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ARTICLE

Cognitive Styles Used in Evidence Citation by Ancient Christian Authors: The Psychology of a Major Ancient Controversy over the Historicity of the Pentateuch, and Its Implications for Science Education Today

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Cognitive experiential self-theory recognizes two cognitive styles that humans use as modes of everyday thinking – experiential thinking and rational thinking – which appear to be products of two functional systems in the brain. These cognitive styles are diagnosable in writing samples of authors who cite evidence in support of a position. Here, I report an analysis of writing samples of opponents in a momentous ancient controversy. Christian authors of the first five centuries disagreed as to whether the stories in the Pentateuch were literal, accurate records of history that could be interpreted allegorically (the literocredist camp) or included non-historical stories that were allegory only (the allophorist camp). Cognitive analysis of their evidence citations reveals a predominance of experiential thinking in literocredists and rational thinking in allophorists in reference to this question. This finding augments those of previous studies that implicate the experiential thinking system as the source of today's biblical literocredism, and shows that the connection between experiential thinking and literocredism is millennia-old. This study also reveals that the allophorist position was dominant among Christian writers in the first three centuries and that the literocredist position did not rise into prominence until the fourth century, suggesting a major cognitive shift among theologians in that century. These findings elucidate the psychology of a prominent ancient controversy but also are relevant to current science education, because the literocredist mindset continues today as anti-evolution bias. The role of cognitive style in such bias has profound implications for classroom strategies for conceptual change.

Introduction

Cognitive experiential self-theory recognizes two cognitive styles that humans use as modes of everyday thinking: experiential thinking (also called intuitive cognitive style or System 1 processing) and rational thinking (also called analytical cognitive style or System 2 processing). The two cognitive styles appear to correspond to two different systems that the brain uses to process information (Epstein et al., 1992; Lindeman, 1998; Niemenen et al., 2015). Experiential thinking is the default mode in humans and appears to be the evolutionarily older of the two (Epstein et al., 1992; Lindeman, 1998). It is based on concrete information and personal experience. It is the faster of the two cognitive styles, and its speed makes it useful for most day-to-day tasks. However, its analyses of evidence often involve logical fallacies, and its conclusions are not as reliable as those of rational thinking. It is also heavily influenced by emotion, making its conclusions difficult to change even in the face of contrary evidence. In contrast, rational thinking is abstract and is based on logic and unemotional analysis of evidence. It is useful in objective analysis and its conclusions are more reliable than those generated by experiential thinking, but it is slow and demanding. Different people use the two cognitive styles in different proportions, with some relying more on experiential thinking and others relying more on rational thinking when making decisions (Epstein et al. 1992; Lindeman, 1998).

Textual analysis is an effective tool for determining which of the two cognitive styles is employed in the rationale for a position on a topic (Niemenen et al., 2015). When a person writes on a specific topic or responds to a question, the response or writing sample may contain clues as to which cognitive style the writer used to address that topic (Pennycook et al., 2012; Shenhav et al., 2012; Razmyar & Reeve, 2013; Gervais, 2015; Djulbegovich et al., 2015; Niemenen et al., 2015). As a result, when an author cites evidence in support of a position, that citation can be examined for signs of rational thinking or experiential thinking. For example, Niemenen et al. (2015: 4–12) found that the ‘evidence’ that anti-evolution authors cite against evolutionary theory in their writings generally consists of logical fallacies, confirmation bias (the tendency to emphasize only the bits of information that support one’s argument even if the rest of the available information contradicts the argument), and irrelevancies, all of which are indicative of experiential thinking.

Here, I present a textual analysis of a collection of ancient writings in which evidence citation reveals a difference in cognitive styles between the proponents of opposite sides of a major controversy. Christian authors of the first five centuries disagreed as to whether the Pentateuch (the five volumes of the Hebrew Torah, which became the first five books of the Old Testament of the Christian Bible), were accurate historical records or included non-historical stories. Authors on both sides of the controversy used allegorical interpretation—in which characters, places, and events are treated as symbols of spiritual principles—to extract deeper spiritual meaning from the Pentateuch than was evident from its literal wording alone. Authors in one camp considered the Pentateuch's narratives to be historically accurate accounts that simultaneously possessed hidden meanings that could be found by allegorical interpretation and which were spiritually useful (Schaff, 1984; Schaff & Wace, 1988; Roberts & Donaldson, 1994). Authors in the other camp considered some or all of the Pentateuch's narratives to be a special brand of historical fiction that placed historical characters and places into non-historical stories that possessed hidden meanings that could be found by allegorical interpretation and which were spiritually useful (Mahlerbe & Ferguson, 1978; Schaff & Wace, 1988; Roberts & Donaldson, 1994). The latter camp considered the hidden meanings the true meaning of the stories and considered the literal wording a veneer that veiled the stories' true meaning.

The two camps could be labeled literalist and allegorist camps respectively, but this would be an oversimplification since both camps utilized allegorical interpretation, so in a sense both camps were allegorist. Here, therefore, I have coined the terms literocredist and allophorist for the two camps. The literocredist ('letter-believing', from the Latin *littera* [letter] and *credere* [to believe]) camp accepted the letter of the Pentateuch as historically accurate, despite using allegorical interpretation to find deeper meaning in the Pentateuch. The allophorist ('different-bearing' or 'other-bearing', from the Greek *ἄλλος* [different/other] and *φορέω* [to bear]) camp did not accept the letter of the Pentateuch as historically accurate and thought that the Pentateuch bore a hidden meaning beneath the literal wording and that this other, different meaning was its true meaning. It should be noted that within the allophorist category is a spectrum of ancient opinions as to how much of the Pentateuch

to take literally, with some ancient authors accepting some parts of the Pentateuch as accurate history and others accepting none of it as accurate history. However, ancient authors at all points on the allophorist spectrum had in common the opinion that it is incorrect that the *entire* Pentateuch is an accurate record of past events. In contrast, the authors in the literocredist camp accepted the entire Pentateuch as a literal and accurate record of past events.

A plethora of ancient writings survives from authors on both sides of the controversy, and several authors cited evidence for their positions (**Table 1**). The different categories of evidence that are cited correspond to specific cognitive styles. Here, I present a review of such evidence citations, to contrast the cognitive styles revealed by the cited categories of evidence. To fully grasp the implications of the data in such writings it is important to understand that in the first few centuries of the Christian Era the Pentateuch was typically treated as a single, five-volume work called the Pentateuch, the Torah, the Book of Moses, or the Law. The five volumes became the first five books of the Old Testament of the Christian Bible: Genesis, Exodus, Leviticus, Numbers, and Deuteronomy. Genesis tells the story of creation, Noah's Flood, and the lives of the patriarch Abraham and his family. The next four books tell the story of the Israelites' enslavement in Egypt, their exodus, their subsequent journey to Canaan, and the delivery from God to Moses of numerous legal and ritual regulations. Because the early Christians considered the Pentateuch a single composition, doubt as to the historicity of any part of it extended to the whole of it, as Gregory of Nyssa noted (Mahlerbe & Ferguson, 1978: 112–13).

Methods

Choosing texts for inclusion in the study

I used two criteria to select early Christian texts for inclusion in this study: (1) that the text is from one of the first five centuries of the Christian Era, and (2) that its wording reveals whether or not the author considered the Pentateuch to be a literal, accurate record of history. The writings of the New Testament and the Apostolic Fathers meet the first criterion. To determine whether they meet the second criterion, I read through all of them and identified passages addressing the historicity of the Pentateuch.

Author and stance	Written composition and passages that reveal stance	Summary or quote of passages that reveal stance	Evidence cited
Philo of Alexandria: A	Allegorical Interpretation One, 2.2, 9.21 – 12.32, 14.43 – 47, 17.56 – 18.59, 19.63 – 27.85 (Yonge, 2006)	God did not actually create the world in six days. In Genesis 1, heaven and earth are symbols of mind and body, and the plants and animals are symbols of mental processes, as are the waters that watered the garden. The making of the man from earth plus breath-of-life symbolizes the dual (partly physical, partly spiritual) nature of humankind. Paradise (Eden) is a metaphor for a state of virtue, and its trees and rivers symbolize particular virtues.	It is impossible to have time divided into days before the creation of the sun, which determines the length of a day (VN). Adam and Eve continued to live long after eating the fruit that they were told would cause their deaths (CP).
Allegorical Interpretation Two, 7.19 (Yonge, 2006)		It is ridiculous to think that a woman was made from the rib of a man.	A human cannot be made from another human's rib (VN).

Epistles of the New Testament (first century)

Paul: A	<p>First Epistle to the Corinthians, 10:4–13, 15:44–49 (Berry, 1993)</p> <p>Adam (part earth, part breath-of-life, Genesis 2:7) represents humankind's dual nature: partly physical and partly spiritual. In the exodus story, the rock from which water flowed (Exodus 17:1–7) is Christ. The cloud that accompanied the Israelites (Exodus 13:21) and their passage through the sea (Exodus 14:21–22) are metaphors related to baptism. See Appendix 1.</p> <p>Epistle to the Galatians, 3:16, 3:29, 4:21–31 (Berry, 1993)</p> <p>God's promise to Abraham about his seed (Genesis 15 and 17) is a metaphor for Christ and Christians. The story of Hagar and Ishmael (Genesis 16 and 21) is allegory.</p> <p>Epistle to the Ephesians, 5:31–32 (Berry, 1993)</p> <p>The joining of Adam and Eve as one flesh (Genesis 2:21–24) refers to Christ and the Church.</p>
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(Contd.)

<p>First Epistle to Timothy, 1:4–7 (Berry, 1993)</p>	<p>Paul uses the term ‘myths’ for the narratives promoted by a literocredist faction whose members want to teach the Law but do not understand it (which equates literocredism with lack of understanding). See Appendix 1. The <i>peritomēs</i> (a literocredist faction; see also Galatians 2:12, Ephesians 2:11) are ‘empty-talkers’ and ‘mind-deluders’; the Pent. regulations upon which they insist are ‘commandments from men’ (in contradiction to the Pent., which says that they are commands from God) and are based on ‘Jewish myths’. See Appendix 1.</p>
<p>Paul and Timothy: A Epistle to the Colossians, 2:8–23 (Berry, 1993)</p>	<p>Pent. regulations are veiled prophecies of Christ. The instructions to literally observe them come not from God but from man.</p>

anonymous: A	Epistle to the Hebrews, 3:7 – 4:11, 10:1–10 (Berry, 1993)	God's rest on the seventh day (Genesis 2:2–3) represents a spiritual state into which an obedient believer can enter, as does entering the Promised Land. The promise of entry into the Promised Land is an ongoing (metaphorical) promise, not a past event. The Pent. animal sacrifice commands contradict other biblical passages.	Animal sacrifice cannot atone for sin, but the Pent. says it can (VS). The prophet David states that God does not want animal sacrifices and is not pleased by them (Psalm 40:6), which contradicts the Pent. (CS).
?Peter: A	First Epistle of Peter, 3:20–21 (Berry, 1993)	Cleansing of the heart is the antitype of (that which is symbolized by) the Genesis Flood. See Appendix 1.	

Extrabiblical compositions by Christian authors of the first century

(Contd.)

?Barnabas: A	Epistle of Barnabas, 2.4–8, 6.10, 6.16–17, 7.6 – 8.2, 10.1–9 (Holmes, 2007)	God doesn't want literal animal sacrifices and did not command them. The Israelites' entry into a 'land of milk and honey' is a parable. An impossible command in Genesis is a clue that the text should not be taken literally. What appear to be ritual regulations are actually prophecies of Christ and symbolic instructions for spiritual life.	God states, through the prophets, that he neither commanded nor wants animal sacrifices (Isaiah 1:11–12; Jeremiah 7:21–22), which contradicts the Pent. (CS). God's command to rule over fish and birds and beasts (Genesis 1:28) is impossible to follow (VN).
Clement of Rome: A	First Epistle of Clement, 29.2 – 30.1 (Holmes, 2007)	In Deuteronomy 4:34 (in which God says Israel is a nation taken out of other nations) Christians are the ones to whom God refers as 'Israel'.	
Pseudo-Clement	Second Epistle of Clement, 2.1–3, 14.2 (Holmes, 2007)	Isaiah's (54:1) reference to barren Sarah delivering a child (cf. Galatians 4:27) prophesies the Church bearing Christians as children.	
1: A		In the phrase 'God created humankind male and female' (Genesis 1:27), the male is Christ and the female is the Church.	

Compositions by Christian authors of the second century

anonymous: A	Epistle to Diognetus, 4.1–5 (Holmes, 2007)	Literal observance of Pent. regulations involves violations of moral and spiritual principles.	Literal observance of Pent. regulations involves violations of moral and spiritual principles (VS).
?Pantaenus: A	appendix to Epistle to Diognetus, 11.1 – 12.9 (Lightfoot, 1898; Holmes, 2007)	The author explains the Paradise (Eden) narrative (Genesis 2) as a veiled reference to spiritual things that happen inside a believer and prefaces this explanation with insistence that this sort of exigesis is valid, because it was taught by the incarnate Logos [Jesus] to apostles, who taught it to him.	

(Contd.)

Clement of Alexandria: A	Stromata, 5.6, 5.11, 6.15 (Roberts & Donaldson, 1994)	'It were tedious to go over all...the Law, specifying what is spoken in enigmas; for almost the whole Scripture gives its utterances in this way'. God does not desire sacrifices, which contradicts the Pent. Scripture is written in parables. 'Moses, describing allegorically the divine prudence, called it the tree of life planted in Paradise'. 'The serpent in Eden allegorically symbolizes pleasure crawling on its belly'. Ignatius calls the Pent. narratives myths by admonishing readers not to engage in Jewish practices that come from 'myths told to the ancients'. The ancients lived for hundreds of years, as recorded in Genesis. Pent. regulations and narratives are symbolic prophecies of Christ. Animal sacrifices are not meant to be literally performed. The story of Noah is a symbol of salvation through Christ.	The God who forbade the making of graven images (Exodus 20:4) would not have literally meant to make golden cherubim figures (Exodus 25:17) (VS). God states that he does not desire animal sacrifices (Psalm 50:9, 50:13), which contradicts the Pent. (CS).
Ignatius of Antioch: A	Exhortation to the Heathen, 11 (Roberts & Donaldson, 1994) Epistle to the Magnesians, 8–10 (Holmes, 2007)		
Irenaeus of Lyons: L	Against Heresies, 5.5 (Roberts & Donaldson, 1994)		
Justin Martyr: A?	Dialogue with Trypho, 40 – 42, 86, 91, 134, 138 – 139 (Roberts & Donaldson, 1994)		

Theophilus of Anti-och: L	Theophilus to Autolyucus, 2.13, 2.19, 2.23, 2.24, 2.28, 2.30, 3.28–29 (Roberts & Donaldson, 1994)	Theophilus explains the first days of creation, the mist watering Paradise, and the creation of Eve in a literalistic fashion. He assumes the literal historicity of the characters in the early Genesis genealogies and cites the physical existence of the Tigris and Euphrates as evidence that Eden is a physical place. He uses Pent. chronology to calculate ancient dates.	The labor pains of women (PE) and the fact that snakes crawl on their bellies (PE) are proof of the reality of the curse from Genesis 3. Paradise (Eden) must have been a physical place, because the Tigris and Euphrates (Genesis 2:10–14) exist (PE). The writings of the Chaldean philosopher Berosus corroborate the Flood and some other points of history in the Pent. (AA); see Appendix 3.
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Compositions by Christian authors of the third century

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anonymous: A?	<p>Treatise against Novatian, 2 – 6 (Roberts & Donaldson, 1994)</p> <p>The deluge that pounded the Ark symbolizes persecution of the Church. The raven that did not return to the Ark symbolizes apostates who leave the Church. The return of the dove symbolizes the repentance of lapsed believers, and in its carrying olive leaves it is a double symbol that represents both the faithful and the Holy Spirit.</p>
Cyprian of Carthage: A?	<p>Treatise 12: Three Books of Testimonies against the Jews, 1.19–21, 2.16, 2.20–21, 2.25 (Roberts & Donaldson, 1994)</p> <p>On the Hexameron, fragment (Roberts & Donaldson, 1994)</p> <p>Paradise (Eden) must have been a physical place, because the rivers that watered it (Genesis 2:10–14) exist (PE).</p>
Hippolytus: L	<p>Paradise (Eden) was a physical location.</p> <p>Hippolytus uses Pent. chronology to calculate ancient dates. He says the relics of Noah's Ark still exist.</p> <p>Relics of Noah's Ark still exist in the Ararat vicinity (PE); see Appendix 3.</p>

Julius Africanus: L	Chronography, fragments (Roberts & Donaldson, 1994)	Julius uses Pent. chronology to calculate ancient dates.	Jacob's tent was preserved at Edessa until the time of the Roman Empire (PE). The terebinth tree under which Jacob buried the family's idols (Genesis 35:4) is known and revered by locals (PE). The tombs of Abraham and Isaac still exist (PE). The exodus of the Hebrews from Egypt is recorded by Polemo (AA), Herodotus (AA), Apion (AA), and Ptolemy (AA); see Appendix 3.
Novatian: A	On the Jewish Meats, 2 – 3 (Roberts & Donaldson, 1994)	The Law is meant figuratively; its precepts are symbols of spiritual principles.	According to Paul the Law is 'spiritual' (non-literal) (NT). God's calling certain animals unclean (Leviticus 11) is inconsistent with his previously having called them good (Genesis 1) (CP).
Origen of Alexandria: A	Against Celsus, 3.40 (Roberts & Donaldson, 1994)	'We are of the opinion that the literal acceptance of the laws [in the Pent.] is not that which conveys the meaning of the legislation'.	Paul's writings teach that the Pent. is not to be taken literally (NT).

(Contd.)

<p>Homily 5 on Genesis, 2 (Heine, 1981)</p>	<p>The story of Lot is allegory. Quotes from Paul's epistles support this interpretation.</p>	<p>Paul's writings teach that the Pent. is not to be taken literally (NT).</p>
<p>Homily 6 on Genesis, 1 (Heine, 1981)</p>	<p>'If anyone wishes to hear and understand these words [the story of Abraham and Abimelech] literally...let him hear Paul saying "the Law is spiritual", declaring that these words are allegorical when the Law speaks of Abraham and his wife and sons'.</p>	<p>Paul's writings teach that the Pent. is not to be taken literally (NT).</p>
<p>Homily 10 on Genesis, 4 (Heine, 1981)</p>	<p>'In these stories history is not being narrated, but mysteries are interwoven'.</p>	
<p>Homily 1 on Exodus, 5 (Heine, 1981)</p>	<p>'These words were not written to instruct us in history, nor must we think that the divine books narrate the acts of the Egyptians'.</p>	
<p>Homily 2 on Exodus, 1 (Heine, 1981)</p>	<p>Certain parts of the story of Moses are impossible and were '...written not to relate ancient history...[but you should] understand that these things which are said also happen now not only in this world, which is figuratively called Egypt, but in each of us also'.</p>	<p>It makes no sense that because the midwives feared God they built houses for themselves (Exodus 1:21, LXX) (NS).</p>

Homily 5 on Exodus, 1 (Heine, 1981)	The Apostle Paul taught that the Pent. is not to be taken literally, even the exodus story.	Paul's writings teach that the Pent. is not to be taken literally (NT).
Homily 1 on Leviticus, 1.1 (Barkley, 1990)	The ritual regulations in Leviticus are not meant literally.	
Homily 3 on Leviticus, 3.1, 6.1–2 (Barkley, 1990)	The regulations in Leviticus are meant figuratively.	The declaration that anyone who touches a corpse is unclean (Leviticus 5:2–3) makes no sense, because it means the corpse of a prophet is unclean and that a live prophet becomes unclean by touching a corpse to raise the dead, and by making buriers unclean it prevents burial of the dead (NS).
Homily 4 on Leviticus, 7:1–3 (Barkley, 1990)	The regulations in Leviticus are meant figuratively.	
Homily 7 on Leviticus, 4.1–5 (Barkley, 1990)	The Apostle Paul taught that the Pent. is not to be taken literally, even the dietary laws.	Paul's writings teach that the Pent. is not to be taken literally (NT).

(Contd.)

Homily 16 on Leviticus, 2.2–3, 5.4 (Barkley, 1990) The rewards for following the Pent. commands—
including rain and abundant food (Leviticus 26:3–8)—must be meant figuratively, because literally they are granted even to those who don't follow the commands (VS).

<p>On First Principles, 4.1.13, 4.1.16–17, 4.1.19–21 (Roberts & Donaldson, 1994)</p>	<p>The Apostle Paul taught that the Pentateuch is not to be taken literally. Absurdities and incongruities in the Pent. narratives, unnecessary regulations, and regulations that are impossible to follow, are clues that the text should not be taken literally. 'And who is so foolish as to suppose that God, after the manner of a husbandman, planted a paradise in Eden, toward the east, and placed in it a tree of life, visible and palpable, so that one tasting of the fruit by the bodily teeth obtained life?...I do not suppose that anyone doubts that these things figuratively indicate certain mysteries'.</p>	<p>Paul's writings teach that the Pentateuch is not to be taken literally (NT). It is impossible to have three days (Genesis 1:1–13) without the sun, moon, and stars (Genesis 1:14–19) (VN); or to gain life or knowledge of good and evil by eating a fruit (Genesis 2:9) (VN). It is senseless to command that a child be destroyed for not being circumcised (Genesis 17:14, LXX) (VS). The "goat-stag" (Deuteronomy 14:4–5, LXX) is a nonexistent animal (VN). The Pent. forbids the eating of the griffin (Leviticus 11:13, LXX), which no human can subdue anyway (NS). It also forbids the eating of the vulture (Leviticus 11:14), a repulsive bird that no one would eat anyway (NS). The Pent. command to remain seated all day on the Sabbath (Exodus 16:29) is impossible to follow (VS).</p>
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Pseudo-Clement 2: L	Recognitions of Clement, 27 – 36 (Roberts & Donaldson, 1994)	The author treats the Pent. stories as history.	Bones of giants (Genesis 6:4) are dis- played in some places, confirming their physical existence (PE).
Tertullian of Carthage: A	Against Marcion, 3.5, 5.13 (Roberts & Donaldson, 1994)	Pent. stories have characteristics of 'prophetic announcement': 'that future events are... announced as if they are already passed' and that 'many events are figuratively predicted by means of enigmas and allegories and parables, and that they must be understood in a sense different from the literal description'. The Apostle Paul taught that the Pent. is prophetic and figurative, not meant literally.	Paul's writings teach that the Pentateuch is not to be taken literally (NT).

Compositions by Christian authors of the fourth century

Ambrose of Milan: A	On Abraham, Book 2 (Tomkin- son, 2000)	Ambrose opens the book by explaining that Abraham symbolizes the mind in its spiritual journey, and the rest of the book explains the symbolism of the episodes in Abraham's life.
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	Paradise, 2.11 – 3.23, 13.65–66, 15.73 (Savage, 1961)	Ambrose interprets the characters and events in the Eden story as symbols of the soul cultivating virtues but being deceived by sensory pleasures. The Law is spiritual and should not be interpreted in a material manner.
Aphrahat: L	Demonstration Twenty-one, 4 (Schaff & Wace, 1988)	Aphrahat uses Pent. chronology to calculate the date of the destruction of Sodom.
Athanasius: L	Festal Letter Nineteen, 3 – 4 (Schaff & Wace, 1988)	God's instructions for animal sacrifices were meant to be literally followed. The statements by the Prophets to the contrary refer to God's preference against such sacrifices, and God's reason for ordaining the sacrifices despite his preference was to ensure that the Israelites—who were intent on worshipping in that manner—sacrificed to Him instead of to an idol.

(Contd.)

Basil the Great: L	Homily 9 on the Hexaemeron, 1 (Schaff & Wace, 1988)	<p>'I know the laws of allegory...There are those truly who do not admit the common sense of the Scriptures, for whom water is not water, but some other nature, who see in a plant, in a fish, what their fancy wishes...For me grass is grass...I take all in the literal sense'.</p> <p>In Genesis 1, separation of the waters by the firmament should not be understood in its literal sense, nor should the gathering of the waters to expose dry land. These are symbols of operations of the mind. The cloaks of skin in Genesis 3:21 are not literal skins but symbols of the physical body. Human women cannot conceive the offspring of angels.</p> <p>The historical sense of the Scriptures is correct.</p> <p>Those who interpret the Scriptures as allegory ought not do so.</p>
Didymus the Blind: A	On Genesis, 20, 26, 106, 152 (Nautin, 1978)	<p>It is not possible for human women to conceive the offspring of angels (Genesis 6:1–4) (VN).</p>
Diodorus of Tarsus: L	Commentary on Psalms 1 – 51, Preface (Hill, 2005)	<p>The historical sense of the Scriptures is correct.</p> <p>Those who interpret the Scriptures as allegory ought not do so.</p>

Ephrem the Syrian:	Commentary on Genesis, 1.1	'Let no one think there is anything allegorical in the works of the six days. No one can rightly say that the things that pertain to those days were symbolic'.
L	(Matthews & Amar, 1994)	
Epiphanius of	Letter to John, Bishop of Jerusalem, 5 (Schaff & Wace, 1988)	Adam and Eve were real people, and Eden was a real, physical place. It is incorrect to interpret the Eden narrative as allegory. Paradise (Eden) must have been a real place, because it included the Nile and the Euphrates (2:10–14), which are real (PE).
Salamis: L		
Eusebius of Caesarea: L	Chronicon, 1.24–29 (Pearse, 2014)	Eusebius uses Pent. chronology to calculate ancient dates and considers the Genesis Flood historical. Fossils of fishes in mountaintop strata are evidence of the historicity of the Flood (PE).
Gregory of Nyssa: A	The Great Catechism, 5, 8 (Schaff & Wace, 1988)	'Moses...[is] placing doctrines before us in the form of a story'. In Genesis 'doctrine...is set before us by Moses under the disguise of an historical manner'.

(Contd.)

<p>Life of Moses, 2.91–92, 2.103–105, 2.1112–113, 2.155, 2.219–220 (Mahlerbe & Ferguson, 1978)</p>	<p>The narrative of the exodus is symbolic of spiritual principles. Absurdities and incongruities in the text are clues that it is not to be taken literally.</p>	<p>It is unjust that infants should die for someone else's sin (Exodus 11:4–7, 12:29–30) (VS). It is incongruous for God to have given the Israelites instructions on how to cook and dress during the Passover meal (Exodus 12:1–11), because such details are unimportant for virtue (NS). It would have been unjust for God to have literally commanded the Israelites to plunder the Egyptians (Exodus 12:35–36) (VS). It is absurd for God to have commanded the Israelites to wash their clothes before his appearance (Exodus 19:10), because clothing stains are irrelevant to spiritual progress (NS). The Pent. says that God spoke with Moses face to face (Exodus 33:11) but also that God refused to allow Moses to see his face (Exodus 33:20) (CP).</p>
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Hilarius of Poitiers: L	Book of Mysteries, 1.3, 1.32 (Brisson, 1947)	Pent. events were real events but they occurred in such a way as to prophesy the advent of Christ
Jerome: L	Letter 53: to Paulinus, 8 (Schaff & Wace, 1988)	The books of the Pentateuch are plain, straightforward narratives.
John Chrysostom: L	Homily 13 on Genesis, 13 (Hill, 1896)	The Garden of Eden was a literal, physical place.
Lactantius: L	The Divine Institutes, 2.14, 4.10, 7.14 (Schaff & Wace, 1988)	Lactantius recounts the story of Noah and the story of the exodus as literal history, and says the world was created in six days.
Methodius of Olympus: L	Banquet of the Ten Virgins, 3.2 (Schaff & Wace, 1988)	'It is a dangerous thing wholly to despise the literal meaning...especially of Genesis'.
Tyconius: A	Book of Rules, pp. 51, 97, 145 of (Babcock, 1989)	Incongruities in the Pent. (and other parts of the Hebrew canon) show that it should not be taken literally. It is incongruous that Jacob receives a blessing as a reward for deceit (VS). Adam had female children only after having had male children (according to Tyconius' interpretation of Genesis 5:4), which defies nature (VN). To say that Lot lived in 'cities' rather than a city (Genesis 19:29) makes no sense (NS).

(Contd.)

Compositions by Christian authors of the fifth century

Augustine of Hippo:	City of God, 13.21, 15.9, 15.27	The Eden story, the Flood, and other Pent. stories literally happened as recorded in Genesis.	Augustine cites giant bones in tombs (PE) and a huge molar tooth that he saw (PE) as evidence of the physical existence of giant humans. He cites Pliny's mention of 200-year-old Epii as corroboration that humans can live for hundreds of years (AA); see Appendix 3.
L	(Schaff, 1984)		
Philostorgius: L	Ecclesiastical History, referenced in Photius' Epitome of the Ecclesiastical History of Philostorgius 3.10 (Pearse, 2014)	Paradise is a literal place from which the Tigris and Euphrates Rivers still flow.	
Salvian: L	On the Government of God, 1.6 – 1.12 (Pearse, 2014)	Salvian treats the Pent. narratives as literal history.	
Severian of Gabala:	On the Creation of the World, 6.2 (Louth, 2001)	Some scoff at the idea that the snake in Eden spoke, but it did.	
L			

	Homily 1 on Genesis, Gen. 1:2 (Glerup, 2010)	Severian considers allophorists heretics.
Sulpicius Severus: L	Sacred History, 1.1 – 1.2 (Schaff & Wace, 1988)	Severus treats the Genesis narrative as literal history.
Theodore of Mop- suestia: L	Commentary on the Epistle to the Galatians, 73–75 (Greer, 2010)	The Hagar and Ishmael story has literal his- toricity. Eden was a real, physical place, and Adam and Eve were real people.
Theodoret of Cyr: L	Questions on Genesis, 25, 26, 49 (Hill, 2007)	Eden is not a symbol of heaven. The Tree of Life was a literal, physical tree. The skins that Adam and Eve wore after their expulsion were literal skins.

Table 1: Writings of Philo and Christian authors of the first five centuries of the Christian Era, passages that reveal a stance on whether to accept the literal sense of the Pentateuch, and evidence cited (if any) by each author to support his stance. An author whose writings span parts of two centuries is listed in the section for the century in which he wrote more. Abbreviations for stances: A = allophorist; A? = probable allophorist (wording strongly suggestive of but not explicit about opposition to literal interpretation of the Pentateuch); L = literocredist. Abbreviations for categories of evidence: AA = appeal to authority outside the Christian canon; CP = self-contradiction within the Pentateuch; CS = contradiction of the Pentateuch by other scripture passages in the Hebrew canon; NS = non sequitur; NT = appeal to the authority of the New Testament; PE = physical evidence; VN = violation of a principle of nature; VS = violation of a principle of morality or of a spiritual principle. 'LXX' indicates reference to the Septuagint (the Greek Old Testament used in the early Church) where its wording differs from its Hebrew equivalent. Pent. = Pentateuch.

To identify pertinent passages in the rest of the vast corpus of first- through fifth-century Christian literature, I conducted electronic searches of the writings of the comprehensive list of ancient Christian authors given in Louth (2001). For these authors, I used specific search terms (see below) to search electronic versions of their works for passages that addressed the historicity of the Pentateuch. For most such works, I made use of searchable compilations in the form of pdf files (Schaff, 1984; Schaff & Wace, 1988; Roberts & Donaldson, 1994; Roberts et al., 1994), a website (Pearse, 2014), and a CD-ROM (Louth, 2001). For the majority of the rest, I used searchable, electronic versions of transcripts posted on Google Books (Lightfoot, 1898; Matthews & Amar, 1994; Hill, 2005; Hill, 2007; Glerup, 2010; Greer, 2010). In a few cases, crucial pages were not viewable on Google Books, or electronic versions of pertinent works were not available. In such cases (Brisson, 1947; Savage, 1961; Mahlerbe et al., 1978; Nautin, 1978; Heine, 1981; Hill, 1986; Babcock, 1989; Barkley, 1990; Tomkinson, 2000), I read through hard copies of the works in lieu of an electronic search. After employment of the procedures above, any ancient work that did not reveal an identifiable stance on the historicity of the Pentateuch was omitted from the study.

I used the following as search terms in the electronic searches: *allegor, figur, histor, literal, deluge, euphrates, flood, giant, hexa, paradise, six days, tigris*. I used the word *literal* and the word fragments *allegor, figur, and histor* to find all words that include these fragments (e.g. the words *allegory, allegories, allegorical, allegorically, etc.*), so as not to miss any reference to *literal, allegorical, figurative, or historical* interpretations. The word fragment *hexa* was used to find references to the *hexameron or hexaemeron* (the six days of creation). I used it and the other latter eight terms listed above to search for references to Pentateuch stories the historicity of which was commonly disputed in ancient Christian circles (**Tables 1 and 2**). In addition to the terms listed above, I also searched the ancient works for references to New Testament passages that were commonly cited by ancient allophorists in support of the allophorist position (**Table 3**).

Author	Written composition	Passage	Disputed Pentateuch passages and concepts
Third century			
Hippolytus	On the Hexaemeron (Roberts & Donaldson, 1994)	fragment	the physical existence of Paradise (Eden)
Fourth century			
Ephrem the Syrian	Commentary on Genesis (Matthews & Amar, 1994)	1.1	the six days of creation
Hilarius of Poitiers	Book of Mysteries (Brisson, 1947)	1.12	the Genesis Flood
John Chrysostom	Homily 13 on Genesis (Schaff, 1984)	13	the physical existence of the Garden of Eden
Fifth century			
Augustine of Hippo	City of God (Schaff, 1984)	13.21, 15.9, 15.27	the physical existence of Paradise (Eden); the historicity of the Sarah and Hagar story; the historicity of water flowing from the rock that Moses struck; the physical existence of the Genesis giants; the Genesis Flood story
Severian of Gabala	On the Creation of the World (Louth, 2001) Homily 1 on Genesis (Glerup, 2010)	6.2	the speaking of the Eden serpent the six days of creation
Theodore of Mopsuestia	Commentary on the Epistle to the Galatians (Greer, 2010)	73–75	the historicity of Adam; the physical existence of Paradise (Eden) and its serpent; the Sarah and Hagar story
Theodoret of Cyr	Questions on Genesis (Hill, 2007)	25	the physical existence of Paradise (Eden)

Table 2: Pentateuch passages and concepts for which literocredist authors record or imply the disputation of historicity by anonymous contemporaries.

Author	Written composition	Passage	New Testament passage
Origen of Alexandria	Against Celsus	3.40, 4.44,	1 Corinthians 9:9–10, 10:1–4; 2
	(Roberts & Donaldson, 1994)	4.49	Corinthians 3:15; Galatians 4:21–24; Ephesians 5:31–32
	Homily 5 on Genesis (Heine, 1981)	1.2	Romans 7:14; 1 Corinthians 10:11; Galatians 4:24
	Homily 6 on Genesis (Heine, 1981)	1	Romans 7:14
	Homily 2 on Exodus (Heine, 1981)	1	Romans 7:14
	Homily 5 on Exodus (Heine, 1981)	1	John 6:51; 1 Corinthians 10:1–4
	Homily 7 on Leviticus (Barkley, 1990)	4.1–2	1 Corinthians 10:1–4; Colossians 2:16–17
	On First Principles (Roberts & Donaldson, 1994)	4.1.12, 4.1.13	1 Corinthians 9:9, 10:4, 10:11; Galatians 4:21–24; Colossians 2:16; Hebrews 8:5
Novatian	On the Jewish Meats (Roberts & Donaldson, 1994)	2	Romans 7:14
Tertullian	Against Marcion (Roberts & Donaldson, 1994)	3.5, 5.13	Romans 7:14; 1 Corinthians 9:9, 10:4; Galatians 4:22–24; Ephesians 5:31–32

Table 3: New Testament passages cited by allophorists in support of the allophorist view of the Pentateuch.

Identification of literocredist and allophorist authors

Once pertinent passages were located with the search methods delineated above, I used the following sets of predictions regarding the passages in order to test hypotheses on the authors’ stances toward Pentateuch historicity. The hypothesis that a given author is in the allophorist camp predicts that the author either (a) makes an

explicit claim that at least some Pentateuch event(s) and/or character(s) are symbols or are non-historical, (b) makes an explicit claim that the literal meaning of the Pentateuch passage(s) in question is not the true meaning but that an underlying (hidden) meaning instead is the true meaning, or (c) treats at least some Pentateuch event(s) and/or character(s) in question as symbols in a manner incompatible with acceptance of the Pentateuch as literal history. Note that this hypothesis is compatible with the use of Pentateuch characters as examples to follow (or avoid), because behavioral examples do not require historicity. Note that it is also compatible with the view that the Pentateuch contains some historically accurate details in addition to historical inaccuracies. It is also compatible with some versions of typology, in which wording and/or context reveals that the ancient author viewed putative Pentateuch types of Christ as meant to be taken figuratively only, and not literally.

The hypothesis that a given author is in the literocredist camp predicts that the author either (a) treats the Pentateuch in a manner compatible only with a view of it as reliable record of past events (e.g. using genealogies in the Pentateuch to calculate ancient dates), (b) explicitly claims that the entire Pentateuch is a historically accurate record, (c) explicitly claims that the Pentateuch has no hidden, underlying meaning, or (d) makes such a claim as in points b and c about passage(s) that had been accepted by others as lacking historical accuracy, e.g. the literal existence of the Garden of Eden as a physical location (**Table 2**). Note that this second hypothesis is compatible with the use of Pentateuch events and/or characters in analogies or as symbols to make a point. It is also compatible with identification of an underlying (hidden) meaning in addition to simultaneous acceptance of the literal meaning as also valid, as in some versions of typology in which wording and/or context reveals that the ancient author viewed Pentateuch types of Christ as meant to be taken both literally and figuratively—that is, the ancient author thought the events narrated in the Pentateuch actually happened but could be interpreted allegorically to deepen their application to one's spiritual life.

For most ancient writings I consulted an English or French translation, but in some cases it was necessary to examine the wording of a transcript of the Greek or Latin original to verify that my understanding of the writer's stance on Pentateuch

historicity was correct. Because of the particular potential for this test of hypotheses to be controversial in the case of the New Testament and the Apostolic Fathers, I consulted Greek transcripts (Berry, 1993; Holmes, 2007) of all pertinent passages of these works (see Appendix 1). I ignored passages in which Christian authors dealt with interpretation of figures of speech such as references to God's hands, back, and other body parts. This is because ancient literocredist and allophorist authors both argued against taking such figures of speech literally. Even literocredist authors were of the opinion that figures of speech did not compromise the overall meaning of the Pentateuch as literal history (Schaff, 1984; Schaff & Wace, 1988; Roberts & Donaldson, 1994). I also ignored passages in which Christian authors used Pentateuch characters and/or stories as behavioural examples to emulate or avoid. This is because ancient allophorists and literocredists both frequently used Pentateuch characters and stories in this way. The attitude of the allophorists was that examples need not be historical in order to be instructive (Mahlerbe & Ferguson, 1978; Schaff, 1984; Schaff & Wace, 1988; Roberts & Donaldson, 1994).

Authors whose available writings reveal a stance on whether to accept the literal sense of the Pentateuch are listed in **Table 1**, along with their stances. There are some ancient authors whose inclusion in this study may be controversial. This is because they were censured by ecclesiastical authorities at some point in history, and some ecclesiastical historians might therefore consider their writings heretical. Appendix 2 lists these authors and the justifications for including each in this study.

Attribution of putative first-century works

Disagreement exists among scholars as to the authorship and dating of some epistles that are here treated as first-century works: 1 Peter, the Pastoral Epistles of the New Testament (the epistles to Timothy and Titus), the New Testament epistle to the Colossians, the anonymous New Testament epistle to the Hebrews, and the anonymous *Epistle of Barnabas*. The New Testament epistle known as '1 Peter' begins with identification of its author as the Apostle Peter. Modern scholars have given numerous reasons to doubt that the epistle was actually written by Peter, but there is general agreement that it was written in the first century (Senior, 2008: 3–7). For this study,

it is less important for the author to have been Peter than for the author to have been a different first-century author than the other first-century texts that are included in this study. Modern scholars agree that such was the case (Senior, 2008: 3–13).

Modern scholars vary in their opinions as to the authorship and date of the Pastoral Epistles. Some attribute these epistles to the Apostle Paul, others attribute them to a different first-century author, and others attribute them to a second-century author (Marshall & Towner, 1999). Here, I attribute the Pastoral Epistles to Paul. I base this attribution upon the arguments of Aherne (1912: n. pag.) and Porter (1995: 107–17), who point out that the reasoning behind contrary claims is questionable. Alleged problems with fitting these letters into the chronology of Paul's life are nonexistent (Aherne, 1912: n. pag.; Porter, 1995: 107–8). Differences in style between the Pastorals and the undisputed Pauline epistles are no greater than those among the undisputed Pauline epistles (Aherne, 1912; Porter, 1995), and are to be expected because the Pastorals are addressed to individuals, whereas the other epistles are addressed to congregations. Numerical differences in word usage between the Pastorals and the undisputed Pauline letters are inconsequential, because in this respect the Pastorals do not differ from the undisputed Pauline epistles any more than the undisputed Pauline epistles differ from each other (Aherne, 1912; Porter, 1995). Additionally, there is abundant evidence that the argument by some modern scholars that the Pastorals address Gnosticism (and therefore must be later than the first century) is spurious (Senter, in press).

The epistle to the Colossians begins with identification of Paul and Timothy as authors. It ends with an assertion by Paul that he wrote the last few lines himself, which implies that Timothy wrote the rest. Many modern scholars doubt the attribution to Paul, mainly on stylistic or theological grounds (Moo, 2008), but the theology of the letter is a close match for that of the undisputed Pauline letters (Moo, 2008), and stylistic differences are to be expected if Timothy wrote the epistle. Here, I accept Timothy as the main author, with Paul's approval as indicated by the closing of the letter.

The Pastoral Epistles and the undisputed Pauline epistles all begin with the author identifying himself as Paul. In contrast, the epistle to the Hebrews was written anonymously. A few scholars of the first few centuries of the Christian Era attributed

the epistle to the Hebrews to Paul, but most expressed doubt as to that attribution, and modern scholars almost universally accept that some other first-century author wrote it (Lincoln, 2006). Here, I accept that the epistle was written by someone other than Paul in the first century.

The earliest ancient comments on the authorship of the *Epistle of Barnabas* usually attribute it to the Apostle Barnabas, but modern scholars generally doubt that attribution and attribute it to some other first- or second-century author (Holmes, 2007). Modern arguments against Barnabas as the author or against a first-century date for the epistle are summarized by Paget (1994) and Rhodes (2004). The argument that Barnabas, a Levite and a Jew, cannot have been the author because the epistle is full of anti-Jewish polemic, is spurious. As Rhodes (2004: 201–205) notes, the epistle has no polemic against Jews per se. Rather, it criticizes the Jewish practice of literally observing Pentateuch regulations; its criticism of this is no more vehement than that found in the epistles of Paul, another Jew. The argument that Barnabas cannot have been the author because he promoted the literal following of Pentateuch regulations is based on a misreading of Galatians 2:11–13, which records a momentary lapse, not a habitual stance; moreover, this argument ignores the testimony in Acts 15 that Barnabas was a vocal opponent of the Jewish Christian faction that promoted the literal observance of Pentateuch regulations. The argument that no Levite would oppose the literal observance of Pentateuch regulations also ignores the testimony in Acts 15 that Barnabas did oppose it. Even so, it is less important to this study that Barnabas be the author of the epistle than that the epistle be dated to the correct century. Here, I accept a first-century date for the epistle, for two main reasons. Firstly, the epistle makes no reference to any New Testament work, which is unusual in Christian writings after the first century. Secondly, its primary focus is on the lack of need to literally follow Pentateuch regulations, an issue that was a hot topic in the first century (see Paul's New Testament epistles, for example) but had ceased to be a problem in the churches by the second century, as witness the lack of second-century exhortations on the topic. As Paget (1994) and Rhodes (2004) note, alleged references to second-century events and emperors in the *Epistle of Barnabas* are dubious.

It is important to note that my attributions of all the above epistles to first-century authors does not affect the testing of the hypotheses as to their authors' espousal of literocredist or allophorist positions. However, it does affect conclusions regarding the number of authors espousing each position in each century. For example, if the Pastoral Epistles were written by a first-century author other than Paul, then the number of first-century authors espousing the position that these epistles espouse, as found here, will need to be adjusted by one author. The reader should keep this in mind as a caveat and is welcome to question any of my conclusions that depend on correct attribution and/or dating of these works.

Identification of cognitive styles

For authors whose available writings reveal a stance on whether to accept the literal historicity of the Pentateuch, I searched the relevant texts for stated evidence in support of each stance and listed that evidence in **Table 1**. I classified the evidence into eight categories. Five of the categories correspond to rational thinking: violation of a principle of nature; violation of a principle of morality or a spiritual principle; self-contradiction within the Pentateuch; contradiction of the Pentateuch by other passages in the scriptures of the Hebrew canon (the Old Testament of the Christian Bible); and reference to a non sequitur. References to natural, moral, and spiritual principles indicate abstract thought processes, a characteristic of rational thinking. References to contradiction and non sequiturs derive from principles of logic, another characteristic of rational thinking.

The sixth category of evidence, physical evidence, is concrete and therefore conducive to experiential thinking, but its use can correspond to either mode of thinking. Its use indicates rational thinking if it is used to draw logical conclusions without confirmation bias. Confirmation bias, the tendency to emphasize only the bits of information that support one's argument even if the rest of the available information contradicts the argument, is a type of error that stems from experiential thinking (Nelson, 2000: 259; Niemenen et al., 2015: 2). Confirmation bias in the use of physical evidence therefore indicates experiential thinking.

The last two categories of evidence, New Testament authority and the authority of extrabiblical written sources, can correspond to either mode of thinking. Authors citing sources do so with rational thinking when their sources are relevant and support the position under consideration. Authors citing sources do so with experiential thinking when a citation involves confirmation bias, or when their sources are irrelevant or do not support the position under consideration.

Statistical tests for differences in the ratio of literocredist to allophorist authors between centuries

To determine whether the ratio of literocredist to allophorist authors differed from one century to another, I used two-tailed z-tests, which test for whether a difference exists in a proportion between two populations (Jackson, 2014). I recorded the results with alpha (the level at which the results are statistically significant) set at 0.01 (stringent, lowering the risk of a Type I error), 0.05 (intermediate in rigor), and 0.1 (lenient, increasing the risk of a Type I error but often necessary when sample sizes are small) (Jackson, 2014). The sample size for each century is small, so the results of the z-tests should be understood as tentative.

It should also be noted that many ancient texts that were written have not survived. Any statistical test applied to ancient texts therefore comes with the caveat that it applies only to surviving texts. Any such test is therefore applied to an incomplete sample of ancient writing, and there is no guarantee that the surviving texts represent an unbiased sample. The reader should keep this caveat in mind.

Results

Among early Christian authors whose writings reveal a definite stance on Pentateuch historicity, all those from the first century were allophorists, including the only four New Testament authors whose works reveal a stance on Pentateuch historicity. The majority from the second and third century were also allophorists; literocredist authors were present but in the minority. Pentateuch literocredism became the predominant view among Christian authors in the fourth century and remained so during the fifth century (**Table 1; Fig. 1, 2**). The results of two-tailed z-tests (**Table 4**) indicate

a significant rise in the proportion of authors embracing a literocredist stance in the fourth century. The z-tests do not reveal a significant difference in this proportion between any two of the first three centuries, except between the first and third when alpha is set at 0.1 (**Table 4**); however, this may be an artifact of small sample sizes.

Not all of the ancient authors cited evidence to support their positions. Among those that did, there is no overlap between categories of evidence cited by allophorist authors and categories cited by literocredist authors (**Table 1**; **Fig. 3**). The evidence cited by allophorist authors consists entirely of categories that correspond to rational thinking: violations of natural principles; violations of moral or spiritual principles; self-contradiction within the Pentateuch; contradiction of the Pentateuch by other passages in the scriptures of the Hebrew canon; non sequiturs; and pertinent, appropriately-cited New Testament passages (**Table 3**; **Fig. 3**; Appendix 1).

Only two categories of evidence are cited by literocredist authors: physical evidence and the authority of written works outside the Christian canon (**Table 1**; **Fig. 3**). Confirmation bias, indicating experiential thinking, is present in all six citations of extrabiblical written works (Appendix 3) and in six (46%) of thirteen cited

	alpha = 0.01	alpha = 0.05	alpha = 0.10
1st vs. 2nd century	no	no	no
1st vs. 3rd century	no	no	yes
1st vs. 4th century	yes	yes	yes
1st vs. 5th century	yes	yes	yes
2nd vs. 3rd century	no	no	no
2nd vs. 4th century	no	yes	yes
2nd vs. 5th century	yes	yes	yes
3rd vs. 4th century	no	no	yes
3rd vs. 5th century	no	yes	yes
4th vs. 5th century	no	no	no

Table 4: Results of two-tailed z-tests for significant differences, between centuries, in the proportion of Christian authors espousing literocredist versus allophorist views. Blanks with 'yes' indicate z-tests that found a significant difference in this proportion between centuries, and blanks with 'no' indicate z-tests that did not find a significant difference in this proportion between centuries.

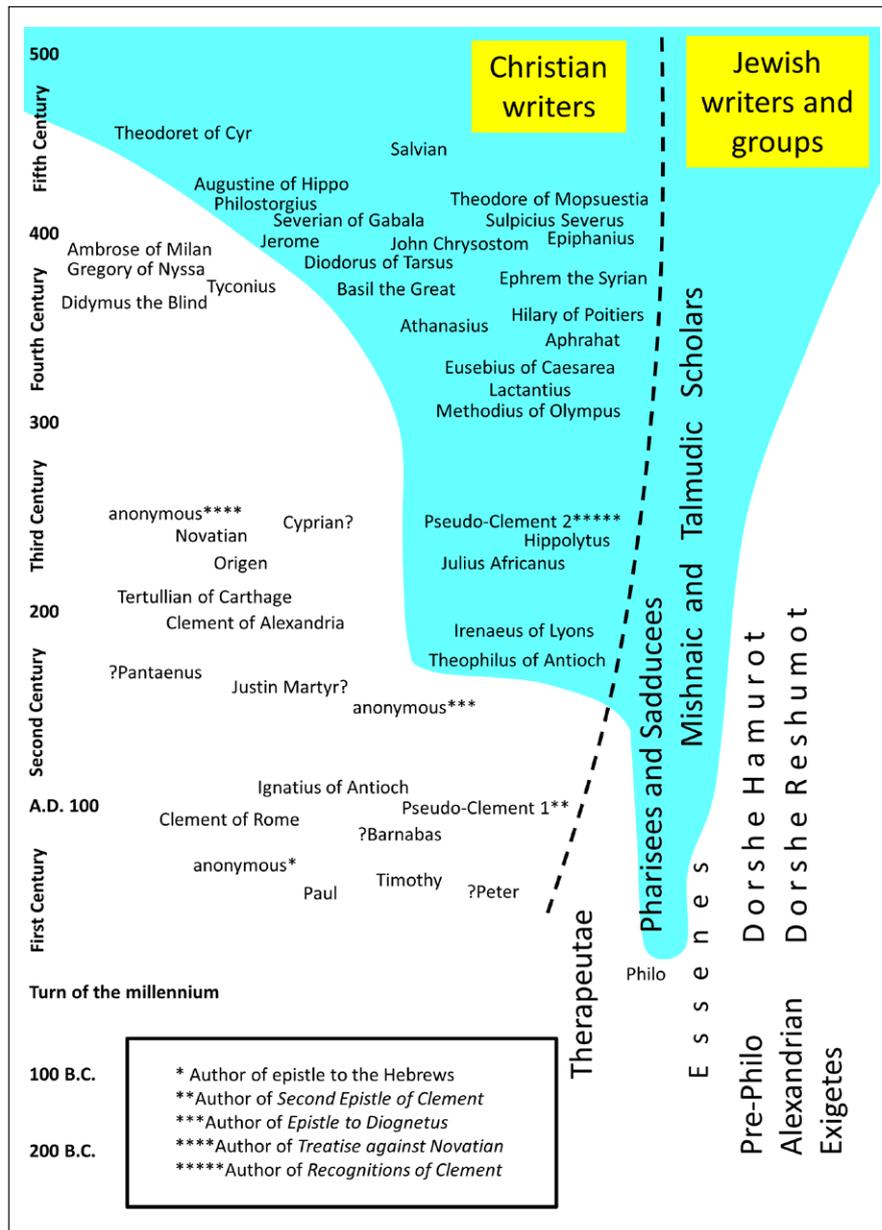


Figure 1: Stances of ancient writers as to the historicity of the Pentateuch. White background indicates authors and groups who did not accept the historicity of the Pentateuch. Blue background indicates authors and groups who accepted the historicity of the Pentateuch. The ‘?’ before the names of Peter, Barnabas, and Pantaenus indicates uncertainty that these authors are correctly identified. The ‘?’ after the names of other authors indicates that their wording strongly suggests—but is not explicit about—a stance that the Pentateuch is not history.

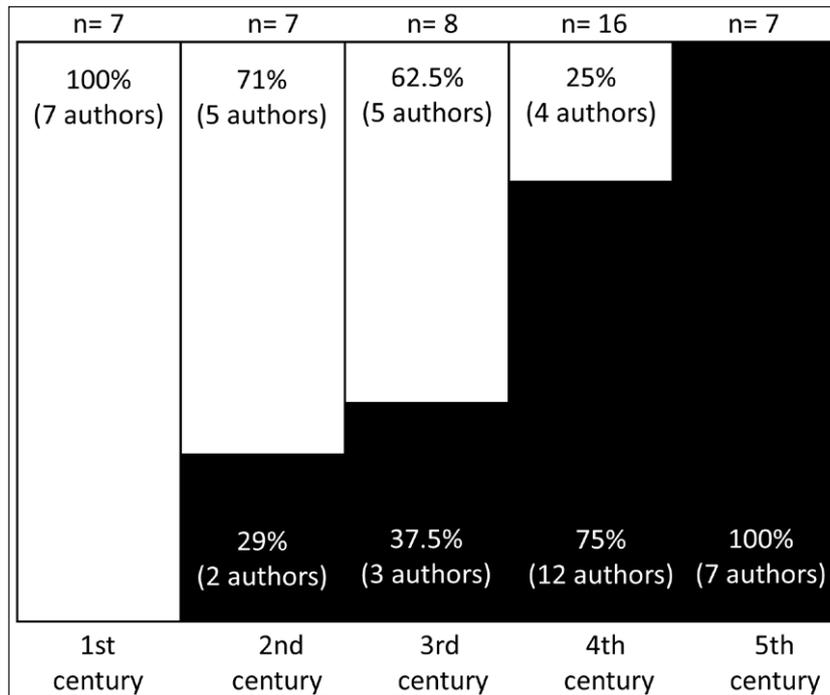


Figure 2: Proportion of ancient Christian authors who did (black) or did not (white) accept the historicity of the Pentateuch. Note that acceptance of the historicity of the Pentateuch was rare in the first two centuries but had become the predominant view by the fourth century.

examples of physical evidence (Appendix 3). It is therefore present in more than half (12 of 19, 63%) of the citations of evidence by literocredist authors in the examined sample. This indicates a predominance of experiential thinking in the citation of evidence by literocredist authors.

Discussion

The results of this study implicate experiential thinking as the root of scriptural literocredism in ancient Christian literocredists. Because experiential thinking is the default cognitive mode in humans, it is unsurprising that literocredism overturned allophorism as the predominant Christian approach to the Pentateuch within five centuries of the beginning of the Christian religion. Ancient allophorists amassed a voluminous set of evidence against the historicity of the Pentateuch and recorded it for posterity (**Table 1**), but in the end even this mountain of evidence was not powerful

<u>Century</u>		AA	PE	NT	CP	CS	NS	VN	VS
Allegorist authors	1st					2		1	1
	2nd					1			2
	3rd			7	1		4	3	2
	4th				1		3	2	3
	5th								
Literalist authors	1st								
	2nd	1	3						
	3rd	4	6						
	4th		2						
	5th	1	2						
Totals:		6	13	7	4	3	9	7	8

Figure 3: Numbers of instances of citation of each category of evidence by ancient Christian authors. Data are from **Table 1**. Abbreviations for categories of evidence: AA = appeal to authority outside the Christian canon. CP = self-contradiction within the Pentateuch. CS = contradiction of the Pentateuch by other scripture passages in the Hebrew canon. NS = non sequitur. NT = appeal to the authority of the New Testament. PE = physical evidence. VN = violation of a principle of nature. VS = violation of a principle of morality or of a spiritual principle.

enough influence to sway readers into overcoming their natural human impulse to employ the error-prone cognitive style that leads to literocredism. Centuries later, the pernicious influence of this error-prone cognitive style persists as opposition to the findings of science, as shown by previous studies that demonstrate a strong connection today between experiential thinking and the phenomena of scriptural literocredism and anti-evolution bias (Razmyar & Reeve, 2013; Niemenen et al., 2015).

An interesting subject for future researchers would be to analyze whether it is possible to identify cultural or educational factors that were involved in the sea change that had occurred by the fifth century. What factors enabled early Christian allophorists to overcome the natural human impulse toward experiential thinking

when addressing the question of Pentateuch historicity? And what was it about those factors that had changed by the fifth century, dooming allophorism to near-extinction? Answers to these questions would be of interest to researchers studying the phenomenon of conceptual change and may be applicable in today's world.

An important finding of this study is that before the fourth century, the allophorist position was predominant among Christian authors. This should perhaps be unsurprising, because Christianity originated as an outgrowth of first-century Judaism, and opposition to literal interpretation of Genesis and the rest of the Pentateuch was common among first-century Jewish scholars. The first-century Jewish theologian Philo of Alexandria—citing evidence that indicates rational thinking (**Table 1**)—rejected the historicity of the Pentateuch's narratives and interpreted them as spiritual allegories (Yonge, 2006). He insisted that the regulations in the Pentateuch should be literally practiced but also that such literal practice was meant to remind the doer, during the practice, of the spiritual principles to which each practice allegorically referred. For example, he considered clean and unclean animals symbolic of specific virtues and vices and that, if this were kept in mind during a meal, the meal would become a set of reminders about virtuous living (Yonge, 2006: 626-628). Such interpretation of the Pentateuch's dietary laws was already present in Jewish thought before Philo's day, for it is expounded in the *Letter of Aristeas*, which was written by a Jew living in Egypt over a century before Philo (Wright, 2015: 315 n. 1). Previous Jewish sources that Philo cited also interpreted the Pentateuch's narratives as allegories (Hay, 1980: 42–47, 51–58). In his book *On the Contemplative Life* Philo recorded the existence in Egypt of a Jewish sect called the Therapeutae, who also understood the Pentateuch as allegory and were numerous enough to occupy at least one monastery (Yonge, 2006: 700-701). Among Jewish scholars of first- and second-century Palestine two schools of thought, the Dorshe Reshumot and the Dorshe Hamurot, also insisted that the Pentateuch should be understood as allegory rather than literal history (Lauterpach, 1911: 329–330, 509–510).

Early Christian rejection of the historicity of the Pentateuch was therefore not a new phenomenon but was instead an outgrowth of contemporary Jewish scholarship.

That Jewish scholarship, in turn, may have been inspired by Greek influence. At least as early as the fifth century B.C.E., Greek scholars had been interpreting their own sacred texts allegorically (Brisson, 2004: 29–40). The prevalence of the practice of allegorical interpretation of sacred texts in the Greco-Roman world may even have been an important factor in the acceptance of Christianity by Gentiles during the early spread of Christianity, because it was a religious practice to which they were already accustomed.

The connection between cognitive styles and Pentateuch interpretation, together with the overturning of allophorism by literocredism in the fourth century, suggests a major shift in the psychology of Christian authors of that century. The same century witnessed sudden and enormous changes in ecclesiastical procedures, interpretations, architecture, and liturgy after Emperor Constantine legalized the Christian religion in the year 313 (Schmemmann, 1966: 91–125). It would be interesting to determine whether the cognitive shift that is reflected in the change in Pentateuch interpretation was a result of the post-Constantinian metamorphosis of Christianity, but such determination is beyond the scope of this study.

The shared foundation of experiential thinking between modern (Razmyar & Reeve, 2013) and ancient scriptural literocredism suggests continuity through the centuries in the psychology of literocredism. Such continuity is further suggested by the tendency of literocredist authors from both periods to commit similar mistakes in the citation of evidence, including fossil evidence. One such mistake is to misinterpret physical evidence about which an author is ignorant. Such ignorance is understandable in authors of the first five centuries, because it antedates the relevant scientific findings. Eusebius cited fish fossils in mountains as evidence that the Genesis Floodwaters reached the mountaintops (**Table 1**), revealing fourth-century ignorance that geological processes can lift ancient marine deposits far above current sea level. Augustine and Pseudo-Clement, revealing ancient ignorance of the former existence of now-extinct giant mammals, cited large bones and a large tooth as evidence of the physical existence of the Genesis giants (**Table 1**), perpetrating an error similar to that of other ancient authors who mistook large fossil mammal remains

for the remains of the giants of pagan myths (Mayor, 2000: 104–129, 197–202). Similarly, recent anti-evolution publications reveal ignorance about physical evidence via numerous misinterpretations of the fossil record (Kuban, 1989; Rowe, 1991; Isaak, 2005; Senter, 2011) and misidentifications of bones (Senter & Wilkins, 2013; Senter & Klein, 2014). Another mistake that is shared by literocredists of the first five centuries and present-day literocredists is to cite ancient written accounts that provide contradiction instead of support for the literocredist position (Senter, 2013a, b) (Appendix 2). A third mistake that both sets of authors have in common is to fall frequent prey to confirmation bias in areas other than literature citation (Niemenen et al., 2015).

This study's finding that Augustine of Hippo was a literocredist (**Table 1**) provides an important cautionary tale for evolutionary biologists. Modern authors sometimes quote *The Literal Meaning of Genesis* 1.19 out-of-context as an example of ecclesiastical permission to accept a non-literal interpretation of Genesis and, by extension, evolutionary theory (Nelson, 2000; Prothero, 2007). However, the context of the quote—Augustine's book *The Literal Meaning of Genesis*—is a defense of a literal interpretation of the Genesis creation account (Hill, 2002). It therefore provides contradiction and not support for a non-literal interpretation. To provide ecclesiastical support for a non-literal interpretation it would be more appropriate to quote an ancient author who opposed literocredism. See **Table 1** for numerous appropriate examples.

Through the centuries, Christian theologians have long embraced the concept that nature and scripture constitute two books by the same divine author, and that the two books cannot contradict each other (Tanzella-Nitti, 2005: 11–12); any apparent contradiction is due to one's having misunderstood one book or the other. Current literocredists insist that scientists who accept evolution have misunderstood nature (e.g., Brown, 2001; Sarfati, 2002; Vail, 2003; Ham, 2006). However, the results of this study indicate that the Christian stance endorsed by the New Testament is that the literocredists have misunderstood scripture. From a theological standpoint, apparent contradictions between nature and the Pentateuch are resolved if the Pentateuch is understood as allegory instead of history. The endorsement of that understanding by the New Testament (**Table 1**; Appendix 1), an important finding of this study, constitutes permission from the Bible to accept the findings of

science that contradict the literal wording of the Pentateuch. Such findings include abundant evidence not only for biological evolution (Stein, 2006; Prothero, 2007) but also for an age of billions of years for the Earth and the rest of the universe (Patterson, 1956; Lineweaver, 1999; Senter, 2013c; Planck Collaboration, 2014), in addition to archaeological evidence for the non-historicity of certain details in the Pentateuch's exodus account and in its accounts of the lives of the patriarchs (Finkelstein & Silberman, 2001).

Communication of this permission could prove helpful in the struggle with anti-evolution bias in public schools, because when this bias is based on loyalty to the Christian Bible (coupled with the misunderstanding that such loyalty entails a literocredist interpretation), minds may change upon learning that loyalty to the New Testament actually entails rejecting literocredism. By itself, presentation of scientific data that support evolutionary theory usually does not change the minds of students who begin with anti-evolution bias (Lawson & Worsnop, 1992; Sinatra et al., 2003; Chinsamy & Plagányi, 2007). This is plausibly because presentation of physical data appeals to the rational thinking system, whereas anti-evolution bias is based on experiential thinking. This would explain why the cognitive processes that sustain anti-evolution bias are typically unresponsive to fact-based attempts at persuasion (Evans, 2008; Coburn, 1996; Lawson & Worsnop, 1992; Sinatra et al., 2003; Chinsamy & Plagányi, 2007). Because they are not fact-based but worldview-based they are more likely to be responsive to worldview-based persuasion (Coburn, 1996; Smith, 2010).

Because educational strategies that appeal to rational thinking alone are inadequate to combat bias that is based on experiential thinking, it may be useful to supplement strategies that appeal to rational thinking with strategies that appeal to the experiential thinking system, and because anti-evolution bias is worldview-based such a strategy should address worldviews. One such strategy is to address religious viewpoints on evolution in science classes. It is legal, at least in the United States, to address religious viewpoints in science classes if it is done within certain parameters (Hermann, 2013: 541–542). Previous studies have found that conceptual change, in which student attitudes toward evolution become more rational, occurs more

often in classes in which religious viewpoints are carefully addressed than in those in which they are not (Verhey, 2005). It is possible that the success of such strategies is due to engagement of the experiential thinking system, because experiential thinking is correlated with religious belief (Pennycook et al., 2012; Shenhav et al., 2012; Razmyar & Reeve, 2013) and particularly with scriptural literocredism (Razmyar & Reeve, 2013). The results of the present study are applicable to such strategies and could therefore prove useful as a tool for such conceptual change. Moreover, the introduction to students of a study that involves hypothesis-testing would reinforce education on the scientific method. Therefore, as part of a remedy for anti-evolution bias in science students, I recommend—with due caution—the communication of the results of this study to students, or the invitation to students to examine it on their own, outside of class.

Additional Files

The additional files for this article can be found as follows:

- **Additional File 1:** New Testament Passages on the Historicity of the Pentateuch, and Their Use by Subsequent Allophorist Authors. <https://doi.org/10.16995/olh.80.s1>
- **Additional File 2:** Justification for inclusion of potentially controversial ancient authors in the study. <https://doi.org/10.16995/olh.80.s2>
- **Additional File 3:** Confirmation Bias in the Citation of Evidence by Ancient Christian Authors. <https://doi.org/10.16995/olh.80.s3>

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