenton's English gloss is deceptive because παιδίον (neuter, singular, nominative) is not in the genitive and does not translate as "of a child" but "[a] child" (anarthrous—having no article). The genitive αὐτοῦ (him) is a genitive of reference linked to ἐναντίον (before), giving the phrase "before him." But the main point to be made is that the verb ἀναγγέλλω does not even come close to representing the usage of the Hebrew verb "to grow up" *âlâ*. The Greek verb used[15] is ἀναγγέλλω (*anaggelló*), which means to proclaim, report, or announce. And its verbal form is ἀνηγγείλαμεν (aorist, active indicative, first person plural), which means "we reported" with the subject of "we" built in.

In contrast to the errant Greek translation of this verse, the Hebrew *âlâ* meaning to grow/rise, which is defined within the analogy of a growing tender plant (*yônêq*). This idea in the Hebrew could easily have been richly expressed in a variety of Greek verbs for plant-specific growth, such as θάλλω (*thallō*), αὐξάνω (*auxanō*), βλαστάνω (*blastanō*), or φύω (*phúō*). Furthermore, the Hebrew noun for *yônêq*, describing a "tender plant," is entirely missing in

12 By Origen in the LXX. Aquila and Theodotion wrote ραντισει (*rhantisei*), "sprinkle." Symmachus strangely put αποβαλει (*apobalei*), "throw off, throw away."

13 And we see this in the fact that both Aquila (125 AD) and Theodotion (175 AD) used ραντισει in their translations.

14 Origen in the Greek. Aquila wrote και αναβησεται ως τιθηνιζομενον εις προσωπον αυτου ("And he shall rise as one being nurtured before his face"). Symmachus put (και) ανεβη ως κλαδος ενώπιον αυτου ("(And) he rose as a branch before him"). Theodotion put και αναβησεται ως θηλαζον ενωπιον αυτου ("And he shall rise as a suckling before him").

15 By Origen.

the LXX. An appropriate noun describing a "tender plant" could have been used, such as φυτόν (*fyton*), meaning "plant," or βλαστός (*blastos*), meaning "shoot or bud." The clarifying adjective ἁπαλός (*hapalos*) for "tender" could also have been connected to the noun.

One of the great miracles of God incarnate as the Lord Jesus Christ was that he was not only born of a virgin through the power of the Holy Spirit, but that he grew up and matured as an earthly human in the midst of a wicked world and lived a sinless life (Luke 2:40–52). One of the outcomes of this important point is given in Hebrews 4:15, "For we have not an high priest which cannot be touched with the feeling of our infirmities; but was in all points tempted like as we are, yet without sin." In this respect, this LXX corruption destroys the miraculous prophecy that Christ, the God-Man, as deity-incarnate human would grow up as a man, living a completely sinless life on a sinful, cursed Earth before the Lord, using the analogy of a tender plant growing up in a hostile and dry desert.

Hosea 11:1 LXX Corruption of Matthew 2:15's Fulfillment

LXX

Early in the morning, were they cast off, the king of Israel has been cast off: for Israel is a child, and I loved him, and out of Egypt ***have I called his children****.*

MT

When Israel was a child, then I loved him, and ***called my son*** *out of Egypt.*

The beginning of 11:1 in the LXX contains words taken from 10:15 and moved over to the next chapter. Of the printed editions we had access to, only in the LXX it is in 10:15. In Brenton and the Orthodox text, it is moved to 11:1. However, the main point is that there is a clear corruption of the prophecy in the difference between "out of Egypt have I called *his children*" in the LXX compared to "called *my son* out of Egypt" in the MT.[16] An exegesis of both the Greek and Hebrew validate the corruption readily apparent in the English. There is no genuine dispute, however, that the New Testament confirms and verifies the MT on this Messianic prophecy, because Matthew 2:15 explicitly recognizes the MT wording as a Messianic prophecy fulfilled in Jesus Christ's migration to Egypt: "And was there until the death of Herod: that it might be fulfilled which was spoken of the Lord by the prophet, saying, "Out of Egypt have I called my Son."

The Hebrew word for "son" (which is singular, not plural) in this verse in the MT is *bên*. This prophecy was literally fulfilled by Jesus Christ, as indicated in Matthew 2:13–21, in which Joseph was warned in a dream to flee to Egypt to avoid Herod's plot to kill the Lord, and then, when Herod had died, Joseph was again informed in a dream to bring his family back to Israel such that this prophecy in Hosea might be fulfilled as stated, "Out of Egypt have I called my Son" (Matthew 2:15).

The key phrase in Greek from this passage in the LXX is, "ἐξ Αἰγύπτου μετεκάλεσα τὰ τέκνα αὐτοῦ" which is correctly represented in Brenton's English translation. The definite article and neuter noun "τὰ τέκνα" (accusative, plural) followed by the personal pronoun form "αὐτοῦ" (genitive, masculine, singular) clearly mean "his children," not "my son." Had it been accurately translated into Greek from the Hebrew, it would have read, "τὸν υἱόν μου" with "son" (υἱόν *huion*) being in the accusative, singular, and "my" (μου *mou*) being in the first person, genitive, singular. Given the high specificity of Koinê (common) Greek in conveying this type of information, this corruption is a clear perversion of the Hebrew text and completely corrupts this important and highly precise prophecy.

In regard to the history of how this LXX corruption came about, only Origen could have altered or approved of the change in the text to τὰ τέκνα αὐτοῦ. Aquila (125 AD), Symmachus, and Theodotion (both ca. 175 AD) all had it right, saying some form of υἱόν μου (my son). So the one who changed it, or the only one not to change it back, if it had said "his children" from the 1st century AD, was Origen's column of the *Hexapla*. Aquila reads "τὸν υἱόν μου," Symmachus put "υἱός μου," and Theodotion wrote "υἱόν μου," all without the definite article. None of these Alexandrian Jewish translators chose words that violated the Hebrew as Origen's words startlingly did. Both the Alexandrinus and the Vaticanus followed Origen (Hosea was removed from Sinaiticus), not the Hebrew. An examination of the source texts puts the blame for passing on this error squarely on Origen's shoulders.

Zechariah 12:10 LXX Corruption of John 19:37's Fulfillment

LXX

And I will pour upon the house of David, and upon the inhabitants of Jerusalem, the spirit of grace and compassion: ***and they shall look upon me, because they have mocked me****, and they shall make lamentation for him, as for a beloved friend, and they shall grieve intensely, as for a firstborn son.*

MT

And I will pour upon the house of David, and upon the inhabitants of Jerusalem, the spirit of grace and of supplications: and ***they shall look upon me whom they have pierced****, and they shall mourn for him, as one mourneth for his only son,*

16 By Origen in the LXX. Aquila, Symmachus and Theodotion all read "my son."

and shall be in bitterness for him, as one that is in bitterness for his firstborn.

The fulfillment of this MT scripture in the New Testament is recorded in John 19:37 that states, "And again another scripture saith, 'They shall look on him whom they pierced.'" This verse is also widely regarded as a prophecy in which the Jews will look upon the returning Lord Jesus, the Messiah, as the one whom their ancestors had rejected and pierced (Hebrew: *daqar*) during His crucifixion. The obvious corruption of this prophecy is clearly evident by the complete omission of the phrase, "whom they have pierced" (with the LXX replacing that phrase with "because they have mocked me"). The LXX's verb κατορχέομαι (κατωρχήσαντο, aorist, third person plural, "they mocked") is nothing close to the Greek New Testament's verb "pierced" (εξεκεντησαν). The literal piercing of the Lord Jesus at Calvary was originally prophesied in Psalm 22:16**,** which states, "they pierced my hands and my feet." It was fulfilled at the cross and prophetically affirmed in John's (19:37) gospel account of the crucifixion, which states, "And again another scripture saith, They shall look on him whom they pierced" (εξεκεντησαν, aorist, third person plural, "they pierced").

In Revelation 1:7, we have a similar messianic prophetic verse to Zechariah 2:10, "Behold, he cometh with clouds; and every eye shall see him, and *they also which pierced him*: and all kindreds of the earth shall wail because of him." The usage of the verb to pierce, "ἐκκεντέω" (*ekkenteō*) that was used in Revelation 1:7 and John 19:37**,** is entirely missing in this LXX passage.

Once again, the blame for either writing or passing this error on can be placed squarely upon Origen's shoulders. Only he has κατωρχήσαντο. Aquila and Theodotion both put εξεκεντησαν, and Symmachus used επεξεκεντησαν. Alexandrinus, Vaticanus, and Sinaiticus all have Origen's corrupt reading.

Zechariah 13:7 LXX Corruption of Matthew 26:31's Fulfillment

LXX

Awake, O sword, against my shepherds, and against the man who is my citizen, saith the Lord Almighty; ***smite the shepherds, and draw out the sheep****: and I will bring mine hand upon the little ones.*

MT

Awake, O sword, against my shepherd, and against the man that is my fellow, saith the LORD of hosts: ***smite the shepherd, and the sheep shall be scattered****: and I will turn mine hand upon the little ones.*

At the Mount of Olives, right after the Passover supper with his disciples, Jesus himself declared that this prophecy of Zechariah would be immediately fulfilled saying, "All ye shall be offended because of me this night: for it is written, *I will smite the shepherd, and the sheep of the flock shall be scattered abroad*." This LXX corruption in Zechariah 13:7 employs a previously noted sabotaging strategy, which is to simply make a key noun in the messianic passage to become plural, thus sabotaging the otherwise clear meaning of the prophecy. In Hebrew, the noun for shepherd (*haroʿeh*) is clearly in the singular form. The Greek noun for shepherd, along with its article is clearly plural (τοὺς ποιμένας). Another corruptive oddity is the fact that the Greek verb to "draw out" (ἐκσπάω *ekspaō*) is not the same verb as given in Matthew 26:31, which means "to strike" or "to smite" (πατάσσω *patassō*), used 10 times in the NT and 404 times in the LXX. The verb ἐκσπάω is not used at all in the NT, but appears about 20 times in the LXX.

Flood-Related Chronology Corruption

An amazing problem with the LXX, skipping the partial years regarding birthdays and gestations, is that its math requires Methuselah to survive the Flood by 14 years (Johnson, 2008). Genesis 5:25–26, in the Hebrew MT, tells that Methuselah fathered Lamech when Methuselah was 187 years old, and that Methuselah lived 782 years thereafter (i.e., till Methuselah died).

Lamech was 182 years old when he fathered Noah (Genesis 5:28–29). Since Methuselah lived 782 years after Lamech was born, Methuselah lived 600 years after Noah was born (because 782 − 182 = 600). Noah was in his 600th year of age when the Flood commenced (Genesis 7:11). Therefore, the Hebrew MT reports Methuselah dying the year when the Flood hit (Johnson, 2008).

Genesis 5:25–26, in the Greek LXX, tells that Methuselah fathered Lamech when Methuselah was 167 [ἑκατὸν καὶ ἑξήκοντα ἑπτὰ] years old, and that Methuselah lived years 802 [ὀκτακόσια δύο] thereafter (i.e., till Methuselah died). Genesis 5:27 then says that Methuselah's total lifespan was 969 years (167 + 802 = 969). The LXX says that Lamech is 188 [ἑκατὸν ὀγδοήκοντα ὀκτὼ] years old when Noah is fathered (Genesis 5:28–29). Since LXX says Methuselah lived 802 [ὀκτακόσια δύο] years after Lamech was born, Methuselah would have lived 614 years after Noah was born (because 802 − 188 = 614). LXX says that Noah was in his 600th year of age when the Flood hit (Genesis 7:11); therefore, such that Methuselah would have died 14 years after the Flood started. The obvious and embarrassing problem for the LXX translation is that Methuselah cannot have survived the Flood, according to Genesis 6–9 and 1 Peter 3:20 ("eight souls were saved by water").

In regard to the Genesis chronology errors of the LXX which we and the

post-Reformation scholars have also taken note of as will be shown below, we would like to acknowledge the recent work of creation scientists Carter and Cosner who have also shown this same flaw in the LXX—proving the superiority of the MT (Cosner and Carter, 2015, 2018; Sanders [formerly Cosner] and Carter, 2019).

Theological Witnesses Against the Septuagint in the Post-Reformation Era

William Whitaker (1548–1595) was a prominent Protestant Anglican churchman, academic, and theologian. He was Master of St. John's College, Cambridge, and a leading divine in the university in the latter half of the sixteenth century. Few English divines were held in higher esteem than Whitaker, who was known as "the pride and ornament of Cambridge" (Beeke and Pederson, 2006, pp. 614–615). He was especially well known for his monumental, 718-page treatise on the Bible entitled *A Disputation on Holy Scripture*, first published in Latin (1588) and then later translated into English and published (Whitaker, 1848). In this work, he made a number of comments on problems with the LXX. First, he notes the discrepancies it had with the MT, saying, "Learned men question whether the Greek version of the scriptures now extant be or be not the version of the seventy elders. The sounder opinion seems to be that of those who determine that the true Septuagint is wholly lost, and that the Greek text, as we have it, is a mixed and miserably corrupted document" and "But this of ours differs amazingly from the Hebrew copies, as well in other places and books, as specially in the Psalms of David" (p. 121).

Whitaker also tackles the issues with the Genesis chronologies, stating, "There is the greatest difference between the Hebrew and Greek books in the account of times and years. The Greek books reckon 2242 years from Adam and the beginning of the world to the flood, as we read in Augustine, Eusebius, and Nicephorus' Chronology. But in the Hebrew books, we see that there were no more than 1656. Thus, the Greek calculation exceeds the Hebrew by 586 years. Again, from the deluge to Abraham, there is, according to the LXX, an interval of 1082 years. But if you consult the Hebrew Verity, you will not find more than 292" (p. 121). And engaging with the issue of Noah's Flood he says, "It is even a laughable mistake in the Greek by which Methusalem is made to survive the flood fourteen years. Where did he remain during the deluge? or how was he preserved? Certainly he was not in the ark; in which the scripture testifies that there were no more than eight persons. This, therefore, is a manifest falsity in the Greek edition" (p. 122).

Regarding the source of messianic prophecy corruptions, Whitaker gives a synopsis of three Greek translations of the OT that were done by Aquila of Sinope (~130 AD), Symmachus (late second century AD), and Theodotion of Pontus (~150 AD). For the first instance, Whittaker recounts, "Aquila, having originally been a Greek, received baptism and was admitted into the Christian society; but, on account of his assiduous devotion to astrology, was first censured by the Christians, and finally, when he disregarded their censures and admonitions, ejected from the Church; that, stung by such a disgrace, this impious man revolted from the Christians to the Jews, had himself circumcised, learned the Hebrew language and literature, and translated the scriptures of the Old Testament into Greek, but not with faithfulness or sincerity, but with a depraved and perverse intention (καμπύλῳ καὶ διεστραμμένῳ, as Theodoret says,) of obscuring the testimonies which confirm the doctrine of Christ" (p. 123). Of Theodotion, Whittaker notes that he was originally of the heretical Christian sect of Marcion, and who "utterly abjured Christianity, went over to the Jews; and, having learned their language, translated the scriptures into the Greek tongue, 'for the confutation,' as Theodoret says, 'of his own sect'" (p. 124). Concerning all three of these men Whittaker notes, "these three interpreters were enemies of the Christian faith, and did not translate the scriptures honestly" (p. 124).

Edward Leigh (1602–1671) was an Oxford-educated Protestant theologian and politician who sat in the House of Commons (1645–1648). After Oxford, Leigh entered the Middle Temple and became a painstaking student of divinity, law, and history. Leigh also served as a colonel in the Parliamentary Army and had a seat in the Westminster Assembly. Leigh wrote a three-volume Treatise of Divinity, which, in the first volume, he made enlightening comments on the state of the Septuagint in his day (Leigh 1646). On page 120 (vol. 1) in his section on the LXX Leigh immediately notes, "That Ancient and true translation of the Septuagint, is corrupted and violated, which (as Jerome saith) was agreeable to the Hebrew, but so is not the Greek Copy now extant, which is full of corruptions, and seemeth to be a mixt and confused translation of many." And he follows this statement with, "If the Seventy, as well as the Hebrew, had been authentical, the Lord would have been careful to have kept it pure and uncorrupt unto our days, as well as he hath done the Hebrew. There is indeed a Greek Edition extant, which goeth under the name of the 70. But Whitaker saith that the true seventy is lost and that this which we now have is mixt and miserably corrupted." Leigh also notes the Genesis chronology errors as well.

John Owen (1616–1683) was an English Puritan Nonconformist church leader, theologian, and vice-chancellor of the University of Oxford. Owen was one of the most prominent theologians in England during his lifetime and a prolific author. His published works are still widely read, studied, and revered today. Owen's writings today have been reprinted by Banner of Truth Trust in a 16-volume set on a variety of theological topics (Owen, 1853a), as well as a massive 7-volume commentary on the NT epistle to the Hebrews (Owen, 1853b). In various places in his writings, Owen pointed out many of the problematic issues with the LXX. In fact, even in Owen's day, there were proponents claiming that the MT needed "to be corrected by translations, especially that of the LXX; with sundry other such imaginations, which they countenance with uncertain conjectures and fabulous stories" and "I cannot but wonder how some seem to take shelter unto their opinions, especially that of preferring the translation of the LXX" (Owen, 1853a, p. 4:233). In commenting on errors made by John Chrysostom (AD 347–407) and Jerome of Stridon (AD ~342–420) in using the LXX in the Psalms (Jerome would later assert primacy of the MT; Currid, 2019), Owen said, "It cannot be denied but that they were led into these mistakes by the translation of the LXX" (Owen, 1853a, p. 6:608). Regarding the corruption of Isaiah 52:15 discussed previously, Owen acknowledges, "The LXX have very badly rendered the words, "'Many nations shall wonder at him,' both as to words and sense" (Owen 1853a, p. 12:462).

And regarding the fictional and historically inaccurate letter of Aristeas and its tale of a ~300 BC translation of the OT, Owen says, "let the authors of this insinuation prove the assertion, namely, that there was ever in the world any other copy of the Bible, differing in any one word from those that we now enjoy; let them produce one testimony, one author of credit, Jew or Christian, that can, or doth, or ever did, speak one word to this purpose" (16:409). And of the fruit of the post-BC LXX translators that did contribute to the text, Owen speaks in terms of them "altering and varying many things from the original, with the innumerable corruptions and interpolations that have befallen that translation" (Owen, 1853a, p. 16:409).

Owen, in his massive 7-volume commentary on the NT epistle to the Hebrews, which has some OT quotes similar to the LXX, says what we also have proposed: back corrections of the errant LXX. In this regard in Volume 4, Owen says, "as many such differences occur, where some have tampered to make the apostle's words and the translation of the LXX in all things to agree" (Owen, 1853b, p. 4:4) and in Volume 5 he again affirms "That sundry passages have been unquestioningly taken out of the New Testament, and inserted into that translation [LXX]; which I have elsewhere proved by undeniable instances" (Owen, 1853b, p. 5:458).

Francis Turretin (1623–1687) studied theology at Geneva, Leiden, Utrecht, Paris, Saumur, Montauban, and Nîmes. He eventually returned to his native city of Geneva, where he pastored and served as professor of theology at the University of Geneva. Turretin's highly impactful *Institutes of Elenctic Theology* (IET) was published in three volumes between 1679 and 1685 in Latin and then used as the chief theological textbook at Princeton Seminary until the middle of the 19th century, when Charles Hodge produced a systematic theology in English. Turretin's IET was recently translated into English and published in the late 20th century. And for the purpose of this paper, Turretin's scholarly writings on the LXX are very insightful.

In a section of his IET on *The Holy Scriptures*, where he addresses the LXX, Turretin immediately turns his attention to the issue of messianic prophecy corruptions, noting that "The second [following the alleged BC version] is that of Aquila of Pontus, under the emperor Hadrian, about AD 137. Being first a Greek in religion, afterwards a Christian, then being excommunicated from the church for his attachment to the study of astrology, he went over to the Jews and (actuated by hatred of the Christians) translated the Old Testament in order to corrupt the prophecies concerning Christ" (Turretin, 1992, p. 124). After noting this issue, the topic of this paper, Turretin also addresses subsequent versions up to Origen and Jerome, saying,

> "Third, that of Theodotion, who lived under Commodus (AD 184), born in Pontus, a Marcionite in religion, and afterwards turning Jew, made a new version in which he followed the Septuagint for the most part. Fourth, that of Symmachus, under Antoninus and Aurelius (about AD 197), who, from a Samaritan turned Jew, translated the Old Testament in order to confute the Samaritans. There were also two others of uncertain authors: from Jericho, found in a cask in that city, under Caracalla (AD 220); the other, the Nicopolitan, found near Nicopolis in the reign of Alexander Severus (AD 230). Out of all these versions, Origen made up his Tetrapla, his Hexapla, and his Octapla. The Tetrapla contained in distinct columns the four Greek versions of the Septuagint, Aquila, Symmachus and Theodotion. In the Hexapla, he added two Hebrew editions: one in Hebrew, the other in Greek letters. In the Octapla were inserted the two other anonymous Greek versions, those of Jericho and Nicopolis, which some call the seventh edition. The eighth was that of

> Lucian the Martyr, who emended the preceding ones and was favored highly by the Constantinopolitans. The ninth was that of Hesychius, which the Egyptians and Alexandrians embraced. "

And regarding Jerome, Turretin says, "The tenth was one which the ancients said was translated from the Latin of Jerome into Greek," and regarding the early use of the LXX for translations, Turretin notes, "Various ancient Latin versions were also made principally from the Greek versions. The most common was the Italian, according to Augustine (CI 2.15 [FC 2:79; PL 34.46]). Two others were made by Jerome: one from the Septuagint; the other (which he carefully corrected from the Hebrew and Greek text) is supposed to be the present Vulgate, but in process of time became greatly corrupted"(p. 124).

Turretin also added important notes regarding The Letter of Aristeas saying, "However, if we were called upon to express an opinion, we would give our cordial assent to that of those learned men who consider all these things as worthy of little credit. Even in his time, Jerome began to exhibit and attack the genuineness of the narratives, and this has been done more clearly and strongly by more modern writers (Vives, Saint Augustine, of the Citie of God…with…comments of Lodovicus Vives 18.42 [1620], pp. 687–88; Scaliger in Thesaurus temporum Eusebii [1606]; Drusius, Casaubon, Wouverus, Ussher, Rivet, Heinsius and others)" (p. 127).

And as an interesting side note to the importance of the LXX to the Roman Catholic Church, he says, "Although the papists do not all speak alike, yet most of them agree that this version [LXX] was divinely inspired and therefore properly obtains divine authority; and that the translators are to be considered not as interpreters but as prophets, who, that they might not err, had the help of the Holy Spirit in a special way, as Bellarmine says [Jesuit Cardinal and a key figure in the Roman Catholic Counter-Reformation] (VD 2.6, pp. 68–71)" (p. 127).

Turretin also addressed the state of the LXX in his day noting, "It is not considered pure now, but greatly corrupted and interpolated. We have only its ruins and wreck (*leipsana*), so that it can hardly be called the version of the Septuagint (like the ship Argo, which was so often repaired as to be neither the same nor yet another). Jerome frequently alludes to this (Letter 112 [89], "Ad Augustinum" [PL 22.928–29]; 'Praefatio…in librum Paralipomenon Praefatio,' from "Hieronymi Prologus Galeatus" in Biblia Sacra Vulgatae Editionis Sixti V…et Clementis VIII [1865], p. xlix and '…in Esdram et Nehemiam Praefatio,' from ibid., p. 1)" (p. 128).

And finally, Turretin also gives us one of the most concise summaries of the absurd Genesis chronology errors of the LXX; "The great discrepancies in chronology between the Hebrew text and the version of the Septuagint (the Hebrew manuscripts making only 1656 years from the creation to the deluge, while the Septuagint makes 2242) does not prove that the version is authentic, but rather that it is corrupt…also the manifest error of the Greek version in extending the life of Methuselah at least fourteen years beyond the flood (if not twenty) and yet does not say that he was in the ark. For if Methuselah begat Lamech in the 165th year of his age (as the admirable notes in Walton's edition of the Greek version say, Biblia sacra polyglotta [1657], 1:20 on Gen. 5:25), Methuselah ought to have lived so many years after the flood. [pg. 129]" and "The anachronism (*anachronismos*) in the Septuagint in the calculation of the life of the postdiluvian patriarchs (where they extend the number of years above 1700 to the birth of Abraham—the Hebrew making only 292 years—because they add at least one hundred years to the life of each of the patriarchs who lived between the flood and the time of Abraham) cannot favor the authenticity of that version. It demonstrates a glaring error from whatever source it may have arisen" (p. 130).

Discussion

In comparing these twelve high-profile Messianic prophecies between the LXX and the MT, we find that they have been completely corrupted and sabotaged in the Greek of the LXX, effectively removing their prophetic connection to the New Testament mission and divinity (and Gospel) of the Lord Jesus Christ. And while we are the first to systematically document how they were sabotaged, we are not the first to acknowledge this sad state of affairs as we proved by the writings of leading post-Reformation scholars.

These findings are completely contradictory to the unsupported claim of the LXX promoters that post-AD Jews seeking to quench the spread of Christianity altered the chronologies in Genesis in the Hebrew Bible to de-authenticate Jesus as the Messiah. Rather than altering complicated chronologies of interest to an isolated Jewish audience in the Hebrew text, which very few Greek-speaking Christian Gentiles could even understand, would it not make more sense for unbelieving Jews and/or Gentile apostates, conspiring against Christ and His Deity, to produce a corrupt and deceptive Greek text like the LXX for a much wider audience? The impact on the early Church and thereafter would be considerably greater, given that Koinê Greek was the international language of the era. In such a case, not only would foundational Messianic prophecies have been corrupted as they are in the LXX, but heretical folk tales such as the writings of the Apocrypha were also added throughout

the text, masquerading as "additional" scripture, further polluting the text of the Old Testament and allowing for unbiblical doctrines.

It is also noteworthy that the case for the LXX is also largely based on an assumed BC text, which has now been shown to be a highly unreliable assumption, fraught with provenance problems that fail forensic science standards of scrutiny (Daniels, 2017). At this point, it appears the LXX is nothing more than a compilation and synthesis of post-AD corrupt Greek OT translations, in many places sloppily translated (like a paraphrase), and in some theologically sensitive places, mistranslated on purpose. It is therefore proposed that the Messianic prophecy corruptions were done by either ill-meaning Jews seeking to de-authenticate Jesus as Messiah or gnostic pseudo-Christians seeking to downplay Christ's divinity (e.g., Origen of Alexandria).

We do not downplay the fact that the different versions of the LXX can serve as important aids in learning and studying the vocabulary and grammar of the Koinê Greek language of the New Testament era. However, given the blatant textual errors of the LXX, along with its non-canonical and unbiblical apocryphal writings, it is strongly recommended that it be abandoned as a reliable source of Biblical Scripture, being inferior to the preserved Hebrew Scriptures that we know as the Masoretic Text. It is the carefully transmitted and providentially preserved Hebrew text that should be used as the authoritative text for Old Testament research.

Finally, we would like to acknowledge that following the first version of this paper that we published five years ago (Tomkins, Daniels, and Johnson, 2019) there was quite a heated backlash from several individuals in the creationist community. Their concerns and objections were subsequently answered by authors James Johnson (Th.D. and Hebraist) and David Daniels (M.Div. and Wycliffe and SIL Global-trained Bible translator), and we request that before any letters to the editor be sent in response to this current paper, that these citations be read and considered (Daniels, 2020; Johnson and Daniels, 2020a, 2020b).

References

Bardtke, H., W. Baumgartner, P.A. de Boer, O. Eibfeldt, et al. *Biblia Hebraica Stuttgartensia BHS 5th*. Deutsche Bibelgesellschaft, Stuttgart, Germany.

Beeke, J.R., and R.J. Pederson. 2006. *Meet the Puritans*. Reformation Heritage Books, Grand Rapids, MI.

Brenton, L.C. 1851. *The Septuagint with Apocrypha: Greek and English.* Samuel Bagster and Sons, Ltd., London, UK.

Brenton, L.C. 1986. *The Septuagint with Apocrypha: Greek and English*. Hendrickson Publishers, Inc., Peabody, MA.

Cooper, William R. 2017. *New Testament Fragments Amongst the Dead Sea Scrolls*. Creation Science Movement, Portsmouth, UK.

Cosner, L., and R. Carter. 2015. Textual Traditions and Biblical Chronology. *Journal of Creation* 29(2):99–105.

Cosner, L., and R. Carter. 2018. Is the Septuagint a Superior Text for the Genesis Genealogies? Posted on creation.com at https://creation.com/lxx-mt-response. Accessed February 11, 2025.

Currid, J. 2019. The Hermit Who Saved the Hebrew Truth. *Reformed Faith & Practice* 4(3). Accessed February 18, 2025, at https://journal.rts.edu/article/the-hermit-who-saved-the-hebrew-truth.

Daniels, D. 2020. Reply to Doug Ell's Letter to the Editor. *Creation Research Society Quarterly* 56:261–264.

Daniels, D.W. 2017. *Did Jesus Use the Septuagint*? Chick Publications, Ontario, CA.

Johnson, J.J.S. 2008. How Young Is the Earth? Applying Simple Math to Data in Genesis. *Acts & Facts* 37(10):4.

Johnson, J.J.S., and D. Daniels. 2020a. Septuagint Reply. *Creation Research Society Quarterly* 56(2):188–191.

Johnson, J.J.S., and D. Daniels. 2020b. Johnson and Daniels' Response to Carter and Cosner's Letter. *Creation Research Society Quarterly* 57(1):65–68.

Lanier, G.R., and W.A. Ross. 2021. *The Septuagint: What It Is and Why It Mattters*. Crossway, Wheaton, IL.

Leigh, E. 1646. A Treatise of Divinity Consisting of Three Bookes: The First of Which Handling the Scripture or Word of God, Treateth of Its Divine Authority, the Canonicall Bookes, the Authenticall Edition, and Severall Versions, the End, Properties, and Interpretation of Scripture. E. Griffin, London, UK. Accessed on February 14, 2025. https://quod.lib.umich.edu/e/eebo/A47629.0001.001/1:7.6?rgn=div2;view=fulltext.

Morris II, H.M. 2012. *The Henry Morris Study Bible*. Master Books, Green Forest, AR.

Owen, J. 1853a. *The Works of John Owen*, edited by W. Goold. Johnstone and Hunter, Edinburgh-London, UK. 24 volumes; volumes 1–16, reprint editions, 1987. Banner of Truth, London, England.

Owen, J. 1853b. *An Exposition of the Epistle to the Hebrews*, edited by W. Goold. Johnstone and Hunter, Edinburgh-London, UK. 24 volumes; volumes 17–23 (vol. 1–7) reprint editions, 1991. Banner of Truth, London, England.

Rahlfs, A. 2007. *Septuaginta (Greek Edition)*. Edited by R. Hanhart. Deutsche Bibelgesellschaft, Stuttgart, Germany.

Rydelink, M., and E. Blum. 2019. *The Moody Handbook of Messianic Prophecy: Studies and Expositions of the Messiah in the Old Testament*. Moody Publishers, Chicago, IL.

Sanders, L., and R. Carter. 2019. The Masoretic Text of Genesis 5 and 11 is still the most reliable. Posted on creation.com at https://creation.com/smith-response. Accessed February 11, 2025.

Sexton, J. 2015. Who Was Born When Enosh Was 90? A Semantic Reevaluation Of William Henry Green's Chronological

Gaps. *Westminster Theological Journal* 77:193–218.

Smith, H.B. 2018. The case for the Septuagint's chronology in Genesis 5 and 11. *Proceedings of the Eighth International Conference on Creationism*. Edited by J.H. Whitmore, pp. 117–132. Creation Science Fellowship, Pittsburgh, PA.

Thiede, C.P. 2001. *The Dead Sea Scrolls and the Jewish Origins of Christianity*. Palgrave Macmillan, Camden, London, UK.

Thiede, C.P., and M. d'Ancona. 1996. *Eyewitness to Jesus: Amazing New Manuscript Evidence about the Origin of the Gospels*. Doubleday, London, UK.

Tomkins, J.P., D.W. Daniels, and J.J.S. Johnson. 2019. Extensive Messianic Prophecy Corruptions and Flood-Related Chronology Errors Disqualify the Septuagint (LXX) as a Reliable Source for Creationist Research. *Creation Research Society Quarterly* 56(1):40–47.

Turretin, F. 1992. *Institutes of Elenctic Theology*, Volume 1. Edited by James T. Dennison, Jr.; translated by George Musgrave Giger. P&R Publishing, Phillipsburg, NJ.

Whitaker, W. 1849. *A Disputation on Holy Scripture*. Cambridge University Press, Cambridge, UK. First published in Latin as *Disputatio de Sacra Scriptura* in 1588.

Woodward, S.D. 2018. *Rebooting the Bible, Part 1*. Faith Happens Books, Oklahoma City, OK.

Woodward, S.D. 2019. *A Biography of the Christian Bible*. Faith Happens Books, Oklahoma City, OK.

Should Creationists Rely on Natural Selection?

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Key Words: adaptation, adaptive tracking, non-random variation, selection, theory of biological design

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Accepted for publication May 27, 2025

Abstract

A recent long-term population study finds no evidence for "directional selection," but plenty of evidence for "fluctuating selection." These findings present a serious challenge to the traditional assumptions that variations in biological traits are random and that adaptation results from an external mechanism. Though several kinds of selection are invoked to explain observed population dynamics, evidence for non-random variation renders the concept of selection unnecessary. Instead, observed adaptation is better explained by distributed problem solving. This mechanism also provides a plausible explanation for the post-Flood rapid diversification of life. It is time for creationists to discard natural selection.

Simple Summary

This article argues that creationists should stop relying on natural selection as the main explanation for how organisms adapt. Recent long-term studies, including one on water fleas (Lynch et al., 2024) and others on fruit flies (Machado et al., 2021; Rudman et al., 2022), have found no strong evidence of natural selection consistently pushing traits in one direction over time. Instead, these studies show traits rapidly changing back and forth, or "fluctuating," in response to environmental shifts, which previous studies often missed by looking at too long a timescale. This finding challenges the traditional view, held by both evolutionary biologists and creationists, that adaptation comes from natural selection acting on random variations. The article suggests that the generation of adaptive variation is by design, where organisms have an inherent, engineered ability to quickly and purposefully adjust to their environment. This mechanism, a form of "distributed problem solving," allows populations to rapidly find and share adaptive solutions to environmental challenges, which provides a more plausible explanation for the rapid diversification of life after the Biblical Flood.

Introduction

A recent long-term study (Lynch et al., 2024) on *Daphnia pulex*, the most common species of water flea, draws some surprising conclusions regarding natural selection. The study authors report the results of a 10-year (about 35 generations) population-genomic study, which revealed "no evidence of consistent directional selection." Instead, the study findings were consistent with a scenario in which the population experienced "selection coefficients close to zero, while experiencing significant random variation in selection pressures across generations." In other words, the authors found that natural selection had little to no long-term effect (Figure 1).

To explain their unexpected findings, the authors attribute the observed back-and-forth oscillations in the frequency of trait variations among the population to "fluctuating selection." They then point out that "most

empirical studies in molecular population genetics implicitly assume that fluctuating selection is of negligible significance," but their study undermines that assumption. Instead, their findings call into question the results of hundreds of studies that claim to observe the operation of natural selection. This is a shocking conclusion, and it presents a serious challenge to the traditional creationist view of biological adaptation.

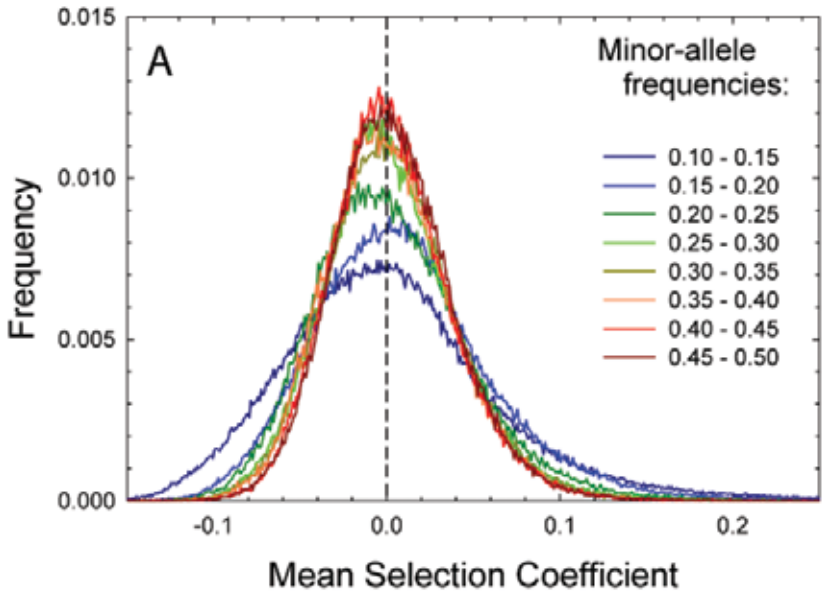

Figure 1. (A) from Lynch et al (2024). Averaged over time, seven of eight alleles (i.e., genetic variants) showed no net change in frequency. The frequency of the rarest allele decreased slightly. The variants are listed from least to most common in the line color key on the right.

The Challenge for Creationists

To understand the significance of the challenge presented by the Lynch et al. (2024) study results, it must be remembered that the majority of both evolutionary biologists and creationists have traditionally made the same two foundational assumptions regarding adaptation: 1) variations in biological traits are random, and 2) adaptation results from an external, selective mechanism (i.e., natural selection) which preserves favorable variations and discards unfavorable ones.[1] Thus, it is not natural selection alone which is thought to explain adaptation, but natural selection *acting on* random variation. Put another way, a selective mechanism is necessary to convert random variations into adaptive variations. This is true whether variations are thought to arise from random mutations (as in the neo-Darwinian model of evolution) or from random expression of pre-existing genetic diversity (as in the creationist Heterozygous Fractionation model).[2] Absent a strong selective mechanism, the random variations plus natural selection model of adaptation cannot account for the diversification of organisms over time. With very weak selection (i.e., "selection coefficients close to zero"), it is difficult to imagine how significant change could occur. This problem is particularly acute for creationists, who need to explain how the mind-boggling diversity of life arose in just a few thousand years. Further, with very weak selection, the relative frequency of variations cannot be strongly tied to environmental cues and thus cannot be adaptive even on shorter timescales; biological variation would remain essentially random. How, then, did populations of organisms become so well-adapted to their environments, and how do they continue to adapt today?

What Kind of Selection?

The key takeaway from the Lynch et al. (2024) study is that stronger-than-expected "fluctuating selection" negates the expected directional influence of

1 For example, the blind cave fish exhibit at the Institute for Creation Research museum for decades included the following statement:

> As genetic information is copied and passed on generation after generation, occasionally there are copying "mistakes" known as mutations…When a mutation occurs in a light environment that causes an animal's offspring not to have eyes, it is an enormous disadvantage… so natural selection eliminates this flaw…When the eyeless defect occurs here [in a cave], it does not give any disadvantage, so it is not eliminated. In fact, it gives advantages…Eventually, selective pressures ensure that all are eyeless.

2 For more details of the Heterozygous Fractionation model, which is one of the most recent and comprehensive creationist models to rely on natural selection as a driving mechanism for adaptation, see Jeanson (2015, 2017).

natural selection on a population over long periods of time. By fluctuating selection, the study authors mean selection that reverses direction, repeatedly, over relatively short periods of time, due to changing environmental conditions. The study authors argue that hundreds of studies which have interpreted patterns of population variation and claimed to find evidence for natural selection failed to account for the strong significance of fluctuating selection and so misconstrued transitory changes as evidence for directional selection.

One well-studied species which demonstrates clear directional selection in the short-term (i.e., seasonal adaptation), but on which selection has apparently little to no long-term effect, is the fruit fly (*Drosophila melanogaster*). The Lynch et al. (2024) study authors point out that fruit flies have population-genetic features quite similar to the *D. pulex* study population, and they reference the findings of Machado et al. (2021), which are particularly instructive. In the Machado et al. (2021) study, researchers looked at parallel changes in allele (i.e., genetic variant) frequencies across 20 populations from 15 separate locations across North America and Europe. Sampling was done early and late in the growing season (roughly spring to fall, corresponding to about 10 generations) over the course of 1–6 years. Over such a wide geographic range, the length of the growing season and other environmental conditions varied substantially, but a clear and consistent pattern of seasonal adaptation was nonetheless observed. That is, the populations adapted to seasonal changes in a predictable manner, such that the traits they exhibited at the end of the season were quite different from those exhibited at the start of the season. Patterns of adaptation also varied from south to north. Though the study authors were unable to identify the specific environmental variables driving these changes, they did find that the changes were statistically associated with temperature extremes in the two weeks prior to sampling in the spring and fall. However, one aspect of the observed population dynamics puzzled the researchers: How do *D. melanogaster* populations survive the annual population collapse during the winter and then establish the same spatial population structure and patterns of seasonal and clinal (i.e., varying from south to north) adaptation year after year?

The Machado et al. (2021) study authors admit that the ability of fruit fly populations to reestablish themselves every spring is poorly understood, but they raise the possibility that "natural selection may not push populations in the same consistent direction across the entire growing season but rather that natural selection and adaptation may be more heterogeneous through time," and that this may have something to do with it. They propose that sampling on a shorter timescale might illuminate how quickly the "selective pressures change in strength and even direction." In the end, they speculate that polymorphisms (i.e., two or more different forms) *must* be maintained by "balancing selection," despite or even because of "strong fluctuating selection," to explain the observed "reset" to the spring state every year.

The findings of Machado et al. (2021) and similar studies prompted an experiment at the University of Pennsylvania (Rudman et al., 2022) in which the researchers looked for fluctuating changes in fruit fly traits during the growing season. Specifically, they were looking for evidence of "adaptive tracking," which they define as "continuous adaptation in response to rapidly changing conditions." The study authors point out that adaptive tracking has historically not received much attention because it has been thought that natural selection is too slow and should theoretically prevent it from occurring.

To test this assumption, researchers established ten separate populations of fruit flies from the same original population and measured changes in traits over four months (about 10 generations). Each population began with 1,000 founders and grew to a maximum of approximately 100,000 individuals. All ten populations were exposed to similar conditions but were not allowed to interact. Every four weeks (about three generations), sampling was conducted for six different physical characteristics (i.e., traits) related to reproduction and stress resistance. The results were astonishing. The study authors report that the direction of adaptation for the traits changed multiple times, "swinging like a pendulum as environmental conditions changed." They were very surprised that a trait could become dominant in the population over a few weeks and then reverse direction the following month, and they reasoned previous studies missed this rapid change in direction by looking at too long a timescale, just as suspected by the authors of the Machado et al. (2021) study. The Rudman et al (2020) study results are shown in Figure 2.

The Rudman et al. (2022) study authors also note that observed changes in fruit fly traits were both phenotypic (i.e., variation in gene expression) and genomic (i.e., variation in the genes themselves), and that the changes affected more than 60% of the genome. To explain these extensive changes, the study authors appeal to a "rapid adaptive response to momentary selection pressures that often results in strong and fluctuating selection." However, they did not actually observe any selection events, only "rapidly fluctuating patterns of adaptation that suggest that populations of *D. melanogaster* are

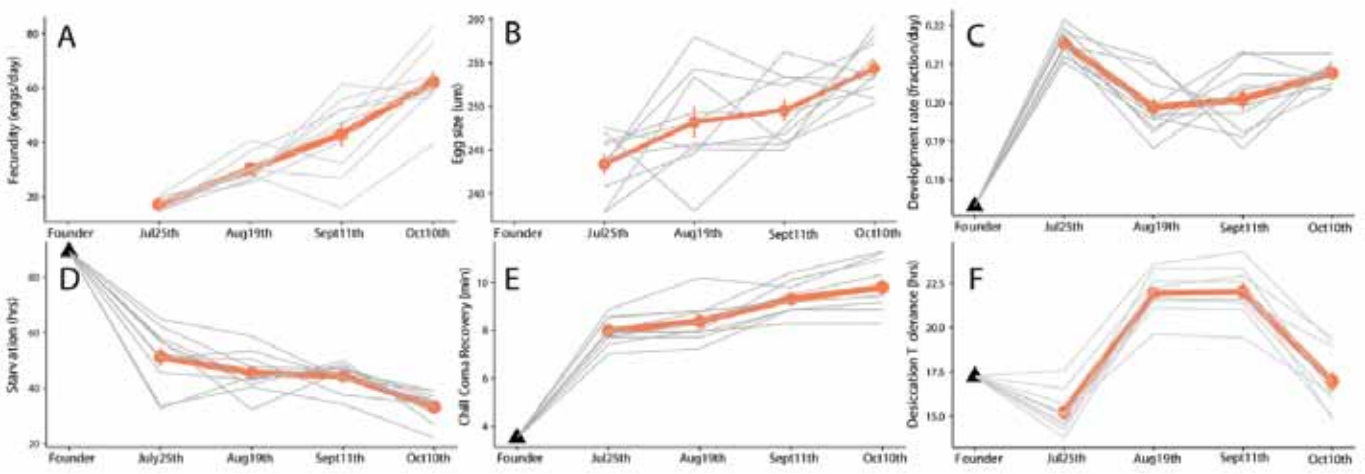

Figure 2. (A-F) from Rudman et al. (2022). Trajectories of change in reproductive-associated traits (A-C) and stress-resistance traits (D-F) in multiple populations, measured every three generations, over four months. Black triangles are the starting point of the founding population. Gray lines are the mean trajectories of each population, and orange lines are the mean of all mean trajectories. Note that the direction of change switched multiple times, even when exhibiting a clear directional trend over the entire study period, and that the directional trend reversed for development rate (C) and desiccation tolerance (F).

continuously and adaptively tracking the environment."

A Challenge for Selectionists

When non-random changes in the frequency of variations are attributed to "selection," even in the absence of an observed selection event, the term itself becomes ambiguous to the point that it ceases to be meaningful. To select is, by definition, to choose or pick out one thing from among several, to remove all but one thing from consideration. This is implicit in Darwin's definition of natural selection (Darwin, 1872):

> This preservation of favourable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection, or the Survival of the Fittest. (Charles Darwin, *On the Origin of Species, Chapter IV)*

Thus, it is difficult to maintain that a process that doesn't reduce the frequency of "unfit" variations in a population can legitimately be described as selective. Therein lies the problem presented by the findings of Lynch et al. (2024), Machado et al. (2021), and Rudman et al. (2022).

To adapt a population to rapidly fluctuating changes in the environment, selection must be strong enough to result in "fit" variations becoming much more common (i.e., higher frequency) than unfit variations over a short period of time. However, if selection is too strong, the frequency of variations fit for change in the opposite direction will be so low that the time required to re-establish them at high frequency when the environment changes will be too long. On the other hand, if selection is too weak, fit variations will not become common enough for the population to adapt. At either selection extreme, the frequency of variations in the population will quickly become out of phase with changes in the environment and will soon be indistinguishable from genetic drift (i.e., a change in frequency due to random chance). Thus, the strength of selection (i.e., the "selection pressure") must be finely tuned. The more quickly changes in the environment switch direction, especially when acting on a large population, the more finely-tuned selection pressures must be to adapt the population to those changes.

Since little to no long-term divergence from the initial set of traits is observed in study populations, both the direction and magnitude of change in environmental variables must nearly or exactly balance in oscillating fashion, and thus arrive back at the starting point, given sufficient time. Even a slight deviation would lead to a long-term shift in the frequency of traits and could be readily observed. That the environment could maintain such a delicate balance over anything but a very short period of time is highly improbable.

One oft-invoked way around this dilemma is to assume that fluctuating

selection somehow actively maintains multiple variants for the same trait (with opposing fitness value) and alternates the expression and suppression of each variant, as appropriate ("balancing selection"). This may appear at first glance to be a reasonable solution since there are many known examples of such polymorphisms (light and dark peppered moths immediately come to mind). However, the speed at which selection must occur to effectively switch the population norm from one variant to its opposite in time with environmental oscillations brings up the fine-tuning issue again. Further, this means that selection must simultaneously act to increase the frequency of fit variations while also preserving unfit or less-fit variations at a high enough frequency so that they are readily available when the environment changes in a direction which would render them fit once again. This is counterintuitive and turns the concept of selection on its head.

Replacing "selection" with "variation" brings clarity to the situation. This is what is being observed in study populations: directional variation, balancing variation, fluctuating variation; variation that closely corresponds with (i.e., responds to, tracks) changes in the environment and is thus inherently adaptive. Occam's razor is applicable here. It is far more plausible to affirm what is apparent (non-random variation) than to assume that random and counterintuitive processes are occurring behind the scenes. The straightforward explanation should be adopted, instead of deferring to an unnecessarily complicated one.

To bring it full circle, why are multiple (even counterintuitive) kinds of selection invoked to explain observed population dynamics? Because those dynamics are unexpected from the original conception of the random variations plus natural selection model. This indicates that one or more of the original assumptions is incorrect. The situation should seem familiar to those who have read Thomas Kuhn's *The Structure of Scientific Revolutions* (Kuhn, 1970). In his classic work, Kuhn describes how an established scientific model is augmented with an array of increasingly cumbersome secondary assumptions in an attempt to save the model as evidence contradicting the original assumptions begins to mount. After some time, the model becomes so unwieldy that, when a simpler model with more accurate initial assumptions comes along, the old model is quickly abandoned, and a paradigm shift occurs. With regard to our understanding of biological adaptation, now is one of those times.

Adaptive Variation by Design

If we accept that biological variations are not random, then it logically follows that a selective mechanism is unnecessary; there would be no "pool" of random variations from which to "select." Instead, another mechanism must be at work; one that responds to environmental changes by generating variations that are inherently adaptive. Such a mechanism would naturally allow organisms to adapt to their environment more rapidly than the trial-and-error approach integral to the random variations plus natural selection model. This is precisely what is observed in the water flea and fruit fly populations.

Of course, these aren't the only populations in which adaptive environmental tracking is apparent. The evidence is abundant. Guliuzza and Gaskill (2018) and ICR's Engineered Adaptability series of articles[3] have discussed more than thirty examples, and even a cursory review of the scientific literature reveals dozens of additional studies in which similar patterns of non-random variation have been observed. The accumulating evidence shows that adaptation is rapid, predictable, repeatable, reversible, and precisely controlled. It is targeted, purposeful, engineered. Once the baggage of the random variations plus natural selection model has been jettisoned, it becomes clear that the generation of adaptive variation is by design.

Though there remains much to learn about exactly how organisms are engineered to closely track changes in the environment and respond by quickly generating adaptive variation, an emerging theory of biological design has identified at least three key elements:

1. Organisms are equipped with a wide array of sensors which are finely-tuned to specific environmental stimuli and which trigger an adaptive response when stimuli exceed a designed threshold (Guliuzza, 2018).
2. A blockchain-like process enables individual organisms to combine inherited information, environmental variables (more specifically, biochemical responses triggered by the sensing of environmental stimuli), and internal state (e.g., metabolic rate, energy reserves, hormone levels, etc.) to adaptively adjust their traits during development and as adults (Gaskill and Guliuzza, 2019b).
3. Distributed problem solving allows a population of organisms to cooperatively and rapidly converge on optimized solutions to environmental problems (Gaskill and Guliuzza, 2019a).

The last of these is critical, since it presents a resolution to the challenge that was pointed out at the beginning of this article. Namely, with the very weak "directional selection" observed

3 See Acts & Facts 46(9)–48(8), appearing from 2017 to 2019.

by Lynch et al. (2024), how did the diversity of life arise in just a few thousand years, how did populations become so well-adapted to their environments, and how do they continue to adapt today?

To achieve rapid convergence on an appropriate set of traits for a specific environmental niche, individual organisms generate similar "solutions" (i.e., adaptive variations) in response to environmental "problems" (e.g., changing conditions or the colonization of a new environment). These adaptive variations are then rapidly distributed within the population by reproduction, with the consensus solutions becoming dominant in one or a few generations. Thus, a population can quickly become optimized to its environment. In a stable environment, oscillations in environmental variables are closely tracked by the population in this manner, resulting in fluctuating and balancing variation. If significant environmental change occurs or if the population migrates and fills a new environmental niche, the same mechanism allows the population to undergo rapid directional variation.

In the creation worldview, the immediate post-Flood world and the Ice Age, which followed soon after, present the most significant colonization event and epoch of extreme environmental change, respectively, since Creation itself. Present conditions are far more stable. It should be expected, then, that the history of life would exhibit explosive diversification post-Flood, then a rapid re-shuffling of diversity as the Ice Age waxed and waned, followed by relative stability today. The distributed problem-solving mechanism is an eminently plausible explanation.

Conclusion

There is abundant evidence demonstrating that organisms rapidly and repeatedly adapt to even minor changes in the environment. Such adaptive environmental tracking can only be described as directed, purposeful, and even engineered. In contrast, as the recent studies discussed in this article reveal, there is little to no evidence that natural selection has any significant effect on populations in the long-term, or explanatory power in the short-term.

The bottom line is that natural selection is not operating in the real world. The hypothesis that adaptation results from engineered optimization provides the only plausible explanation for the origination and perpetuation of the mind-boggling diversity of life in only a few thousand years. It is time for creationists to discard models that rely on natural selection and replace them with a theory of biological design which puts the inherent and amazing ability of organisms to quickly adapt to environmental change back into proper perspective: credit should be given to the Creator who engineered it.

References

Darwin, C. (1872) 1975. *On the Origin of Species by Means of Natural Selection*. Sixth Edition. W.W. Norton & Company, New York, NY.

Gaskill, P.B., and R.J. Guliuzza. 2019a. Engineered adaptability: New distributed problem-solving model for population adaptation. *Acts & Facts* 48(4):17–19.

Gaskill, P.B., and R.J. Guliuzza. 2019b. Engineered adaptability: Blockchain-like process may produce adaptive traits. *Acts & Facts* 48(5):17–19.

Guliuzza, R.J. 2018. Engineered adaptability: Sensor triggers affirm intelligently designed internalism. *Acts & Facts* 47(2); Guliuzza, R.J. 2018. Engineered adaptability: Creatures' adaptability begins with their sensors. *Acts & Facts* 47(3).

Guliuzza, R.J., and P. Gaskill. 2018. Continuous environmental tracking: An engineering framework to understand adaptation and diversification. In Whitmore, J.H. (editor), *Proceedings of the Eighth International Conference on Creationism*, pp. 158–184. Creation Science Fellowship, Pittsburgh, PA.

Jeanson, N.T. 2015. Mitochondrial DNA clocks imply linear speciation rates within "kinds." *Answers Research Journal* 8:273–304. *See Note 2*.

Jeanson, N.T. 2017. *Replacing Darwin: The New Origin of Species*. Master Books, Green Forest, AR. *See Note 2*.

Kuhn, T.S. 1970. *The Structure of Scientific Revolutions*. Second Edition, Enlarged. The University of Chicago Press, Chicago, IL.

Lynch, M., W. Wei, Z. Ye, and M. Pfrender. 2024. The genome-wide signature of short-term temporal selection. *Proceedings of the National Academy of Sciences* 121(28):e2307107121.

Machado, H.E., A.O. Bergland, R. Taylor, S. Tilk, E. Behrman, K. Dyer, D.K. Fabian, T. Flatt, J. Gonzalez, T.L. Karasov, B. Kim, I. Kozeretska, B.P. Lazzaro, T.J.S. Merritt, J.E. Pool, K. O'Brien, S. Rajpurohit, P.R. Roy, S.W. Schaeffer, S. Serga, P. Shmidt, and D.A. Petrov. 2021. Broad geographic sampling reveals the shared basis and environmental correlates of seasonal adaptation in Drosophila. *eLife* 10:e67577.

Rudman, S.M., S.I. Greenblum, S. Rajpurohit, N.J. Betancourt, J. Hanna, S. Tilk, T. Yokoyama, D.A. Petrov, and P. Schmidt. 2022. Direct observation of adaptive tracking on ecological time scales in *Drosophila*. *Science* 375(6586):eabj7484.

Asteroids, TNOs, and Olivine: The Petrological Problem with Hydroplate Theory's Astronomical Submodel

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Key Words: granite petrogenesis, hydrothermal alteration, small Solar System bodies

Accepted for publication July 19, 2025

Abstract

The origin of small Solar System bodies (SSSBs) such as asteroids, Trans-Neptunian Objects (TNOs), comets, and meteoroids remains an elusive question in secular and creation cosmogonies. The Hydroplate Theory (HPT) proposes a terrestrial origin, explaining these features as fragments of the crustal debris launched by the fountains of the great deep during the earlier stages of the Flood. However, HPT faces a challenge: SSSBs are predominantly olivine in composition, yet olivine is absent in the granite crust and rare in its predicted basalt subterranean floor. Despite assertions that olivine would be common, the compositions of granite and basalt simply do not lend credence to this idea. Hydrothermal alteration in the subterranean chamber also contradicts HPT predictions, as quartz is a chemically resistant mineral. Rather than dissolving quartz, hydrothermal alteration would replace feldspars, micas, pyroxenes, and olivine with clay, phyllosilicates, and additional quartz. Consequently, the crustal debris launched by the fountains of the great deep should be dominantly granite and quartz, with olivine being extremely rare if present at all. This is precisely the opposite of what we commonly observe in the composition of SSSBs. This represents a significant flaw in the HPT astronomical submodel.

Simple Summary

The article discusses a major problem with the Hydroplate Theory (HPT), which suggests that small Solar System bodies (SSSBs) like asteroids and Trans-Neptunian Objects (TNOs) were formed from pieces of Earth's crust launched into space during the Global Flood. A significant issue is that SSSBs are mostly made of a mineral called olivine. However, HPT describes the source of SSSBs as the Earth's granite crust, which contains no olivine, and a layer below the crust made of basalt, which has very little olivine. The article explains that the high temperatures and water described by HPT would not help create or preserve olivine; instead, these conditions would cause granite and basalt to change, resulting in more quartz and clays, while destroying any existing olivine. Therefore, the debris launched by the HPT's fountains of the great deep should be mostly granite, clays, and quartz, with very little or no olivine, which is the opposite of what is observed in SSSBs.

Introduction

Small Solar System bodies (SSSBs) such as asteroids and Trans-Neptunian Objects (TNOs) remain an intriguing frontier of the planetary sciences. Debate over their origin and development abound within both the secular and creation cosmogonies. One such model is the Hydroplate Theory (HPT) as proposed by Walter T. Brown (2019). This model relates asteroids and TNOs to the activities fueled by the fountains of the great deep during the earlier stages of the Genesis Flood. Specifically, asteroids and TNOs are explained by the erosion of the pre-Flood crust and subcrustal rocks that were then carried beyond Earth's orbit where they

agglomerated into the SSSBs we see today. This proposal has been challenged on the basis of an insufficient energy supply in the pre-Flood Earth's energy budget to propel crustal debris beyond Earth's orbit (Carter and Isaacs, 2022) and the inability of solar-driven processes to significantly aid in pushing TNOs beyond Mars' orbit (Isaacs, 2023). However, HPT's explanation suffers from an even more fundamental challenge that comes from over a century of pioneering experiments and laboratory data from the field of empirical petrology, the study of rock-forming processes active in the production and progression of rocks and their minerals through time. Specifically, HPT must explain how asteroids and TNOs became dominantly composed of olivine when derived from a primarily granitic and, to a lesser extent, a basaltic source. This note will briefly review the impossibility of HPT's explanation in light of fundamental igneous petrology.

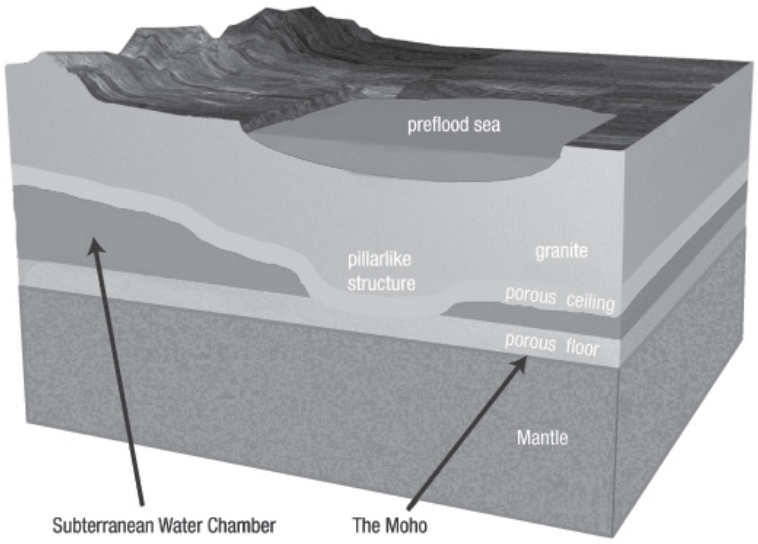

Figure 1. The HPT pre-Flood Earth system consists of a granite crustal shell approximately 100 km thick, which sits atop a solid basaltic mantle. Portions of the granite crust seep downward to act as pillars to support the granite crust. Between this granite crust and basalt mantle is a subterranean water chamber which averages 1.6 km thick. Hydrothermal alteration by the supercritical water within this chamber makes the granite crust and basalt chamber floor porous. Image from Brown (2019, p. 124, Figure 42)

Hydroplate Theory: A Brief Overview

Brown (2019) established several characteristics that define the HPT pre-Flood Earth system. First, Earth's crust was a continuous shell of granite approximately 100 km thick that lay atop a basalt mantle. Between this granite shell and basalt mantle was an interconnected network of subterranean water passages which averaged 1.6 km thick (Figure 1). The granite shell supported itself by pillar structures which settled to the chamber floor (Brown, 2019, p. 343). However, at the onset of the Flood, an initial crack released this highly pressurized water as the fountains of the great deep described in Genesis 7:11:

> "As flood waters escaped from the subterranean chambers, pillars were crushed, because they were forced to carry more and more of the weight of the overlying crust. Also, the almost 60-mile-high walls of the rupture were unstable because rock is not strong enough to support a cliff more than 5 miles high. As lower portions of the walls crumbled, blocks—some a staggering 200 meters in diameter—were swept up and launched by the jetting fountains." (Brown, 2019, p. 340)

This ejected crustal debris, as Brown explains over the course of two chapters, gradually agglomerated to become the comets, meteoroids, asteroids, and TNOs we now see across our solar system.

Asteroids and TNOs: What Are the Potential Sources of Olivine?

The composition of SSSBs has generated considerable excitement over the years due to interests in planetary evolution and, more recently, the possibility of mining asteroids (e.g., Martínez-Jiménez et al., 2016; Cannon et al., 2023; Ríos Muñoz et al., 2024). From observing hand samples of meteorites to spectral measurements of cometary debris tails or asteroids, it is believed that the vast majority of SSSBs are composed dominantly of olivine (e.g., Binzel et al., 2009; Hamilton et al., 2021; Soens et al. 2022), a mafic (magnesium- and iron-rich) silicate mineral which comprises much of the Earth's upper mantle. Brown himself readily recognized this and makes several mentions of it throughout his book (e.g., Brown, 2019, pp. 122, 310, 316), often giving the impression that olivine is readily available to serve as debris to form asteroids and other SSSBs. However, these statements are often misleading and require some

clarification before proceeding. For instance, Brown claimed that, "Olivine may be the most abundant of the more than 2,500 known minerals in Earth's crust and mantle" (Brown, 2019, p. 122). This is true of the upper mantle, which is about 55% olivine, but it is not true of the crust. Instead, the crust is almost exclusively granitic in composition, which by its very definition has no olivine in its overall makeup (as later discussed). Elsewhere, he said again that "Olivine is a class of minerals that includes perhaps half the minerals in the Earth's crust and upper mantle" (Brown, 2019, p. 369, endnote 32). Again, this statement is specifically wrong in reference to the crust's composition, unless Brown meant that olivine is *included* in a class of minerals called silicates, which do dominate the crust and mantle, but include a wide variety of minerals other than olivine. Consequently, we distinguish between the mantle, which is olivine-rich, and the crust, which is olivine-poor.

It is important to recognize, however, that HPT's upper mantle is not the same as what most petrologists would define as the upper mantle. To most petrologists, the upper mantle is composed of peridotite, which is about 55% olivine, 35% pyroxene, and 10% other minerals (Best and Christiansen, 2001, p. 438). In contrast, Brown claimed that the subterranean water chamber rested between the granite crust and an uppermost part of the mantle comprised of solid basalt (Brown, 2019, p. 124). This is because the basaltic Atlantic floor is believed to be the original created chamber floor (Brown, 2019, pp. 130–131), which is in contrast to the Pacific floor, which is from outpourings of basalt over a submerged hydroplate (Brown, 2019, pp. 158–162; see also critical review by Isaacs, 2018). Consequently, in terms of the HPT Earth system, the uppermost mantle was not peridotite but instead basalt. This is an important distinction because the material available to be swept up by the fountains of the great deep is 1) the granite crust, and 2) the solid basalt chamber floor. Consequently, the peridotite mantle cannot be considered an accessible source of olivine, as that would be below the basalt comprising the chamber floor.

Now that we have defined granite and basalt of Atlantic seafloor composition as the source for nascent SSSB debris, the question naturally arises: from where is this olivine derived? As defined in the literature, granite comprises, by volume, 20–60% quartz and 35–90% alkali and/or plagioclase feldspar (Streckeisen, 1976). This is not to be confused with the more general term "granitic rock," which refers to texturally similar rocks that contain proportions of quartz, alkali feldspar, and plagioclase that fall outside of the previous definition (Shellnut et al., 2021). Basalt has widely varying compositions but is dominantly plagioclase and pyroxene (Best and Christiansen, 2001, p. 37). In many cases, basalt is completely devoid of olivine, depending on the location and composition of that basalt. On the scale of basalts, the Atlantic seafloor is probably among the richest in olivine yet generally has less than 10% olivine by weight (e.g., Bryan and Moore, 1997; Zhong et al., 2019).

Hydroplate Theory's Petrological Gymnastics

The composition of the granite and the Atlantic seafloor basalt poses a significant barrier to HPT's explanation for SSSBs. With the vast majority of debris being derived from the granite crust and only lesser amounts from the basalt chamber floor, then olivine should be found in minor quantities at best. This is directly contradictory to Brown's claim that much of the eroded material was comprised of magnesium-rich olivine (Brown, 2019, p. 316). Besides the misleading claims on the distribution of olivine throughout the crust, Brown did not directly address how SSSBs became enriched to the point of becoming dominantly olivine despite their derivation from an olivine-poor source. However, Brown did attempt to answer the question of why quartz is so rare:

> "Pillarlike structures formed in the subterranean chamber when the thicker, denser portions of the crust settled through the subterranean water onto the chamber floor.… Twice daily, during the centuries before the [F]lood, tides in the subterranean water stretched and compressed these pillars. This powerful heating process steadily raised pillar and subterranean water temperatures, dissolved quartz, and made pillars porous (spongelike).…these temperatures exceeded 1,300°F, enough to do all this and allow iron and nickel to settle downward and concentrate in the pillar tips." (Brown, 2019, pp. 343–344)

Elsewhere, Brown explains that "Temperatures [in the subterranean chamber] probably reached 3,000°F (1,650°C).…If so, as temperatures steadily rose, quartz would have been the first major mineral in granite to melt. Much of it would have dissolved in the hot, subterranean water" (Brown, 2019, p. 368, endnote 25).

These elevated temperatures, then, are believed to have removed the quartz from the granite and concentrated it into the subterranean water so that the quartz was no longer available to form SSSBs. This explanation, of course, is incomplete, as tremendous volumes of quartz would have to be dissolved while only a severely limited amount of water exists in which it can dissolve. Note that the thickness of the HPT subterranean water layer is only one mile or 1.6 km. Solubilities measured for quartz in supercritical water are typically well less than 1 g/kg of water,

that is, less than 0.1 percent (Rendel and Mountain, 2023). This implies that the maximum thickness, on average, of dissolved quartz is no greater than 1.6 m, which is only a tiny fraction of the 100 km thickness of the granite crust.

However, these concerns are predicated on the faulty assumption that it was the quartz that would dissolve under these HPT conditions. Quartz may have a relatively low melting temperature, but it is far more chemically resistant than many of its companion minerals. This is why the end result of granite weathering is commonly clay and sand grains; the feldspars and mica chemically alter into clays while the quartz resists alteration, remaining instead as quartz sand grains (e.g., Table 1 of Chiu and Ng, 2014). This matches the well-documented progression of alteration observed from hydrothermal activity (Savage et al., 1987; Meller et al., 2014; Yuguchi et al., 2021; Fries et al., 2025).

For instance, Nishimoto and Yoshida (2010) employed microscopic observation and chemical investigations to identify the order of hydrothermal alteration phases in deep-fractured granite, analogous to Brown's proposed alteration of the granite crust. As seen in Figure 2, they observed three primary phases of alteration:

1. Phyllic zone alteration with the dissolution of K-feldspar and precipitation of the clay mineral illite and quartz.
2. Propylitic zone alteration with dissolution of biotite and precipitation of a clay-like Fe-phyllosilicate.
3. Outer zone alteration with dissolution of plagioclase and partial chloritization of biotite.

In short, alteration involved the dissolution of original feldspars and micas and the precipitation of clay (illite), clay-like minerals (chlorite and Fe-phyllosilicate), and quartz. Note that no quartz was dissolved; instead, the silica tetrahedra in the feldspars and mica were precipitated as additional quartz and the aluminum, potassium, and any remaining silica were precipitated as illite ($K_{0.65}Al_{2.0}[Al_{0.65}Si_{3.35}O_{10}](OH)_2$). The result of this alteration serves to *increase*, not decrease, the modal amount of quartz within the altered granite. This demonstrates that any alteration of the granite crust would lead to the replacement of feldspars and micas with illite, phyllosilicates, and quartz. More pervasive alteration would only continue to eradicate the primary texture of the host granite and replace it with clay minerals and quartz, as observed in advanced argillic and silicic alteration (Hedenquist and Arribas, 2022). Consequently, quartz and clay would dominate the material swept out by the escaping fountains of the great deep, exacerbating the composition discrepancy between HPT expectations and observed SSSBs.

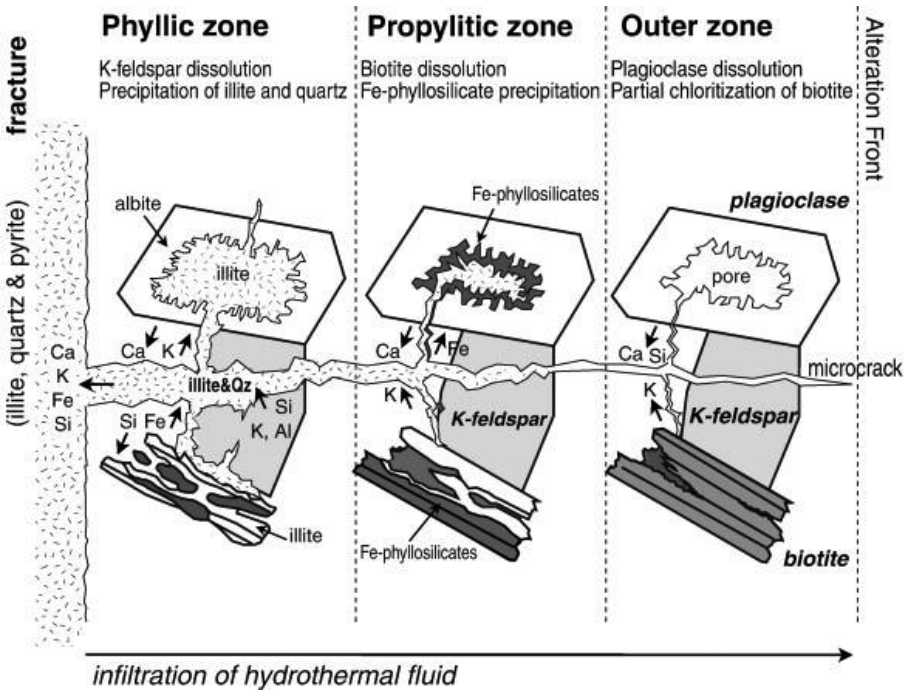

Figure 2. Order of hydrothermal alteration of mineral phases in fractured granite. Alteration radiates outward from the fracture on the left, creating an alteration halo in three zones. The Phyllic zone involves the dissolution of K-feldspar and the precipitation of quartz and the clay mineral illite. The Propylitic zone involves biotite dissolution and precipitation of a Fe-phyllosilicate, while the Outer Zone involves plagioclase dissolution and partial replacement of biotite into the phyllosilicate chlorite. Note that quartz is not dissolved due to its chemical resistance compared to feldspars and micas. Continued alteration would continue to replace the original texture with clay (advanced argillic) and precipitate more quartz (silicify). Image from Nishimoto and Yoshida (2010, Figure 8).

Sourcing Ni: A Two-Edge Sword

HPT also wrestles with how to source Ni from the granite crust to explain

Fe-Ni meteoroids. As referenced earlier, Brown explains this as partial melting of Fe- and Ni-rich minerals in the granite crust, which seep downward and concentrate in the pillar-like structures. This is a desperate attempt, as granite has no major minerals rich in Ni. Instead, Ni-rich minerals are far more common in mafic igneous rocks such as gabbro and to a lesser extent basalt. This is why Ni mining companies explore for weathered gabbro (Ni-laterites) rather than weathered granite (Al-bauxites).

This raises the question: could HPT source the Ni from the basalt chamber floor rather than the granite? Basalt has high variability in Ni composition that correlates with MgO; many basalts consequently have only between 100–300 ppm Ni (Hedge, 1971). The mineral sources of Ni, however, are olivine and pyroxene (Dong et al., 2024). This is contradictory for HPT: olivine and pyroxene must be destroyed in order to liberate Ni, yet olivine must be preserved in SSSBs. In his explanation of pallasites, which are meteoroids where magnesium-rich olivine (forsterite) and nickel-iron alloys are found together, Brown specifically claimed that *only* the nickel-iron source minerals melted while the olivine remained unmelted:

> "In pallasites, the olivine is strictly the magnesium variety, a mineral called forsterite. At atmospheric pressure, forsterite melts at almost 1900°F, one of the highest melting temperatures of all minerals.... An iron-nickel mixture melts at about 1300°F....The fluttering hydroplates and pounding pillars crushed rock and generated frictional heat along the sliding surfaces. Near those surfaces, minerals that had low melting temperatures, including minerals containing iron and nickel, melted quickly. The dense iron and nickel drained down cracks and displaced upward melted material that was less dense....Before forsterite could melt, the molten iron-nickel steadily froze while forsterite crystals were suspended in a weightless environment within the melt." (Brown, 2019, p. 369, endnote 32)

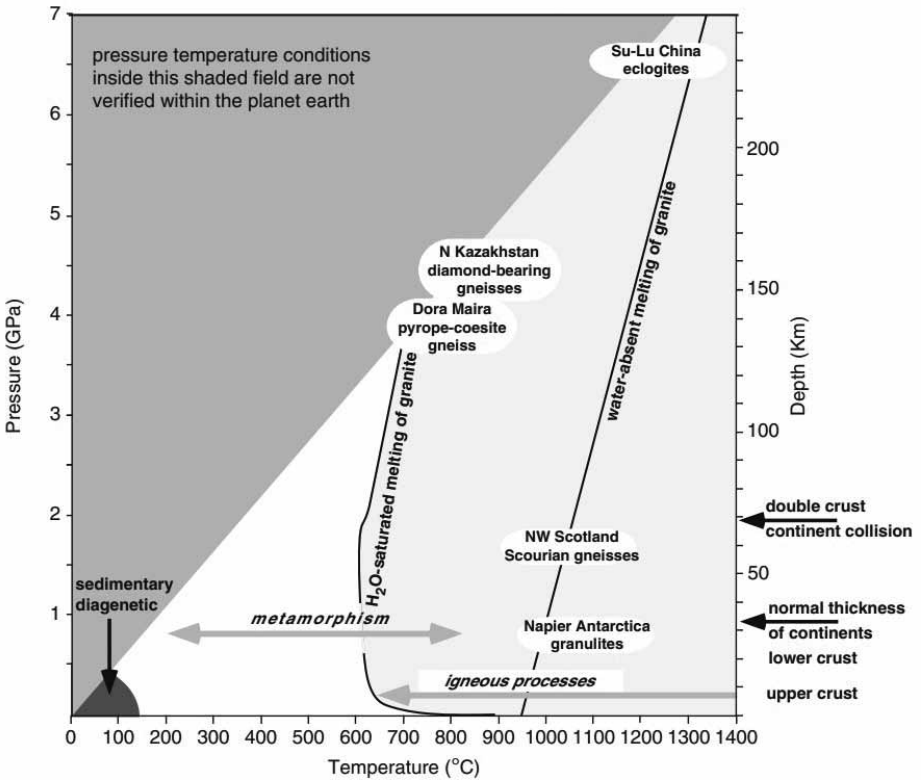

Figure 3. A phase diagram illustrating processes at differing pressure-temperature regimes across crustal depths and beyond. Note the diagonal solid black line, "water-absent melting of granite" is the solidus, where the region to the right of the line is a field of pressure-temperature conditions resulting in melt. This diagram does not even extend as high as HPT's predicted temperature condition of 1650°C. Clearly, the conditions in HPT's predicted subterranean chamber are most conducive to pervasive melting of the granite crust. Diagram from Bucher and Grapes (2011, p. 6, Figure 1.2).

However, forsterite (magnesium-rich olivine) is the Ni-rich mineral that would have to be broken down to liberate Ni. In this scenario, HPT cannot have both liberated Ni and preserved olivine.

Deep Hydrothermal Alteration of Basalt Destroys Olivine

The hydrothermal alteration fueled by the subterranean chamber also poses a problem for preserving olivine in the basalt chamber floor. Much like what happens in granite, hydrothermal alteration of basalt only serves to destroy the original texture and replace it with clays, phyllosilicates, and quartz. Hydrothermal alteration of olivine specifically leads to its breakdown to the phyllosilicate chlorite

(Humphris and Thompson, 1977). In the temperature range of 150–400°C, alteration generally leads towards the greenschist facies where the basalt is broken down into quartz, chlorite, epidote, and other common alteration minerals (Teagle and Alt, 2004). Much as with granite, alteration destroys olivine while increasing the amount of quartz and phyllosilicates like chlorite to be swept up in the subterranean waters. Alteration would be even more pervasive at the postulated pressures and temperatures of the HPT system.

Could Olivine Be Derived from Other Silicates?

As illustrated in the preceding sections, granite is devoid of olivine while any olivine that may occur in basalt is liable to be altered to chlorite rather than being preserved. This leaves no olivine for forming SSSBs. This results in one final question: could olivine be derived from other silicates? Only two mechanisms exist for generating new minerals:

1. Alteration of existing minerals
2. Melting

As discussed with the first option, alteration would destroy minerals like olivine and the feldspars and transform them into clays and phyllosilicates. On the other hand, melting would cause a greater problem for HPT. At a temperature of 1650°C and at crustal depths in the presence of water, rocks melt to form granite magmas at >650°C (Bucher and Frey, 2001, p. 5, Figure 1.1). By 1400°C, partial melting is thermally unpreventable in the deep crust (Best, 2003, p. 313). In the HPT subterranean chambers with water at 1650°C, the granite crust would at the very least partially melt, if not totally melt (Figure 3). As described before, supercritical water cannot hold much quartz in solution. However, magmas readily hold water in solution. Given the extent of melting that would accompany HPT's speculated pressure-temperature regime, the subterranean chamber would be dominated by melted granite with dissolved water, rather than water with dissolved quartz. The resulting magma would be silica-rich (like quartz) rather than silica-poor (like olivine).

Norman Bowen was among the first petrologists to exhaustively study the geochemical processes at work with the crystallization of silicate melts, demonstrating in what is now known as Bowen's Reaction Series that melts become more silica-rich over time in an irreversible sequence (Bowen, 1928). This involves a process known as fractional crystallization (Best and Christiansen, 2001, pp. 95–97). This involves only part of the melt crystallizing, and the available Mg and Fe becoming locked up in those crystals. The remaining melt is now depleted in Mg and Fe and enriched in silica. It is now believed that this process must be repeated multiple times to transform a peridotite to a granitic composition, where as much as 70% of the original mass has been removed by the time that a granitic composition has been achieved (Christiansen et al., 2022). This is where the problem lies: melts only become more silica-rich and more Mg- and Fe-poor in an irreversible progression. A melt from a granite composition simply lacks the necessary Mg and Fe to create stable olivine crystals. Likewise, a basalt melt also cannot create any more olivine than already exists in the original basalt. Mixing a basalt melt with a granite melt would furthermore make a hybrid between the basalt and granite that is also too silica-rich to create olivine.

Conclusions

The composition of the small Solar System bodies (SSSBs) remains a serious objection to Hydroplate Theory (HPT). Olivine, contrary to some statements from Brown, is simply not common in the HPT granite crust. Even in the HPT basalt chamber floor, olivine is only a secondary mineral if present at all. The hypothesized dissolution of quartz from the granite crust is likewise contrary to many observations of granite alteration. Quartz is a chemically resistant mineral in comparison to its companion minerals like potassium feldspar and biotite mica. Hydrothermal alteration by the subterranean waters would replace feldspars and mica in the granite, and olivine and pyroxene in the basalt, with clays, phyllosilicates (e.g., chlorite), and quartz. Consequently, the debris launched by the fountains of the great deep should be, in decreasing order of prominence, 1) granite, 2) illite and other clays, 3) quartz, and 4) chlorite, with olivine and pyroxene only appearing as minor (0.1 – 1 wt.%) or trace (< 0.1 wt.%) quantities if found at all. This is far from what we observe of SSSB compositions. The HPT astronomical submodel simply fails to explain the petrological data, which calls into question the HPT system as a whole (Isaacs, 2023).

References

Best, M.G. 2003. *Igneous and Metamorphic Petrology*, 2nd edition. Blackwell Science, Oxford, UK.

Best, M.G., and E.H. Christiansen. 2001. *Igneous Petrology*. Blackwell Science, Oxford, UK.

Binzel, R.P., A.S. Rivkin, C.A. Thomas, et al. 2009. Spectral properties and composition of potentially hazardous Asteroid (99942) Apophis. *Icarus* 200(2):480–485.

Bowen, N.L. 1928. *The Evolution of the Igneous Rocks*. Princeton University Press, Princeton, NJ.

Brown, W. 2019. *In the Beginning: Compelling Evidence for Creation and the Flood,* 9th edition. Mission Imperative Inc., Lebanon, PA.

Bryan, W.D., and J.G. Moore. 1977. Compo-

sitional variations of young basalts in the Mid-Atlantic Ridge rift valley near lat 36°49′N. *Geological Society of America Bulletin* 88(4):556–570.

Bucher, K., and R. Grapes. 2011. *Petrogenesis of Metamorphic Rocks*, 8th edition. Springer, New York, NY.

Canon, K.M., M. Gialich, and J. Acain. 2023. Precious and structural metals on asteroids. *Planetary and Space Science* 225(105608), doi: 10.1016/j.pss.2022.105608.

Carter, R.W., and E.A. Isaacs. 2023. Hydroplate Theory energy budget falls short of expectations. *Journal of Creation* 37(1):87–93.

Chiu, C.F., and C.W.W. Ng. 2014. Relationships between chemical weathering indices and physical and mechanical properties of decomposed granite. *Engineering Geology* 179:76–89, doi: 10.1016/j.enggeo.2014.06.021.

Christiansen, E.H., M.G. Best, and J. Radebaugh. 2022. The origin of magma on planetary bodies, In: *Planetary Volcanism across the Solar System*, pp. 235–270 .T.K.P. Gregg, R.M.C. Lopes, and S.A. Fagents (editors). Elsevier, New York, NY.

Dong, X.-H., S.-J. Wang, K.-W. Pang, et al. 2024. The behavior of nickel isotopes during mantle melting. *Geochimica et Cosmochimica Acta* 385:34–44, doi: 10.1016/j.gca.2024.10.002.

Fries, D., C. Glaas, and A. Genter. 2025. Hydrothermal alteration role on lithium mobility in a geothermal reservoir: Geochemical analyses of deep granite in the Upper Rhine Graben. PROCEEDINGS, 50th Workshop on Geothermal Reservoir Engineering. Stanford University, Stanford, CA.

Hamilton, V.E., C.A. Goodrich, A.H. Treiman, et al. 2021. Meteoritic evidence for a Ceres-sized water-rich carbonaceous chondrite parent asteroid. *Nature Astronomy* 5:350–355, doi: 10.1038/s41550–020–01274-z.

Hedenquist, J.W., and A. Arribas. 2022. Exploration implications of multiple formation environments of advanced argillic minerals. *Economic Geology* 117(3):609–643.

Hedge, C.E. 1971. Nickel in high-alumina basalts. *Geochimica et Cosmochimica Acta* 35(5):522–524, doi: 10.1016/0016–7037(71)90049–4.

Humphris, S.E., and G. Thompson. 1978. Hydrothermal alteration of oceanic basalts by seawater. *Geochimica et Cosmochimica Acta* 42(1):107–125, doi: 10.1016/0016–7037(78)90221–1.

Isaacs, E. 2018. Hydroplate Theory—Problems for trench formation in the Pacific Basin. *Journal of Creation* 32(3):58–63.

Isaacs, E.A. 2023. Are solar-driven forces sufficient for Hydroplate Theory asteroid origins? *Journal of Creation* 37(2):121–128.

Martínez-Jiménez, M., C.E. Moyano-Cambera, J.M. Trigo-Rodríguez, J. Alonso-Azcárate, and J. Llorca. 2016. Asteroid Mining: Mineral resources in undifferentiated bodies from the chemical composition of carbonaceous chondrites. In: J. Trigo-Rodríguez, M. Gritsevich, H. Palme (editors). Assessment and mitigation of asteroid impact hazards. *Astrophysics and Space Science Proceedings*, Volume 46, doi: 10.1007/978–3-319–46179–3_5.

Meller, C., A. Kontny, and T. Kohl. 2014. Identification and characterization of hydrothermally altered zones in granite by combining synthetic clay content logs with magnetic mineralogical investigations of drilled rock cuttings. *Geophysical Journal International* 199(1):465–479, doi: 10.1093/gji/ggu278.

Nishimoto, S., and H. Yoshida. 2010. Hydrothermal alteration of deep fractured granite: Effects of dissolution and precipitation. *Lithos* 115(1–4):153–162, doi: 10.1016/j.lithos.2009.11.015.

Rendel, P.M., and B.W. Mountain. 2023. Solubility of quartz in supercritical water from 375°C to 600°C and 200–270 bar. *The Journal of Supercritical Fluids* 196, 105883.

Ríos Muñoz, F., C. Peña Ramírez, J. Meza, et al. 2024. Platinum group metals extraction from asteroids vs Earth: An overview of the industrial ecosystems, technologies and risks. *Mineral Economics* 37:681–700, doi: 10.1007/s13563–024–00429-y.

Savage, D., M.R. Cave, A.E. Milodowski, and I. George. 1987. Hydrothermal alteration of granite by meteoric fluid: An example from the Carnmenellis Granite, United Kingdom. *Contributions to Mineralogy and Petrology* 96:391–405.

Shellnutt, J.G., S.W. Denyszyn, and K.-N. Pang. 2021. Editorial: Granite petrogenesis and geodynamics. *Frontiers in Earth Science* 8:1–3, doi: 10.3389/feart.2020.637729.

Soens, B., S.M. Chernonozhkin, C. González de Vega, et al. 2022. Characterization of achondritic cosmic spherules from the Widerøefjellet micrometeorite collection (Sør Rondane Mountains, East Antarctica). *Geochimica et Cosmochimica Acta* 325:106–128, doi: 10.1016/j.gca.2022.03.029.

Streckeisen, A.L. 1976. To each plutonic rock its proper name. *Earth-Science Reviews* 12(1):1–33, doi: 10.1016/0012–8252(76)90052–0.

Teagle, D.A.H. and J.C. Alt. 2004. Hydrothermal alteration of basalts beneath the Bent Hill Massive Sulfide Deposit, Middle Valley, Juan de Fuca Ridge. *Economic Geology* 99(3):561–584, doi: 10.2113/gsecongeo.99.3.561.

Yuguchi, T., Y. Izumino, and E. Sasao. 2021. Genesis and development processes of fractures in granite: Petrographic indicators of hydrothermal alteration. *PLoS One* 16(5):e0251198, doi: 10.1371/journal.pone.0251198.

Zhong, Y., W. Lui, W. Sun, et al. 2019. Geochemistry and mineralogy of basalts from the South Mid-Atlantic Ridge (18.0°–20.6°S): Evidence of a heterogeneous mantle source. *Minerals* 9(11), doi: 10.3390/min9110659.

Notes from the Panorama of Science

Darwin's Central Role in Birthing Racism and Nazism: Another Reason Why God Did Not Use Evolution to Create Life

Some Christians argue that it does not matter if God created life *ex nihilo* as the Bible teaches, or used evolution to achieve the same goal. Either way, they argue, God created. Actually, the fact that evolutionary ideas birthed the worst holocaust in history is one reason, among many, to reject evolution as God's means of creation. Evolutionary ideas *not only* attack God's omnipotence, *but also* His holiness and purity. It is well-documented that Darwinism played a central role in the development of both modern racism and Nazism (Egan, 2008; Bergman, 2012).

After discussing the "holy trinity of scientism, [which is] meliorism [the idea that humans can interfere with natural processes to improve the world], and imperialistic economic nationalism," Christian professor Carlyle Marney opined that the theology which has produced what he calls, not the holy, but rather the *un*holy trinity was

> a hyphenated and distorted naturalistic evolution, based on Laplace, Lyell, Darwin, Spencer, and Huxley. Inverted almost totally from its valid base in biology, this developmentism, this progressiveness, this evolution upward, is used to account for everything.…Success is the 'survival of the fittest,' and World War I was nature clearing the earth of its inferior models. (Marney, 1961, p. 52)

The result was

> Darwin came through, and modern biology was no longer work for naturalists and bird watchers… Under the twistings of Spencer and Huxley, Darwin, poor Darwin, was made to make claims he never dreamed. Malthus and Mendel and Darwin, what crimes were committed in their names!…[and then] Hitler wrote them into *Mein Kampf.* (Marney, 1961, pp. 136–137)

The 1960s were a time of much turmoil in America as the American Civil Rights Movement could not progress as quickly as needed to accomplish the God-ordained equality of mankind. This was a dark time in our nation, and was characterized by unrest. But what ideology aided in both thwarting African Americans' rights and bringing so much unrest via racism raging? Marney expanded his explanations (given above) of the damage of Darwinism from its deleterious influence on biology, to its damage on society, as he argued that the ideas of Darwin were used to suppress large numbers of those evolutionists judged as "inferior people."

Ideas of the French aristocrat novelist, diplomat, and traveler Arthur de Gobineau's 1915 book, *Essay on the Inequality of the Human Races*, were also used for the same nefarious purpose. De Gobineau is best known today for helping to introduce scientific race theory in society and for developing the Aryan master race theory. He argued that aristocrats (he was one) were superior to commoners and that aristocrats possessed more Aryan genetic traits because of less interbreeding with inferior non-Aryan races.

De Gobineau's book supported the false and unbiblical belief that "The Negro people belong to a separate race of mankind. The Negro race has an entirely different ancestry [than the Whites]. The Negro race is inferior in as many capacities as possible. The Negro race has a place in the biological hierarchy somewhere between the white man and the anthropoids," and the Negro must be kept in his "inferior place" (Marney, 1961, p. 137).

De Gobineau's book was translated into German under the title *Versuch über die Ungleichheit der Menschenrassen* in 1897 by Ludwig Schemann, who was "one of the most important racial theorists of imperial and Weimar Germany" (Levy, 2005, p. 640). De Gobineau's basic conclusion was

> the superiority of the white race over others.…labeled the "Aryans," i.e., the Germanic peoples—as representing the summit of civilization. He advanced the theory that the fate of civilizations is determined by racial composition, that white and in particular Aryan societies flourish as long as they remain free of black and yellow strains, and that the more a civilization's racial character is diluted through miscegenation, the more likely it is to lose its vitality and creativity and sink into corruption and immorality…. (*Encyclopedia Britannica*, 2024)

Although Gobineau was influenced by Darwin, his work "was virtually ignored" at first and appealed to only a "handful of reactionary aesthetes." In contrast, Darwin's work "enjoyed massive success" both in acceptance and influence (Glick, 1963, p. 162). Once Darwin's work was widely accepted, Gobineau's "theory of racial deter-

minism had an 'enormous' influence upon the subsequent development of racist theories and practices in Western Europe" (*Encyclopedia Britannica*, 2024).

In support of this conclusion, Jerusalem University professor and atheist, Yuval Noah Harari's book, titled *Sapiens: A Brief History of Humankind*, summarized my book, *Hitler and the Nazi Darwinian Worldview: How the Nazi Eugenic Crusade for a Superior Race Caused the Greatest Holocaust in World History*, in just three pages. He writes: "The idea that all humans are equal is a revamped version of the monotheist conviction that all souls are equal before God." Harari then writes that the only government system that has totally broken loose from the Judeo-Christian worldview was the Nazi government. The reason why the Nazi government was different from other governments was because it was

> deeply influenced by the theory of evolution.…the Nazis believed that humankind is.…a mutable species that can evolve or degenerate. Man can evolve into a superman, or degenerate into a subhuman. The main ambition of the Nazis was to protect humankind from degeneration and encourage its [evolutionary] progression. (Harari, 2015, p. 232)

Furthermore, the Nazis taught that the Aryan race was "the most advanced form of humanity, and had to be protected and fostered, while degenerate" humans, like Jews, Roma, and the Slavic races, plus the mentally ill, had to be exterminated for the good of all humanity. The Aryan race evolved to a higher level, "whereas 'inferior' populations," such as the Neanderthals, did not evolve to the Aryan level (Harari, 2015, p. 232).

The highest-evolved race, the "Aryan race, had the finest qualities—rationalism, beauty, integrity, diligence. The Aryan race, therefore, had the potential to turn man into superman. Other races, such as Jews and Blacks, were today's Neanderthals, possessing inferior qualities. If allowed to "... intermarry with Aryans, they would adulterate all human populations and doom *Homo sapiens* to extinction" (Harari, 2015, p. 232). Therefore, in the Nazi mindset, the *inferior races* must be extinguished at all costs.

Professor Harari added that, in view of the beliefs of leading American and German scientists in 1933, that

> Nazi beliefs were hardly outside the pale. The existence of different human races, the superiority of the White race, and the need to protect and cultivate this superior race were widely held beliefs among most Western elites. Scholars in the most prestigious Western universities, including Harvard, using orthodox science methods of the day, published studies that allegedly proved that members of the White race were more intelligent, more ethical, and more skilled than Africans or [American] Indians. (Harari, 2015, pp. 232–233)

Furthermore, Harari added that "Politicians in Washington, London, and Canberra took it for granted that it was their job to prevent the adulteration and degeneration of the White race by, for example, restricting immigration from China, or even Italy, to 'Aryan' countries such as the USA and Australia (Harari, 2015, pp. 232–233).

In addition, Harari added by "following the logic of Darwinian evolution, they [the Nazis] argued that natural selection must be allowed to weed out unfit individuals and leave only the fittest to survive" to reproduce their kind (Harari, 2015, pp. 233). This view was widely taught in both leading German and American universities. These evolutionary ideas spread through American universities and eventually birthed the 1925 Scopes Trial, where it was decided that school children could no longer be taught the Biblical worldview that mankind descended from Adam and Eve. Instead, the Scopes Trial initiated teachers into being legally manipulated to teach children that humans evolved from some ape-like creature. Since 1925, over 200 court cases have supported this same scientifically illegitimate school doctrine (Bergman, 2024). Thus, only the ape-ancestor view can now be legally taught in American public schools from first grade to college.

Those persons who are suspected of teaching the view that all humans are descended from a common ancestor, which was *fully human* (e.g., Adam and/or Eve), are liable to be terminated. Even those who teach doubts about the apes-as-ancestors theory can lose their career. The example of Harvard graduate Professor Change Laura Tan is a case in point (Bergman, 2023, p. A9).

Hitler biographer Ian Kershaw records how, in Germany, the result was a self-styled national savior who was allowed to rule the most educated nation on Earth, an economically advanced and cultured land known the world over for its philosophers, musicians, and poets. Hitler's rule, built on Social Darwinism, was absolutely decisive in causing the terrible unfolding of events that occurred in the twelve tragic years of Hitler's rule (Kershaw, 2000, pp. 841). German Darwinism had "conclusively demonstrated the utter bankruptcy of the hyper-nationalistic and racist, world-power ambitions (and the social and political structures that upheld them) that had prevailed in Germany over the previous half a century, and twice taken Europe and the wider world into" the worst calamitous war that history has ever seen (Kershaw, 2000, p. 841).

Conclusions

In short, the Nazis based their inferiority-of-certain-people belief on mainstream orthodox evolutionary science, a view of reality universally accepted

in the secular Western world. The main difference between the behavior of Nazi Germany toward the inferior races and the rest of the Western world was that the Nazis carried the belief to its logical end. In contrast, in America, largely due to the influence of Christianity, moving to the logical end of Darwinism was resisted.

The Scriptures make it clear that there is only one race, the human race, and that all humans descended from Adam and Eve. Due to the German people's passiveness, Hitler was able to carry out the almost total destruction of the Jewish people in Europe. And "Hitler was the main author of a war leaving over 50 million dead and millions more grieving their lost ones and trying to put their shattered lives together again." (Kershaw, 2000, p. 841). Never before in history has such total ruination, both physical and moral, occurred. Ironically, the Nazi regime had the full support of all levels of society, especially the well-educated. Hitler's name will justifiably stand forever as the primary instigator of the most profound collapse of civilization in our modern era (Kershaw, 2000, p. 841).

The God of the Bible would never endorse or promote or use mutations chosen by survival-of-the-fittest selection to create life. If Christians would believe as passionately in our Biblically based teachings as Hitler believed in his "religious ideas," the world would be a kinder, more compassionate, loving place—for this is what Jesus taught His followers to pursue—1 Corinthians 13:4–8a!

Dr. Jerry Bergman

References

Bergman, J. 2012. *Hitler and the Nazi Darwinian Worldview: How the Nazi Eugenic Crusade for a Superior Race Caused the Greatest Holocaust in World History*. Joshua Press, Kitchener, Ontario, Canada.

Bergman, J. 2023. A Harvard-Trained Professor Expelled. *The Village Reporter*, p. A9, November 29.

Bergman, J. 2024. *The Other Side of the Scopes Trial*. Wipf & Stock Publishers, Eugene, OR.

de Gobineau, A. 1915. *Essay on the Inequality of the Human Races.* William Heinemann, London, UK.

Egan, J. 2008. *6 Million and Counting: Darwin, Hitler and Genocide, The Darwinian Crisis in America.* Third Millennium Press, Chippenham, England.

Encyclopedia Britannica. 2024. Arthur de Gobineau. French diplomat, writer, and ethnologist. https://www.britannica.com/biography/Arthur-de-Gobineau.

Glick, T. (editor). 1963. *The Comparative Reception of Darwinism*. The University of Texas Press, Austin, TX.

Harari, Y.N. 2015. *Sapiens: A Brief History of Humankind.* Harper Perennial, New York, NY.

Kershaw, I. 2000. *Hitler: 1936–1945 Nemesis*, Volume 2. W.W. Norton & Co., New York, NY.

Levy, R.S. (editor). 2005. *Antisemitism: A Historical Encyclopedia of Prejudice and Persecution*. ABC-CLIO, Santa Barbara, CA.

Marney, C. 1961. *Structures of Prejudice*. Abingdon Press, New York, NY.

Oceanic Ridges, Trenches, and Triple Junctions Contradict Hydroplate Theory

First advanced by Dr. Walt Brown in 1972, Hydroplate Theory (HPT) offers a Flood tectonic model based on a predefined set of initial conditions and pre-Flood Earth System (Brown, 2019). Its explanation of mid-ocean ridges and trenches is perhaps one of its least defensible features. This aspect of HPT is wracked with serious internal contradictions and struggles to account for the observed ridge-trench associations. In particular, because they require mutually exclusive conditions to form within HPT, several pairs of trenches and ridges in relatively close proximity should not exist, but nevertheless, they do. As this paper will explore, a careful examination of the distribution and association of oceanic ridges, trenches, and triple junctions reveals these features to contradict the basic tenets of HPT.

Origin of Oceanic Ridges and Trenches According to Hydroplate Theory

HPT begins with a pre-Flood Earth system with a globally encompassing granite shell averaging 100 km in thickness, unconformably resting upon a solid basalt subterranean chamber floor (Brown, 2019, pp. 124–125). Within the gap between the granite shell and chamber floor is a network of passageways filled with water averaging 1.6 km in thickness. At the start of the Flood, fracturing of the granite shell released this supercritical phase of water purportedly as "the fountains of the great deep" described in Genesis 7:11, and launched vast quantities of crustal debris into space

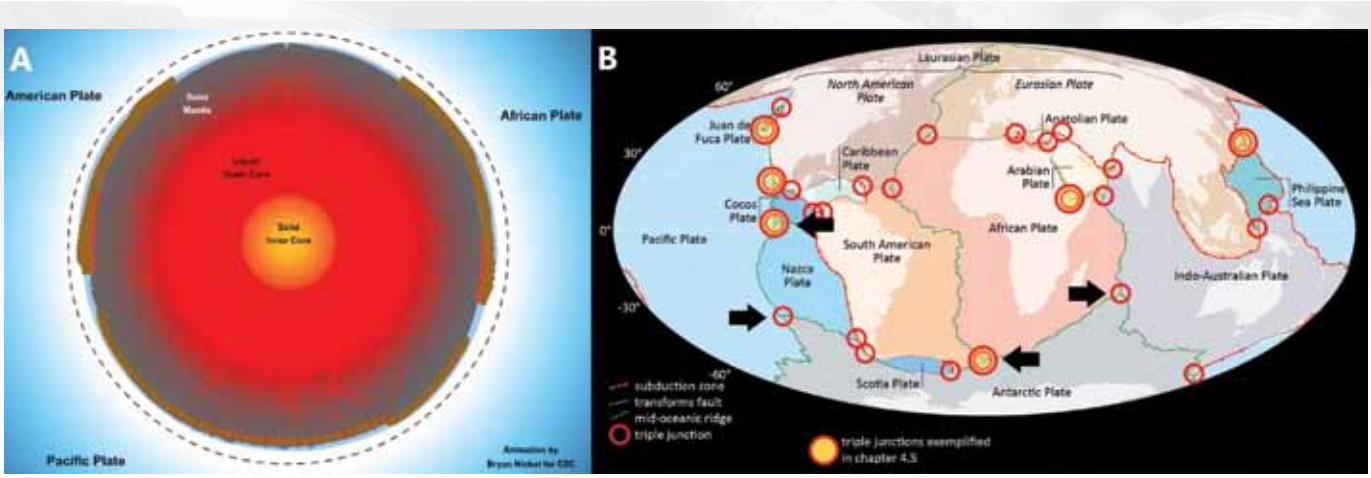

Figure 1. A) Animation by Bryan Nickel (2016) of the HPT trench-forming process. This illustrates that mid-ocean ridges (top of diagram) are believed to form from uplifted subterranean chamber floor, whereas trenches (bottom of diagram) result from shearing of the Pacific Hydroplate opposite the Mid-Atlantic Ridge. B) Distribution of major triple junctions across Earth. Arrows denote ridge-ridge-ridge (RRR) triple junctions; note that there are four despite HPT predicting one and only one. Figure modified from Meschede and Warr (2019).

to form the small solar system bodies (SSSBs) (Brown, 2019, p. 340; see also critiques in Carter and Isaacs, 2022, and Isaacs, 2023). These fountains eroded the edges of the large fractured pieces of the original granite shell, called "hydroplates," continuously expelling the eroded material to space. Eventually, the original fracture eroded to a broad chasm hundreds of kilometers wide. The reduction of pressure on the chamber floor along this fracture is claimed by HPT to cause the chamber floor to "rebound" and uplift as the Mid-Atlantic Ridge (Brown, 2019, pp. 131–133). This rebound propagated across the globe following the path eroded by the fountains of the great deep. In this way, HPT supposes that the distribution of oceanic ridges records the locations of the fountains of the great deep.

HPT proceeds then to assert that a partial vacuum beneath the uplifting Mid-Atlantic Ridge required a corresponding shift of material from the opposite side of the globe. It is this shift that HPT further claims sheared the Pacific Hydroplate from the surrounding granite shell to form the Pacific trenches (Figure 1A) (Brown, 2019, p. 159). In combination, it is claimed that the uplift of the Atlantic and the downfaulting of the Pacific created a slope

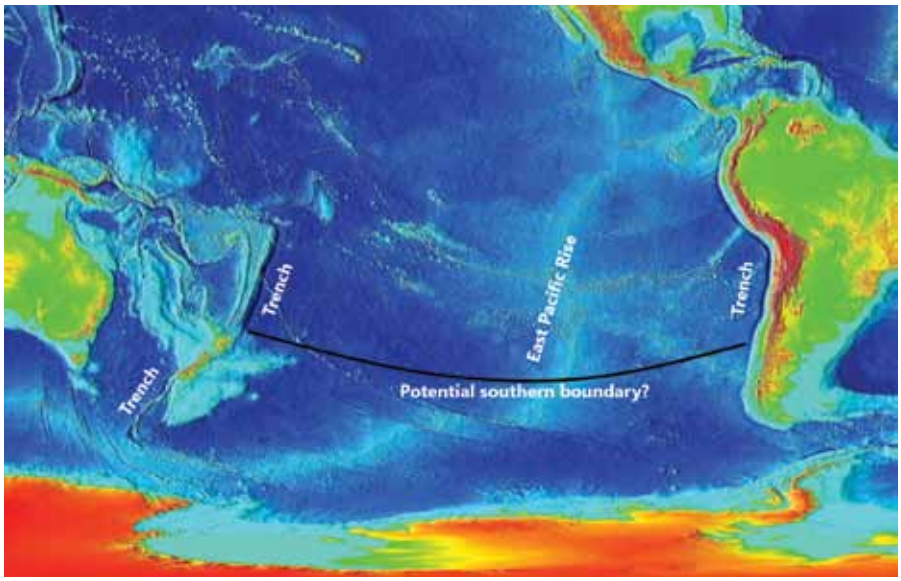

Figure 2. The East Pacific Rise is bounded by trenches to the east and west, which trace how far south the southern boundary of the Pacific Hydroplate should be based on the extent of trenches. However, no trenches or other tectonic features indicate such a boundary, making it anomalous within the HPT concept. Image in Public Domain.

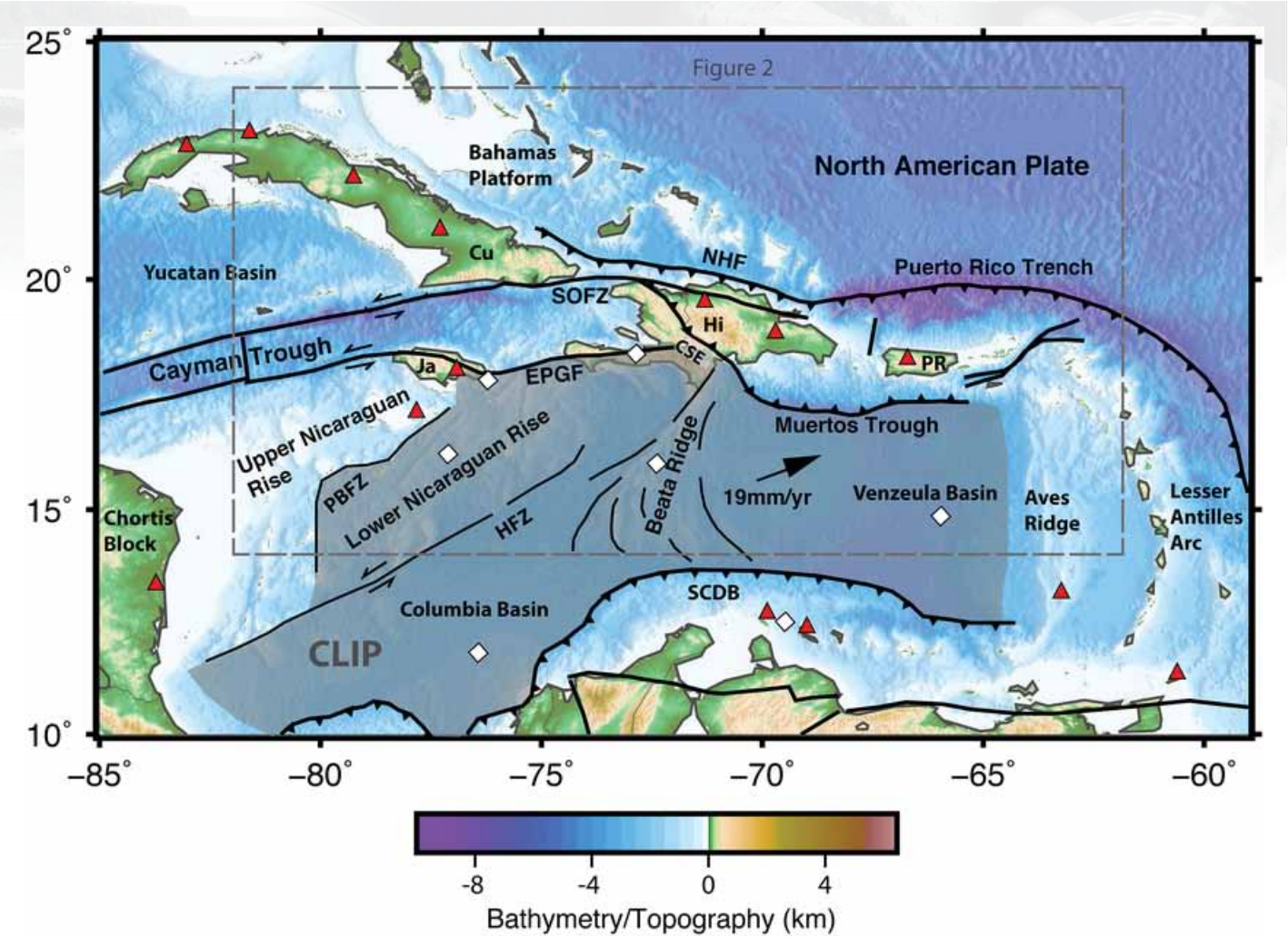

Figure 3. The Puerto Rico Trench occurs in the eastern Caribbean along the northeastern boundary of the Dominican Republic, Virgin Islands, and Puerto Rico. This trench contradicts HPT expectations by its anomalous proximity to the Atlantic, where only uplift of the subterranean chamber floor should be occurring, rather than shearing of the granite hydroplate. Further information (including details of the map and associated abbreviations) can be found in Possee et al. (2021).

along which the hydroplate fragments slid from the uplifting Mid-Atlantic Ridge and towards the downfaulting Pacific basin. These fragments, HPT asserts, eventually ground to a halt and became the primary continents. In the case of the North American Hydroplate, it allegedly gained enough velocity as it slid from the Mid-Atlantic Ridge that it overrode part of the East Pacific Rise, hiding the true extent of the network of mid-ocean ridges now beneath North America (Nickel, 2016). These claims, however, are readily contradicted by real-world observations.

More Than One Ridge-Ridge-Ridge Triple Junction

HPT expects one mid-ocean ridge-ridge-ridge (RRR) triple junction. The initial crack in the granite shell and later the mid-ocean ridges that followed would propagate in two opposite directions (Nickel, 2016). HPT contends that eventually this crack would intersect itself at what is now the Rodrigues Triple Junction (RTJ) or Central Indian Ocean Triple Junction (CITJ) (Brown, 2019, pp. 112, 125). Since a crack propagating in two opposite directions could only intersect itself once, HPT predicts there to be only one RRR triple junction. However, there are three other prominent mid-ocean RRR triple junctions: the Galapagos triple junction in the east Pacific, the Chile triple junction in the southeast Pacific, and the Bouvet triple junction in the south Atlantic (Figure 1B). This makes

four significant mid-ocean RRRs, an impossibility for HPT's initial crack.

Problematic Ridge-Trench Associations

As proposed by HPT, ridges and trenches not only form through two entirely distinct processes, but they also form in separate entities. Ridges represent rebounded chamber floors, while trenches correspond to sheared hydroplates or the granite material that rests on top of the chamber floor. A trench, then, is evidence that the subterranean chamber is deep below the hydroplate. Furthermore, that subterranean chamber should never have rebounded as the hydroplate above it was never removed. This is illustrated in Figure 1A. Trenches are fractures that propagate through a hydroplate and allow the resulting fragments to downfault, while mid-ocean ridges only occur on the subterranean floor. Consequently, ridges and trenches should never occur together.

Contrary to HPT expectations, ridges often occur in problematic locations with respect to trenches. According to HPT, the numerous trenches associated with the "Ring of Fire" or circum-Pacific Belt represent shearing along the boundary of the Pacific Hydroplate (Brown, 2019, p. 154). However, the prominent East Pacific Rise lies just west of the trenches off the eastern coast of Central and South America. This places the East Pacific Rise *within* the confines of the Pacific Hydroplate! In one segment, the East Pacific Rise and Middle America Trench almost parallel each other and lie within merely 150 km of each other, with the East Pacific Rise being found west of the Middle America Trench on what HPT considers the Pacific Hydroplate (Isaacs, 2019). As previously described, ridges are understood to be uplifted portions of the subterranean chamber floor and consequently *cannot* occur on a hydroplate or within the confines of a hydroplate. This is a clear contradiction.

No Clear Indications of the Pacific Hydroplate's Southern Boundary

One question Brown attempts to answer is the paucity of trenches along the southern boundary of the Pacific Hydroplate. Brown speculates that trenches would not form along the southern boundary of the Pacific Hydroplate because it was bounded by the fountains of the great deep.

> The Ring of Fire…marks the path of greatest shearing that resulted from melting and contraction under the Pacific [P]late prior to the continental-drift phase. Months earlier, the rupture fractured the Pacific [P]late's southern boundary, so it did not experience violent shearing. (Brown, 2019, p. 164)

However, consider both the trenches off the coast of New Zealand and Chile. These trenches run north-south on both sides of the Pacific down to latitude S40°. This bounds the East Pacific Rise on both sides, showing that the hypothetical Pacific Hydroplate extended far to the south (Figure 2). However, no east-west trenches or signs of a Pacific Hydroplate boundary can be seen, despite how the north-south trenches indicate just how far south the claimed southern boundary must be.

Trenches in the Atlantic

At its core, HPT's explanation of trenches is based on each action being accompanied by an equal but opposite effect. Uplift of the Mid-Atlantic Ridge supposedly caused downfaulting of the Pacific; because of this, trenches should be restricted to the Pacific opposite of the Atlantic. However, the Atlantic also has trenches. The Puerto Rico Trench (Figure 3) traces the northeastern boundary of the Dominican Republic, Virgin Islands, and Puerto Rico and occurs only 1500 km from the Mid-Atlantic Ridge. By comparison, Central America is over 1900 km west of this trench. A trench with such close proximity to the Mid-Atlantic Ridge is baffling for the HPT framework. The Puerto Rico Trench is far too close to the uplifted Mid-Atlantic Ridge to argue that a downfaulting hydroplate is responsible for it. Similarly, the fact that so many trenches are located on the opposite side of the globe, in the western Pacific, makes it difficult to invoke mid-ocean ridges in the western Pacific to explain this trench.

Conclusions

The Hydroplate Theory (HPT) has been viewed by some as a convincing Flood tectonic model for its perceived ability to explain the large-scale trends of trenches and ridges, yet a closer examination of the true distribution of these tectonic features illustrates HPT's shortcomings. For instance, only one ridge-ridge-ridge (RRR) triple junction could be formed from a single initial crack propagating across Earth's original granite shell, yet four prominent ridge-ridge-ridge triple junctions can be found in the Atlantic, Pacific, and Indian Oceans. Moreover, ridges and trenches are often found in baffling associations. The position of the East Pacific Rise with respect to the trenches off the western coast of South America indicates that the East Pacific Rise logically occurs within the confines of the Pacific Hydroplate. Yet according to HPT, trenches result from the downfaulting of the original granite shell, whereas mid-ocean ridges correspond to rebounded subterranean chamber floor. The existence of one in an area demands the exclusion of the other, yet both features are commonly found in close proximity. This is a glaring contradiction.

HPT struggles to account for the true extent of this network of tectonic features. The presence of trenches

in the Atlantic, more than one ridge-ridge-ridge triple junction, and the anomalous southern boundary of its hypothesized Pacific Hydroplate illustrate its inability to account for these complex structures. The origin of mid-ocean ridges and trenches is not a strength; it is instead an Achilles' heel of HPT.

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References

Brown, W. 2019. *In the Beginning: Compelling Evidence for Creation and the Flood*, 9th Edition. Mission Imperative Inc., Lebanon, PA.

Carter, R.W., and E.A. Isaacs. 2023. Hydroplate Theory energy budget falls short of expectations. *Journal of Creation* 37(1):87–93.

Isaacs, E. 2018. Hydroplate Theory—Problems for Trench Formation in the Pacific Basin. *Journal of Creation* 32(3):58–63.

Isaacs, E.A. 2019. Edward Isaacs responds: Hydroplate Theory–problems for trench formation in the Pacific Basin. *Journal of Creation* 33(2):63–64.

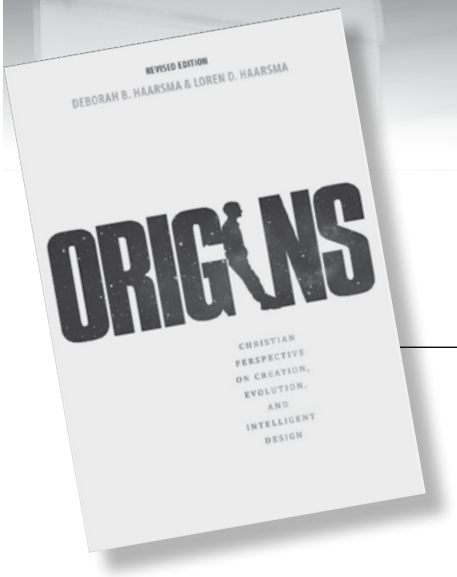
Isaacs, E.A. 2023. Are solar-driven forces sufficient for Hydroplate Theory asteroid origins? *Journal of Creation* 37(2):121–128.

Meschede, M., and Warr, L. 2019. *The Geology of Germany—A Process-Oriented Approach*.Springer, Berlin-Heidelberg, Germany.

Nickel, B. 2016. Hydroplate Theory overview: Part 6. https://www.youtube.com/watch?v=xayjxQOsexM; accessed July 13, 2025.

Possee, D., C. Rychert, N. Harmon, and D. Keir. 2021. Seismic discontinuities across the North American Caribbean Plate boundary from S-to-P receiver functions. *Geochemistry, Geophysics, Geosystems* 22(7):e2021GC009723.

Media Reviews



Origins: Christian Perspectives on Creation, Evolution, and Intelligent Design

by Deborah B. Haarsma & Loren D. Haarsma

2011, Faith Alive Christian Resources, 315 pages, $17.50 (on Amazon)

In *Origins: Christian Perspectives on Creation, Evolution, and Intelligent Design*, Deborah and Loren Haarsma attempt to reconcile evolutionary science with Christian faith, advocating for a framework in which Scripture and modern science coexist. Published in 2011, the book explores complex questions surrounding human origins, intelligent design, and Biblical interpretation. While the authors aim to present a balanced discussion, *Origins* ultimately shifts theological epistemology in a way that subordinates divine revelation to scientific consensus, raising concerns about Biblical authority and doctrinal stability.

A Fragile Foundation: Theological Adaptability vs. Biblical Authority

One of the most pressing concerns in *Origins* is its approach to Biblical interpretation. The authors propose an allegorical reading of Genesis, arguing that theological themes—not historical accuracy—should shape Christian understanding of creation. However, this approach undermines Scripture's portrayal of Adam as a historical fig-

ure. The genealogies in Genesis 5 and 11 trace human ancestry from Adam to Abraham, affirming Adam's real existence. The New Testament further solidifies this connection, with passages like Romans 5:12 and 1 Corinthians 15:22 explicitly linking salvation history to Adam's literal fall.

By reducing Adam to a symbolic character, *Origins* compels Christian doctrine into an unnatural revision to accommodate evolutionary models. This theological flexibility raises serious concerns: if Biblical interpretation must evolve alongside scientific discoveries, then Scripture ceases to be the foundational truth of faith, instead becoming subject to external intellectual trends. While engaging with science is valuable, allowing scientific consensus to dictate theology inevitably leads to doctrinal erosion. As Carl F. H. Henry warns in *Theology and Science*, Christianity faces intellectual threats not from science itself but when scientists overstep their limits and begin making metaphysical claims about reality (Olson, 2013).

This unstable approach to theology naturally extends into a broader misconception—the idea that faith and science must be reconciled by integrating evolutionary assumptions into Christian doctrine.

The False Narrative of Faith vs. Science

A central theme in *Origins* is the presumed tension between faith and science. The book suggests that the only way to bridge this divide is by adopting theistic evolution. However, this assertion rests on a misleading premise: faith and science are opposed. On the contrary, throughout history, theologians and scientists have affirmed the harmony between divine revelation and empirical discovery, showing that belief in Biblical authority does not necessitate rejecting scientific exploration.

By positioning theistic evolution as the best means of reconciling faith with science, *Origins* inadvertently reinforces the misconception that Christian doctrine must adapt to scientific consensus. Yet, this forced synthesis does not truly unify faith and science; rather, it elevates scientific assumptions above Biblical revelation, creating a system where theology is redefined through the lens of secular models.

A truly Biblical approach does not seek to fit Scripture into evolving scientific theories but instead evaluates scientific findings through the unwavering truth of divine revelation.

Scientism and Theistic Evolution: Shifting Epistemological Authority

In *Origins*, Deborah and Loren Haarsma advocate for theistic evolution as a means of integrating faith with modern scientific thought. While their approach aims to affirm both theology and empirical inquiry, it ultimately weakens Biblical epistemology by shifting theological knowledge away from divine revelation and toward prevailing scientific interpretations.

This shift reinforces scientism—the belief that empirical science is the highest or sole authority on truth—effectively reframing theology as an adaptable system rather than an absolute foundation rooted in Scripture (Moreland et al. 2017, 539–620). Allowing science to dictate theology undermines scriptural authority by subordinating divine truth to human reasoning.

Scientific advancements exposing flaws in evolutionary theory further highlight the epistemological instability in *Origins*. One example is its reliance on the outdated junk DNA argument—specifically, the Haarsmas' reference to pseudogenes as evidence for common ancestry. Initially, evolutionary models proposed that large portions of the genome were nonfunctional vestiges of unguided processes. However, modern genetics has decisively overturned this assumption, demonstrating that noncoding DNA plays essential roles in gene regulation and other biological functions.

While *Origins* does not explicitly use the term "junk DNA," the authors cite pseudogenes as supporting evidence for common ancestry—an argument increasingly challenged by contemporary research.

These discoveries further weaken the argument for unguided evolutionary processes, highlighting the necessity of reevaluating assumptions about genetic function in evolutionary theory. By continuing to rely on outdated models, *Origins* fails to account for the shifting scientific landscape, underscoring the broader epistemological concern: when theology is reshaped to fit fluctuating scientific claims, Biblical authority becomes subordinate to human interpretation rather than divine revelation.

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References

Horton, Connor A., Amr M. Alexandari, Michael G. B. Hayes, Emil Marklund, Julia M. Schaepe, Arjun K. Aditham, Nilay Shah, Peter H. Suzuki, Avanti Shrikumar, Ariel Afek, William J. Greenleaf, Raluca Gordân, Julia Zeitlinger, Anshul Kundaje, and Polly M. Fordyce. 2023. "Short Tandem Repeats Bind Transcription Factors to Tune Eukaryotic Gene Expression." *Science* 381 (1304): 22 September 2023. https://www.science.org/doi/10.1126/science.add1250.

Moreland, J. P., Stephen C. Meyer, Christopher Shaw, Ann K. Gauger, and Wayne Grudem, eds. 2017. *Theistic Evolution: A Scientific, Philosophical, and Theological Critique*. Wheaton, IL: Crossway.

Olson, Roger E. 2013. *The Journey of Modern Theology: From Reconstruction to Deconstruction*. Downers Grove, IL: InterVarsity Press.

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Submitted manuscripts should have the following organizational format:

1. Title page. This page should contain the title of the manuscript, the author's name, and all relevant contact information (including mailing address, telephone number, fax number, and e-mail address). If the manuscript is submitted by multiple authors, one author should serve as the corresponding author, and this should be noted on the title page.

2. Abstract page. This is page 1 of the manuscript, and should contain the article title at the top, followed by the abstract for the article. Abstracts should be between 100 and 250 words in length and present an overview of the material discussed in the article, including all major conclusions. Use of abbreviations and references in the abstract should be avoided. This page should also contain at least five key words appropriate for identifying this article via a computer search.

3. Introduction. The introduction should provide sufficient background information to allow the reader to understand the relevance and significance of the article for creation science.

4. Body of the text. Two types of headings are typically used by the *CRSQ*. A major heading consists of a large font bold print that is centered in column, and is used for each major change of focus or topic. A minor heading consists of a regular font bold print that is flush to the left margin, and is used following a major heading and helps to organize points within each major topic. Do not split words with hyphens, or use all capital letters for any words. Also, do not use bold type, except for headings (italics can be occasionally used to draw distinction to specific words). Italics should not be used for foreign words in common usage, e.g., "et al.", "ibid.", "ca." and "ad infinitum." Previously published literature should be cited using the author's last name(s) and the year of publication (ex. Smith, 2003; Smith and Jones, 2003). If the citation has more than two authors, only the first author's name should appear (ex. Smith et al., 2003). Contributing authors should examine this issue of the *CRSQ* or consult the Society's web site for specific examples as well as a more detailed explanation of manuscript preparation.

Frequently-used terms can be abbreviated by placing abbreviations in parentheses following the first usage of the term in the text, for example, polyacrylamide gel electrophoresis (PAGE) or catastrophic plate tectonics (CPT). Only the abbreviation need be used afterward. If numerous abbreviations are used, authors should consider providing a list of abbreviations. Also, because of the variable usage of the terms "microevolution" and "macroevolution," authors should clearly define how they are specifically using these terms. Use of the term "creationism" should be avoided. All figures and tables should be cited in the body of the text, and be numbered in the sequential order that they appear in the text (figures and tables are numbered separately with Arabic and Roman numerals, respectively).

5. Summary. A summary paragraph(s) is often useful for readers. The summary should provide the reader an overview of the material just presented, and often helps the reader to summarize the salient points and conclusions the author has made throughout the text.

6. References. Authors should take extra measures to be certain that all references cited within the text are documented in the reference section. These references should be formatted in the current *CRSQ* style. (When the *Quarterly* appears in the references multiple times, then an abbreviation to *CRSQ* is acceptable.) The examples below cover the most common types of references:

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Lipman, E.A., B. Schuler, O. Bakajin, and W.A. Eaton. 2003. Single-molecule measurement of protein folding kinetics. *Science* 301:1233–1235.

Margulis, L. 1971a. The origin of plant and animal cells. *American Scientific* 59:230–235.

Margulis, L. 1971b. *Origin of Eukaryotic Cells*. Yale University Press, New Haven, CT.

Hitchcock, A.S. 1971. *Manual of Grasses of the United States*. Dover Publications, New York, NY.

Walker, T.B. 1994. A biblical geologic model. In Walsh, R.E. (editor), *Proceedings of the Third International Conference on Creationism* (technical symposium sessions), pp. 581–592. Creation Science Fellowship, Pittsburgh, PA.

7. Tables. All tables cited in the text should be individually placed in numerical order following the reference section, and not embedded in the text. Each table should have a header statement that serves as a title for that table (see a current issue of the *Quarterly* for specific examples). Use tabs, rather than multiple spaces, in aligning columns within a table. Tables should be composed with *14-point type* to insure proper appearance in the columns of the *CRSQ*.

8. Figures. All figures cited in the text should be individually placed in numerical order, and placed after the tables. Do not embed figures in the text. Each figure should contain a legend that provides sufficient description to enable the reader to understand the basic concepts of the figure without needing to refer to the text. Legends should be on a separate page from the figure. All figures and drawings should be of high quality (hand-drawn illustrations and lettering should be professionally done). Images are to be a minimum resolution of 300 dpi at 100% size. Patterns, not shading, should be used to distinguish areas within graphs or other figures. Unacceptable illustrations will result in rejection of the manuscript. Authors are also strongly encouraged to submit an electronic version (.cdr, .cpt, .gif, .jpg, and .tif formats) of all figures in individual files that are separate from the electronic file containing the text and tables.

Special Sections

Letters to the Editor:

Submission of letters regarding topics relevant to the Society or creation science is encouraged. Submission of letters commenting upon articles published in the *Quarterly* will be published two issues after the article's original publication date. Authors will be given an opportunity for a concurrent response. No further letters referring to a specific *Quarterly* article will be published.

Editor's Forum:

Occasionally, the editor will invite individuals to submit differing opinions on specific topics relevant to the *Quarterly*. Each author will have opportunity to present a position paper (2000 words), and one response (1000 words) to the differing position paper. In all matters, the editor will have final and complete editorial control. Topics for these forums will be solely at the editor's discretion, but suggestions of topics are welcome.

Book Reviews:

All book reviews should be submitted to the book review editor, who will determine the acceptability of each submitted review. Book reviews should be limited to 1000 words. Following the style of reviews printed in this issue, all book reviews should contain the following information: book title, author, publisher, publication date, number of pages, and retail cost. Reviews should endeavor to present the salient points of the book that are relevant to the issues of creation/evolution. Typically, such points are accompanied by the reviewer's analysis of the book's content, clarity, and relevance to the creation issue.

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47	☐	☐	☐	☐
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49	☐	☐	☐	☐

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Creation Research Society

History—The Creation Research Society was organized in 1963, with Dr. Walter E. Lammerts as first president and editor of a quarterly publication. Initially started as an informal committee of 10 scientists, it has grown rapidly, evidently filling a need for an association devoted to research and publication in the field of scientific creation, with a current membership of over 600 voting members (graduate degrees in science) and about 1000 non-voting members. The *Creation Research Society Quarterly* is a peer-reviewed technical journal. It has been gradually enlarged and modified, and is currently recognized as one of the outstanding publications in the field. In 1996 the *CRSQ* was joined by the newsletter *Creation Matters* as a source of information of interest to creationists.

Activities—The Society is a research and publication society, and also engages in various meetings and promotional activities. There is no affiliation with any other scientific or religious organizations. Its members conduct research on problems related to its purposes, and a research fund and research center are maintained to assist in such projects. Contributions to the research fund for these purposes are tax deductible. As part of its vigorous research and field study programs, the Society operates the Van Andel Creation Research Center in Glendale, Arizona.

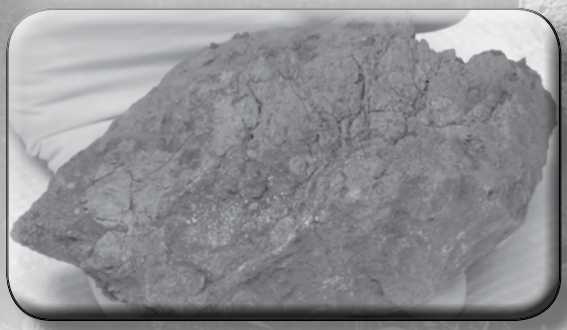
Membership—Voting membership is limited to scientists who have at least an earned graduate degree in a natural or applied science and subscribe to the Statement of Belief. Sustaining membership is available for those who do not meet the academic criterion for voting membership, but do subscribe to the Statement of Belief.

Statement of Belief—Members of the Creation Research Society, which include research scientists representing various fields of scientific inquiry, are committed to full belief in the biblical record of creation and early history, and thus to a concept of dynamic special creation (as opposed to evolution) both of the universe and the earth with its complexity of living forms. We propose to re-evaluate science from this viewpoint, and since 1964 have published a quarterly of research articles in this field. *All members of the Society subscribe to the following statement of belief:*

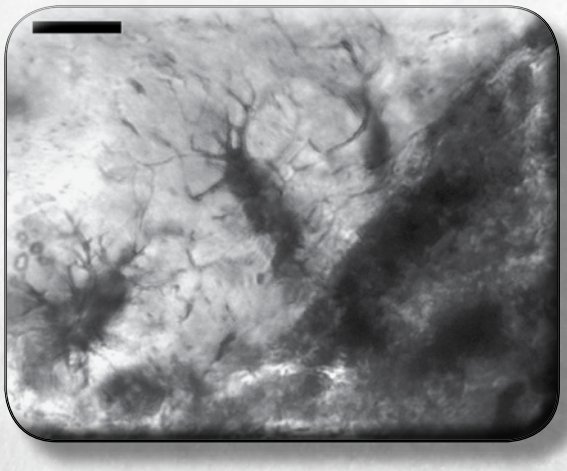
1. The Bible is the written Word of God, and because it is inspired throughout, all its assertions are historically and scientifically true in all the original autographs. To the student of nature this means that the account of origins in Genesis is a factual presentation of simple historical truths.
2. All basic types of living things, including humans, were made by direct creative acts of God during the Creation Week described in Genesis. Whatever biological changes have occurred since Creation Week have accomplished only changes within the original created kinds.
3. The Great Flood described in Genesis, commonly referred to as the Noachian Flood, was a historical event worldwide in its extent and effect.
4. We are an organization of Christian men and women of science who accept Jesus Christ as our Lord and Savior. The act of the special creation of Adam and Eve as one man and woman and their subsequent fall into sin is the basis for our belief in the necessity of a Savior for all people. Therefore, salvation can come only through accepting Jesus Christ as our Savior.

iDINO II

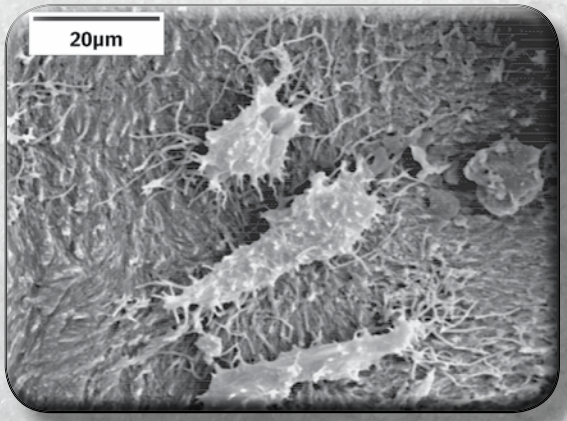
Investigation of Dinosaur Intact Natural Osteo-tissue



A fragment of the *Triceratops* brow horn. Fragments, such as this one, still contain tissue and cells.



Microscopic examination of tissue extracted from a *Triceratops* horn reveals bone cells still present.



Electron microscope picture of intact bone cells still in tissue extracted from a *Triceratops* horn.

How can pliable, stretchable tissue survive inside dinosaur fossils for over 65 million years?

How can this tissue still contain intact cells and even dinosaur proteins?

How can this fragile biological material survive for so long?

The answer to these questions directly challenges the current, evolutionary-biased, geologic timescale.

The Creation Research Society began its iDINO research initiative for the purpose of studying soft tissue in dinosaur fossils. The first phase of the project detected pliable, unfossilized tissue in a brow horn of a *Triceratops*. Within this tissue were intact osteocytes (bone cells). Some results from the iDINO project have been published in a technical microscopy journal and presented at an international microscopy conference. The Spring 2015 issue of the *Creation Research Society Quarterly* also features a special report of the iDINO project. Plus, to further spread the important information about soft tissue, the Society is developing a video (Echoes of the Jurassic).

The **second phase** of the project (iDINO II) will look more extensively at the process of tissue preservation. Evolutionists have offered various theories of how this tissue could survive for millions of years. iDINO II will methodically investigate these preservation claims, assessing their plausibility.

The iDINO results have already provided a strong challenge to the evolutionary worldview. More extensive and detailed examination may provide even stronger evidence that the age of dinosaur fossils is far less than 65 million years. To this end, the Society continues to seek those willing to fund this project with either one-time gifts or monthly donations.

For more information contact us at (928) 636-1153 or crsvarc@crsvarc.com.

Also visit http://tinyurl.com/nphm2c4 for project updates and details.