

The Astronomical Language of James 1:17 Revisited

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Abstract

There is general agreement among scholars that παραλλαγή and τροπῆς ἀποσκίασμα in James 1:17 refer to astronomical phenomena, but little agreement as to the nature of these phenomena. The present article returns to the writings of the Greek astronomers to gain a scientifically precise understanding of these terms, and argues that astronomical terms such as these diffused from the academy into everyday Greek and Jewish life, and were both meaningful to James's readers and useful for James's argument.

1. Need for this study¹

Because of a longstanding interest in the science of astronomy, in 1986 I (Geoffrey) formed the opinion that 'no variation or shadow of turning' (οὐκ ἔνι παραλλαγή ἢ τροπῆς ἀποσκίασμα, Jas 1:17) refers to aspects of the sun's movement and to the solstice. This view did not appear in the literature of the time. Wettstein (1752) believed it was 'a metaphor from the sun and astronomy'² and Gebser (1828) investigated the use of James's terminology by Greek astronomers, especially Geminus of Rhodes. Gebser judged that παραλλαγή described a difference in climate ('Klima') or location ('Lage'), or,

1. Acknowledgements: David A. Shead for linguistic advice; the late Bishop D. W. B. Robinson and Prof. E. A. Judge, who provided encouragement and helpful comments on an early draft.

2. Johan Jakob Wettstein, *Hē Kainē Diathēkē: Novum Testamentum Graecum*, vol. 2 (Amsterdam, 1752), 662.

alternatively, the changing path of the sun, on which the strength or weakness of its light depends. He concluded that we cannot know whether James had in mind variation in sunlight or in the positions of the stars.³ Mayor (1892) also drew on Geminus, concluding that

he uses [παράλλαγή] quite generally of the varying length of the day, etc. ... We may therefore take the word [in James] to express the contrast between the natural sun, which varies its position in the sky from hour to hour and month to month, and the eternal Source of all Light.⁴

Finally Ropes (1916), drawing on Gebser and Mayor, argued that παράλλαγή ‘does not seem to be an astronomical *terminus technicus*, although in general senses (e.g. of the “variation” in the length of the day and in the daily course of the sun through the heavens ...) it is used by astronomers’.⁵ He took τροπή as ‘another semi-astronomical word ... used technically for the solstice’, but did not think its precise celestial reference in James could be determined. He concluded that the general idea behind James’s phrase is that heavenly bodies are ‘subject to change which affects their property of casting light on the earth’.⁶

This general line of interpretation has continued down to the present, with a consensus that the passage refers to astronomical phenomena, but that the nature of these phenomena cannot be pinpointed.⁷ BDAG lists παράλλαγή ‘rarely as an astronom. [*terminus technicus*]’.⁸ Blomberg and Kamell think τροπῆς ἀποσκίασμα ‘probably once formed a technical, scientific expression, but that meaning has been lost in Koine Greek’.⁹ Dibelius, advised by Professor Franz Boll, an expert on Ptolemy and astrology, summarises as follows:

παράλλαγή means ‘change’ and was not a technical term associated with astronomy ... On the other hand, the term τροπή is used already in the

3. August Rudolph Gebser, *Der Brief des Jacobus* (Berlin, 1828), 81–83.

4. Joseph B. Mayor, *The Epistle of St James* (London, 1892), 56.

5. James Hardy Ropes, *Epistle of St James*, ICC 41 (T&T Clark, 1916), 162, <https://doi.org/10.5040/9781472556011>.

6. Ropes, *Epistle of St James*, 164.

7. Peter H. Davids, *The Epistle of James: A Commentary on the Greek Text*, NIGTC (Eerdmans, 1982), 87–88; Chris A. Vlachos, *James: Exegetical Guide to the Greek New Testament* (B&H Academic, 2013), 48–49; Dale C. Allison, *A Critical and Exegetical Commentary on the Epistle of James*, ICC (T&T Clark, 2013), 276–277; and many others.

8. Walter Bauer et al., eds., *A Greek-English Lexicon of the New Testament and Other Early Christian Literature*, 3rd ed. (University of Chicago Press, 2001).

9. Craig L. Blomberg and Mariam J. Kamell, *James*, Zondervan Exegetical Commentary on the New Testament 16 (Zondervan, 2008), 74. Similarly Franz Mussner, *Der Jacobusbrief*, HThKNT 12.1 (Herder, 1964), 90–92; Franz Schnider, *Der Jakobusbrief*, RNT (Pustet, 1987), 44.

classical period with the meaning 'solstice'; therefore it is a technical term, although it was by no means used only by specialists ... The juxtaposition of φώτα ('lights' = stars), τροπή, and ἀποσκίασμα ('shadow' = eclipse?) suggests that τροπή be given this astral significance here also ... The technical term for eclipse is ἔκλειψις, not σκίασμα or one of its compounds.¹⁰

Moo accordingly treats παραλλαγή as an astronomical term which James uses in a general, non-scientific, way to connote 'the orderly and periodic movements of the sun, moon, planets and stars'.¹¹ This begs the question of what it was about the παραλλαγή of the sun which put it in opposition to the character of its Creator. Interpreters are more divided over this. For many older commentators, James's main idea is that nothing can alter or eclipse God's light (cf. Ropes);¹² for many recent commentators, it is that the stars move but God does not change (cf. Mayor).¹³ Dibelius considers similarities to Philo, who contrasts the motion of the heavenly bodies with the motionlessness of God, but concludes that in James 1:17 'only a faint echo remains of the philosophical train of thought'. Allison and Moo are more receptive to Philonic parallels.¹⁴ However, it does not seem to us, by what he has written, that James has been influenced by philosophy. Rather, he applies the Scriptures, illuminated by the teaching of Jesus, with illustrations from everyday life. The conjunction of παραλλαγή with φώτα and the phrase τροπῆς ἀποσκίασμα argues for it having an everyday astronomical meaning in James 1:17.

The aim of the present study is to return to the writings of the Greek astronomers in order to gain a more scientifically precise understanding of the relevant terminology than was (apparently) possessed by Gebser and Mayor. We shall examine James's terminology as it is used in surviving astronomical texts of the day, using Geminus as an exemplar. Our source for Geminus is Manitius, whose book title translates as *Introduction to the Celestial Phenomena*, abbreviated henceforth as *Intr.*¹⁵

10. Martin Dibelius, *A Commentary on the Epistle of James*, trans. Michael A. Williams, Hermeneia (Fortress, 1976), 100–101.

11. Douglas J. Moo, *The Letter of James*, 2nd ed., Pillar New Testament Commentary (Eerdmans, 2021), 104.

12. James B. Adamson, *The Epistle of James*, NICNT (Eerdmans, 1976), 75, and a long list mentioned by Dibelius, *Commentary*, 102 n. 172.

13. Ralph P. Martin, *James*, WBC 48 (Word, 1988), 39; Blomberg and Kamell, *James*, 74–75; Scot McKnight, *The Letter of James*, NICNT (Eerdmans, 2011), 127, <https://doi.org/10.5040/bci-000v>; Moo, *The Letter of James*, 104.

14. Allison, *Epistle of James*, 275 n. 144; Moo, *The Letter of James*, 104.

15. Γεμίνου εισαγωγή εἰς τὰ φαινόμενα, ed. and trans. Karl Manitius (Leipzig, 1898).

We will conclude, firstly, that astronomical knowledge diffused from the academy into everyday Greek and Jewish life and was familiar to James and his readers; and secondly, that contemporary astronomical writings support an astronomical reading of James 1:17 and can help identify the phenomena in question.

2. The text and its *hapax legomena*

The passage is as follows (THGNT, with NKJV as a representative English translation):¹⁶

¹⁷ πᾶσα δόσις ἀγαθὴ καὶ πᾶν δῶρημα τέλειον ἄνωθέν ἐστιν καταβαῖνον ἀπὸ τοῦ πατρὸς τῶν φώτων παρ' ᾧ οὐκ ἔνι ^[a]παραλλαγή ἢ τροπῆς ἀποσκίασμα.

^[a]παραλλαγή ἢ τροπῆς ἀποσκίασμα ^{κ^c} A C K L P 69 1424; παραλλαγή η τροπης αποσκιασματος ^{κ^{*}} B; παραλλαγή ουδε τροπης αποσκιασμα Ψ; παραλλαγης η τροπης αποσκιασματος p²³.

Every good gift and every perfect gift is from above, and comes down from the Father of lights, with whom there is no variation or shadow of turning.¹⁷

James extols the good gifts of the 'Father of lights' – gifts which fulfil God's purposes perfectly – citing the heavenly orbs as prime examples.¹⁸ Then, in the context of his discussion of temptation, James contrasts the sun's παραλλαγή and its τροπῆς ἀποσκίασμα with God's character and activities. Interpretation is hampered by the fact that these three nouns, traditionally rendered 'variation', 'turning', and 'shadow', are *hapax legomena* in the New Testament. The LXX uses παραλλαγή once, τροπή eleven times, and ἀποσκίασμα not at all. We shall consider James's *hapax legomena* in order of their appearance, dealing most exhaustively with παραλλαγή.

3. The diffusion of astronomical knowledge in the world of James

James writes from Palestine, principally to Jewish Christians dispersed throughout the Graeco-Roman world, probably in both the Eastern and Western diaspora.¹⁹ Such were exposed not only to Jewish culture, but to

16. Textual criticism is beyond the scope of this article. We accept the majority opinion and work with ^{κ^c} A, but the choice does not affect our conclusions.

17. Scripture taken from the New King James Version®. Copyright © 1982 by Thomas Nelson. Used by permission. All rights reserved.

18. For φῶτα (pl.), meaning heavenly lights (sun and moon), see Psalm 135(136):7; Jeremiah 4:23 (LXX).

19. Richard Bauckham, *James: Wisdom of James, Disciple of Jesus the Sage*, New Testament Readings (Routledge, 1999), 14–16.

Graeco-Roman or Babylonian knowledge and ideas about the world. Around the Mediterranean, most people lived in the equivalent of a country town and its surrounds, familiar with agricultural lore and the movements of sun, moon, and stars to a much greater degree than modern industrial societies. This also applied to city life.²⁰

James's Jewish contemporaries studied meteorological events competently (Matt 16:2-3; Luke 12:54-56). James himself grew up in rural Nazareth and was still living there when Jesus visited (Mark 6:3). James refers to phenomena of the countryside in his letter (Jas 1:10-11; 3:3,11-12; 5:7,17-18). It is reasonable to assume that he had knowledge of the agricultural year, the lore associated with it, and some technical terminology. His brother Jude labelled certain individuals ἀστέρες πλανῆται, suggesting some knowledge of astronomical terminology within the family (Jude 13).

3.1 *Parapēgmata*

Considerable light was thrown on the role of astronomy in New Testament times by the discovery of two stone *parapēgmata* in Miletus in 1904.²¹ These were stone pillars engraved with astronomical phenomena against calendar dates, with holes into which a peg could be placed to mark the day. They were erected at places of social concourse. A review of a 2017 exhibition in New York City illustrates a Roman one, dated 8 BC.²² A nine-day cycle of market days is correlated with astronomical signs and meteorological lore associated with each day. Other *parapēgmata* indicated festivals and appropriate agricultural activities. The cost and labour of producing them indicates their importance.²³

Literary *parapēgmata* – calendars or almanacs – were being published by the first century BC. Democritus apparently wrote a book entitled *Parapēgma* (ca. 400 BC), since lost (Diogenes Laërtius, *Lives of Eminent Philosophers* 9.48). The astrologer Antiochus Atheniensis (perhaps around AD 100) also produced one.²⁴ Virgil (70–19 BC), Columella (flor. AD 50) and Pliny the Elder (AD 23–

20. John E. Stambaugh, 'Greco-Roman Cities', *ABD* 1:1044.

21. Hermann Diels and Albert Rehm, *Parapegmenfragmente aus Milet*, SPAW (Reichsdruckerei, 1904).

22. Ed Voves, 'Time and Cosmos in Greco-Roman Antiquity at the Institute for the Study of the Ancient World, New York City', *Art Eyewitness Blog*, 29 March 2017, <https://arteyewitness.blogspot.com/2017/03/time-and-cosmos-in-greco-roman.html>.

23. Liba C. Taub, *Ancient Meteorology* (Routledge, 2003), 47, <https://doi.org/10.4324/9780203634288>.

24. Franz Boll, *Griechische Kalender 1. Das Kalendarium des Antiochos*, Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Philosophisch-Historische Klasse 16 (Carl Winter, 1910).

79) discuss connections between astronomical observations and agricultural practice.²⁵ However, our most important source is Geminus of Rhodes (first century BC), who produced two popular works. *Eisagōgē* is ‘an early example of an elementary astronomical handbook written to popularise the main ideas in the technical treatises of the scientists’.²⁶ *Parapēgma*, written for the general public, is ‘one of the most important literary examples’ of *parapēgmata*.²⁷ Geminus follows the course of the sun through the zodiac, starting from the summer solstice in Cancer. He gives the number of days in each constellation, then selects particular days on which a star or constellation rises or sets, and the weather to be expected.

Behind these *parapēgmata* lay a long tradition of astronomical and meteorological observations in Babylonia and Greece. Already Hesiod (ca. 600 BC) was charting agricultural activity and the season for safe seafaring according to the rising and mutual positioning of stars and the summer and winter solstices. The timing of activities was recommended according to the auspicious or inauspicious nature of particular days (Hesiod, *Op.*, 383, 417, 479, 566–567, 571, 586, 598, 609–619, 663). *Parapēgmata*, both literary and stone, were authenticated by reference to reputable scientific writers and popularised by authors such as Theophrastus and the Peripatetics (ca. 300 BC) and the didactic poet Aratus of Soli (315–240 BC), whose work was ‘popular, widely read ... and long-lived’.²⁸

3.2 Babylonian texts

Jews had long been aware of astronomical phenomena and astrological practice. Job, Amos, and Isaiah refer to the same constellations, by their Hebrew names, as Hesiod and ancient astronomers (Job 3:9 (the ‘stars of its dawn’ are Mercury and Venus); 9:9; 38:31–32; Amos 5:8; Isa 13:10 LXX). Babylonian practices are mentioned in Isaiah 47:13.

Aramaic texts, including Babylonian astronomical texts and calendars, played an important role in transmitting Mesopotamian science.²⁹ Fragments of an Aramaic astronomical book (AAB) were unearthed from cave 4 at Qumran,

25. Taub, *Ancient Meteorology*, 20.

26. D. R. Dicks, ‘Geminus’, in *Complete Dictionary of Scientific Biography*, ed. Charles Coulston Gillispie (Scribner’s Sons, 1972), 5:345.

27. Taub, *Ancient Meteorology*, 20. Manitius’s *Introduction* combines the *Eisagōgē* and the *Parapēgma*.

28. Taub, *Ancient Meteorology*, 47.

29. Henryk Drawnel, *The Aramaic Astronomical Book, 4Q208–211 from Qumran: Text, Translation and Commentary* (Oxford University Press, 2011), 27.

dated late third to early second century BC.³⁰ They deal mainly with lunar observations, but also describe winds that blow upon the earth from gates in the sky, bringing either healing and life, or destruction and devastation.³¹ First Enoch appears to have been derived in part from AAB.³² 1 Enoch 72 depicts the sun passing through a sequence of six gates (points of rising and setting on the horizon). On the sun's northward journey, there is a gradual increase in the time occupied by the day. The reverse occurs on the return journey. The equinox is noted. Winds blowing through other gates bring rainfall, prosperity and health; and through yet others, drought, locusts and desolation (1 Enoch 76).

Astronomy was taught in Babylonian schools based in temples. Some Jewish children from priestly families were allowed to attend, leading to an influence of Babylonian educational practice upon Jewish education.³³ Teaching in these schools was not limited to mathematical astronomy, but included celestial as well as terrestrial divination.³⁴ The discovery of a number of sundials on the temple mount indicates that knowledge of this kind existed in Jerusalem.³⁵ The large number of priests who became obedient to the faith (Acts 6:7) suggests a vector for the transmission of this knowledge to the early church.

There is little doubt that James and his readers had both the motive (agriculture) and the opportunity (locally circulating theory and practice) to be familiar with the foundations of astronomy, at least at a popular level.

4. The meaning of παραλλαγή

4.1 Semantic range

Παραλλαγή occurs frequently in ancient literature, being used by a wide range of authors, although most use it relatively infrequently in their works.³⁶ It has a range of meanings depending on the context. LSJ gives παραλλαγή four primary meanings (I–IV below), the first of which is divided into four senses

30. Drawnel, *Aramaic Astronomical Book*, 1–4.

31. Drawnel, *Aramaic Astronomical Book*, 319–323.

32. Drawnel, *Aramaic Astronomical Book*, 1–4, 58.

33. Drawnel, *Aramaic Astronomical Book*, 24.

34. Drawnel, *Aramaic Astronomical Book*, 57–58.

35. See for example B. Mazar, *The Excavations in the Old City of Jerusalem: Preliminary Report of the First Season*, 1968 (Israel Excavation Society, 1968), Plate X.

36. The TLG database gives 222 instances between 3–2 BC and AD 1–2. Numbers per author range from 1–24, with 53 authors represented.

(1–4).³⁷ Its supporting citations extend from 500 BC to AD 300 and across the disciplines of philosophy, grammar, botany, medicine, history, and astronomy. Our focus will be astronomical usage, especially between 200 BC and AD 200:

- I A ‘*passing from hand to hand or transmission*’: (1) ‘*change of position*’ or ‘*movement*’ of the sun’s apparent motion (1a, the geographer Strabo), or ‘of a heavenly body, *passing beyond* the degree occupied by another’ (1b, the astrologer Antiochus Atheniensis); (2) ‘*alternation*’, e.g. of muscles (Hippocrates) or dancers (Critias); (3) ‘*distortion*’ or ‘*contortion*’, e.g. of vertebrae (Hippocrates) or wood (Theophrastus); (4) ‘*interchange*’, e.g. of intellect and sense (Plotinus), or of grammatical cases (Apollonius Dyscolus).
- II A ‘*difference between things*’, e.g. different smells; beauty and shame. This meaning is attested in writings of botany (Theophrastus), history (Polybius, Diodorus Siculus), philosophy (Plotinus, Arrianus), and poetry (Philodemus).
- III ‘*Variety*’ or ‘*variation*’, e.g. of magnitude or meaning, as attested in writings of botany (Theophrastus), philosophy (Epicurus, Chrysippus), mathematics (*Theologumena Arithmeticae*), astronomy (Cleomedes), and James 1:17. Theophrastus (ca. 300 BC) uses παραλλαγή seventeen times in his botanical writings, ranging across meanings I–III according to context.³⁸
- IV ‘*Frenzy*’ or ‘*madness*’ (LXX, 4 Kgd 9:20), or ‘*perturbation*’ of the soul (Iamblichus).

BDAG notes ‘rare’ uses of παραλλαγή as an astronomical technical term, and glosses it *change, variation*, which accommodates meanings I and III. The church fathers, who write at a later date, use παραλλαγή in distinctive ways with limited bearing upon the present investigation.³⁹

A survey of authors writing between 200 BC and AD 200 provides further examples that confirm the semantic range LSJ provides for παραλλαγή. They include Diodorus Siculus: fish ‘not far *removed* from the raw state’ (meaning II); Agatharchides: a *difference* in form between Greeks and Ethiopians (meaning II); Tryphon the Grammarian: two *different* words with the same meaning

37. H. G. Liddell, R. Scott, and H. S. Jones, *Greek-English Lexicon: With a Revised Supplement*, 9th ed. (Clarendon, 1996).

38. Theophrastus, *Caus. Plant.* 1.6.2, 1.20.4, 2.3.2, 2.4.7, 2.4.10 (x2), 2.7.5, 2.19.6, 4.9.4, 5.2.1, 5.3.2, 6.12.6; *Hist. plant.* 2.3.2, 3.4.1, 3.4.5, 5.1.12, 8.8.7.

39. See G. W. H. Lampe, *A Patristic Greek Lexicon* (Clarendon, 1961), s.v. παραλλαγή: ‘1. deterioration, destruction of substance ... 2. discrepancy ... differences of degree ... 3. distinction’.

(meaning III); Josephus: ‘conjoined with *madness*’ (meaning IV).⁴⁰ Two authors from the first century BC are of particular interest. Dionysius of Halicarnassus uses παραλλαγή three times to describe tiny differences between almost identical words, which differ only by a lengthened syllable or a slight change in pronunciation.⁴¹ The stoic philosopher Philodemus uses παραλλαγή twelve times, which the De Lacys translate *difference* or *distinction* nine times (meaning II), *variation* twice (meaning III), and *change* once (meaning I).⁴² In his one reference to the sun, Philodemus claims that its slow reappearance from an eclipse is consistent with the proposition that it moves because of causes whose *difference* (παραλλαγή) in size is inversely related to their distance from us (cols X.1–XI.8). Clearly παραλλαγή is a general word indicating difference of some kind, but the fact that it can describe tiny differences, and that it can be used in astronomical contexts with meanings I, II, or III, agrees well with its usage in Geminus’s *Eisagōgē*, as we shall see.

4.2 παραλλαγή in astronomical texts

Geminus’s *Eisagōgē* is our first source for astronomical meaning(s) of παραλλαγή, in part because the text is complete and well preserved, but also because Geminus was a populariser, so his explanations are more likely to have diffused into wider society than those of a high-level scientist like Ptolemy. We shall then review texts from Eudoxus, Hipparchus, Strabo, Cleomedes, Posidonius, Ptolemy, Plutarch, Antiochus of Athens, and Vettius Valens.

Manitius translates παραλλαγή in Geminus variously, under the broad category of ‘difference’.⁴³ This covers meanings I–III and begs the question of what kinds of scientific difference popularisers like Geminus were highlighting by using παραλλαγή. Geminus uses παραλλαγή only twenty-two times in

40. Diodorus Siculus, *The Library of History* (Oldfather, LCL), 3.18.2; Agatharchides, *De mari Erythraeo*, ed. K. Müller, *Geographi Graeci minores*, vol. 1 (Olms, 1965), 16.2; Tryphon I, *Excerpta Περὶ παθῶν*, ed. R. Schneider, *Programm Gymnasium Duisburg* (Leipzig, 1895), 2.35; Ant. 15.7.7.

41. Dionysius of Halicarnassus, *De compositione verborum*, Greek text ed. with trans. by W. Rhys Roberts (Macmillan, 1910), 152.

42. Philodemus, *On Methods of Inference: A Study in Ancient Empiricism*, trans. Phillip Howard De Lacy and Estelle Allen De Lacy (American Philological Association, 1941), cols X line 37, XIX.20, 35, XXI.30, 33, XXIII.10, 38, XXXIV.31, XXXV.11, 18, XXXVI.17; Frag. II.9.

43. ‘Unterschied’ (Intr. 5.20; 5.42; 5.59 [x2]; 6.3; 6.35; 6.37; 7.12; 8.22; 8.23; 13.28; 16.17; 17.18; 17.37), ‘Verhältnis’ (5.27; 6.38; 13.28), ‘Differenz’ (8.21 x2; 10.3), ‘Ungleichheit’ (2.26).

Eisagōgē, and not at all in *Parapēgma*. His usual word for ‘difference’ is διαφορά.⁴⁴ He uses the cognate noun παράλλαγμα five times (*Intr.* 8.19-32). The related verb is παραλλάσσω, whose astronomical usage has the sense ‘display parallax’. The associated noun used astronomically is παράλλαξις, ‘parallax’.⁴⁵

We are not seeking to find the best English gloss for James’s παραλλαγή, but the concept which its astronomical use might have aroused in James’s and his readers’ minds.

4.3 παραλλαγή in Geminus

All celestial bodies, including the ‘wanderers’ (the five planets and the sun and moon), were observed to move from east to west across the sky. However, if the steady westward revolution of the ‘fixed stars’ was taken as a reference point, the ‘wanderers’ appeared to move from west to east, slowly traversing the zodiac over the course of the year. They moved with variable speed, and the planets stopped and reversed periodically. That raised acute problems. The proposition that these divine and eternal bodies could change speed or stand still was against the nature of the gods and the sensibilities of every educated person. So Geminus set out to show ‘how the celestial phenomena can be explained assuming circular motion’ (*Intr.* 1.19-21). παραλλαγή is central to aspects of his explanation. It describes differences, revealed by scientific observations, which characterise the motion of the sun (as well as related celestial phenomena). These are usually miniscule in magnitude and unnoticed by the general public (*Intr.* 6.1-4), but they may become obvious (*Intr.* 6.29-38), and, if ignored, may produce disastrous results (*Intr.* 8.22-23).

Modern ephemeris show Geminus’s observations to be substantially correct.⁴⁶ However, a modern reader faces two obstacles. Ancient astronomers described the universe remarkably accurately, but with the instruments available to them, emerging with a mental image quite different from the modern one. Secondly, astronomy was directed to the needs of agriculture and trade, and to our human desire to know what future awaits us, and thus it centred on a study of the movement of the sun within the zodiac, the rising and setting of certain prominent stars, and the movements of the moon. Modern

44. *Intr.* 1.23; 2.25,42; 5.20,60-61; 9.13; 10.3; 11.5; 13.3,6,11,14-15,17. In several passages διαφορά and παραλλαγή occur together.

45. LSJ παραλλάσσω, II. 9: ‘*Ptol.Alm* 5.11; παράλλαξις, III. 2: ‘*Ptol.Alm* 5.11, 9.1’.

46. See for instance the changes in length of day around equinox, set for March in Rome, in ‘Time and Date AS’ (timeanddate.com, 1995–2026), <https://www.timeanddate.com/sun/italy/rome?month=3&year=2022>.

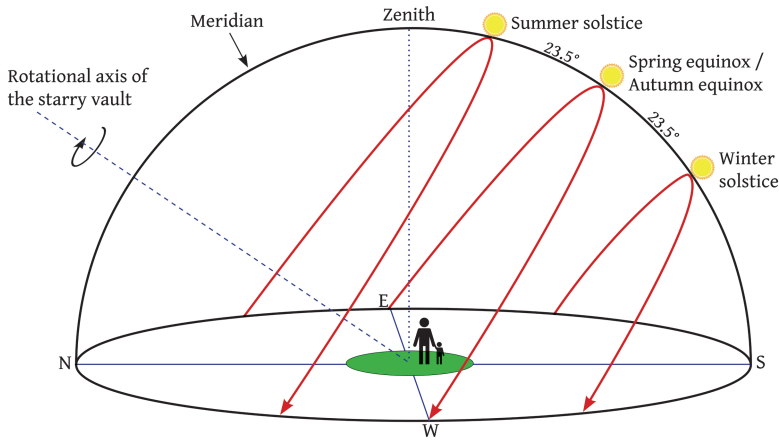


Figure 1: Seasonal path of the sun, as seen from the latitude of Athens.

readers wishing to understand what *παράλλαγή* meant to Geminus and his readers must therefore first learn to see the cosmos as they saw it.

4.3.1. Movement across the horizon

The sun rises at slightly different points on the eastern horizon each day. It passes across the sky in a circular arc to reach its highest point at noon, when it intersects the local meridian (an imaginary great circle passing directly above the observer's head), before setting in the west. The distances travelled between the meridian and each horizon were different (*παράλλαγή*) on every day of the year except two: the spring and autumnal equinoxes (see Figure 1). These were the only days when the lengths of day and night were equal.

The effect of this *παράλλαγή*, which is not apparent to the unaided eye, is to change the points of rising and setting so that, after passing beneath the earth, the sun has moved on to a different circle, which lies alongside (*παράλληλος*) its predecessor. There are 182 of these circles, moving the sun first northward until a day when it reverses the direction of its motion, moves to another part of the universe, and on to another set of circles which carries it south for six months, before reversing once again. These points of reversal are the summer and winter solstices. They were called *tropics* (*τροπικός*) because of the change in direction of the sun's movement (from *τρέπεται*, *turning*) (*Intr.* 5.4,8).

As summer approaches, the sun rises higher in the sky, with the overall slope of its path remaining constant. The proportion (*παράλλαγή*) of the circle described by the sun around the earth which appears above the horizon therefore becomes greater as the summer solstice approaches. The slope of the sun's semicircular path varies only with latitude. The closer an observer

is to the terrestrial equator the steeper the slope of the daily circles the sun describes. On the equator the sun's path is always perpendicular to the horizon.

The celestial equator is marked by the path of the sun at equinox, so except for those living on the terrestrial equator, the celestial equator curves across the sky, either north or south depending on latitude (*Intr.* 1.9-12; 5.18-26,38-42).

4.3.2. Movement along the zodiac

Another set of observations superimposed the sun's movement on that of the universe (κόσμος) – a perfect sphere bearing the fixed stars, which circles the earth from east to west. Its imaginary axis is coincident with the earth's axis, ending in two imaginary poles, one above the earth, whose position can be seen in all inhabited parts, and the other out of sight below the earth.

The fixed stars appear to lie on the surface of a sphere because our eyes cannot detect whether some are closer than others at such a distance (*Intr.* 1.23). They move in harmony regardless, maintaining their mutual relationships. The rotating cosmos carries the sun, moon, and planets with it in circles around the earth, each in its own sphere below the starry vault.

A number of named parallel circles divide the celestial sphere. Stars above the celestial Arctic Circle revolve around the celestial North Pole without ever setting (the celestial South Pole and Antarctic Circle were assumed to exist but were never visible). Stars between the northern and southern tropical circles lie within the area transited by the sun during the course of the year. Dividing the southern and northern tropics is the celestial equator (*Intr.* 5.1-11). Finally, there were great circles passing through both celestial poles and intersecting the equator at right angles – our meridians (ὁ μεσημβρινός).

The fixed stars were traditionally grouped into picturesque constellations. They include the twelve zodiac signs, which were defined as occupying twelve equal 30° segments around the celestial equator. This sloping band of constellations was 12° wide, and over the course of the year the sun moved on a path within it called the 'ecliptic' (ὁ διὰ μεσῶν τῶν ζωδίων κύκλος). The ecliptic can be viewed on a sky chart.⁴⁷ The plane of the zodiac, and of the sun moving within it, is λοξός ('slanting', 'crosswise') to that of the stars around the

47. The movement of the sun may be seen by varying the hour on an interactive sky chart. The chart by Chris Peat (Interactive Sky Chart, www.heavens-above.com) shows the celestial equator (white) and ecliptic plane (magenta). It is set for Rome in this example: <https://www.heavens-above.com/skychart2.aspx?lat=-33.7728&lng=151.0813&loc=Unspecified&alt=2850&tz=UCT>.

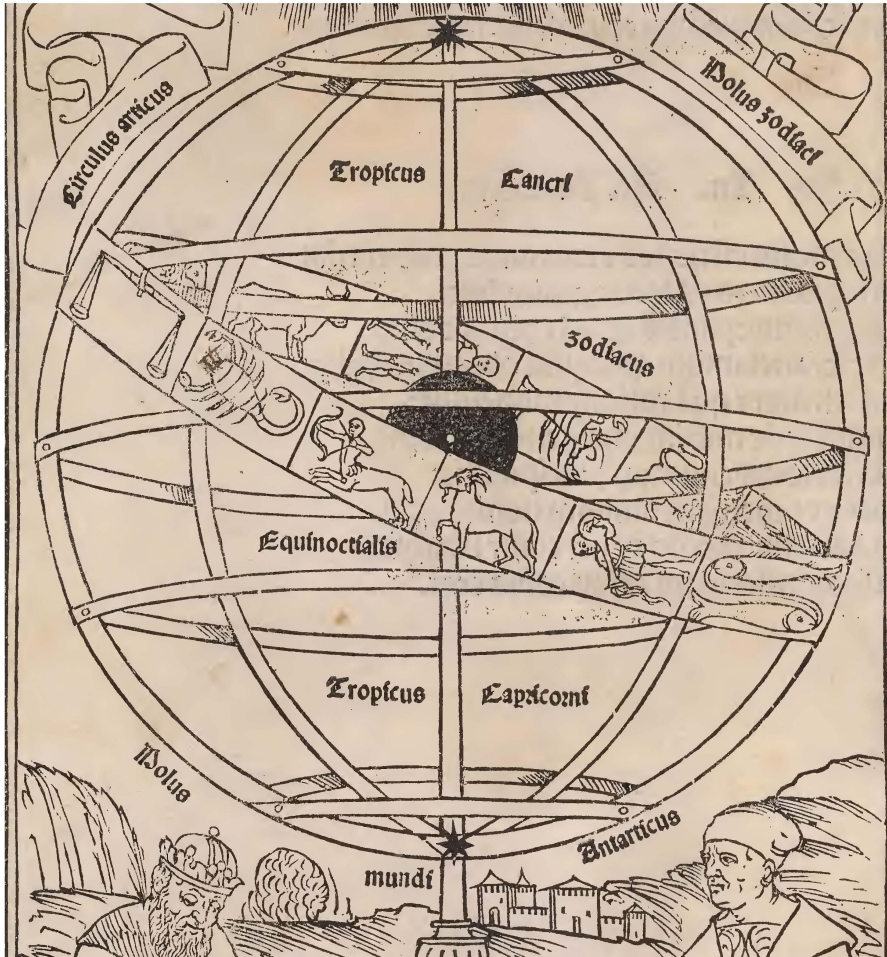


Figure 2: Celestial circles and the zodiac according to Ptolemy. Detail from Joannes Regiomontanus, *Epytoma Ioa[n]nis de Mo[n]te Regio in Almagestu[m] Ptolomei* (Johannes Hamman, 1496), frontispiece. Courtesy of the Smithsonian Libraries and Archives, <https://doi.org/10.5479/sil.448730.39088007520869>.

celestial equator (see Figure 2). The result of this tilting of the zodiac's plane is that six signs are above the celestial equator and six below.

As the sun is carried across the sky it moves independently in the opposite direction to that of the cosmos, rather like a boat sailing upstream while being carried downstream by the current, so that it takes slightly longer to arrive at the ocean. This retrograde movement along the ecliptic is imperceptible to the naked eye, but the difference (παράλλαγή) in the sun's position is revealed by careful astronomical observation. It is this change in position that moves the sun on to a different circle as it passes under the earth during the night. Over the period of a year of 365¼ days the sun comes to lie again in the original

zodiac sign, showing that the cosmos has rotated through 360° during that time. The timing of solstice festivals must take this retrograde movement and its παραλλαγή into account (*Intr.* 8.16-23).

The sun's daily παραλλαγή along the ecliptic becomes smaller as the solstice is approached. The difference in length of day becomes hardly noticeable (*Intr.* 6.35). On solstice day the sun traces the path of the tropical circle. After about forty days hovering with little change, the παραλλαγή in the length of day increases rapidly. It reaches its maximum when the sun reaches the equinoctial position on the celestial equator, where the difference in daily change of day length is up to ninety times that at solstice (*Intr.* 6.37, 38). Modern ephemeris show that the difference in solar length of day is in the order of seconds near solstice, and minutes near equinox. To quote a modern textbook, 'The sun itself is not a uniform timekeeper; it runs fast or slow of a regular schedule, at times nearly half a minute a day. The sundial is the only timepiece adapted to the sun's erratic behaviour.'⁴⁸

4.3.3. τὸ κλίμα and celestial phenomena

Even the slightest change of an observer's position changes the celestial phenomena. The Arctic, Antarctic, tropical and equatorial circles are of different lengths because they are different distances from the poles. This distance, in degrees, is their κλίμα ('slope'). The κλίμα of terrestrial places correlates to the modern idea of *latitude*, or distance from the equator.

Geminus uses παραλλαγή to describe differences of κλίμα because many celestial phenomena are influenced by κλίμα: the number of hours of night and day; the proportion of the celestial circles and the ecliptic lying above the horizon; the horizon itself; whether an eclipse will be total or partial; the rising and setting of stars; an effect on the weather and how this might influence the construction of a *parapegma*.⁴⁹

In short, Geminus uses the term παραλλαγή to describe small differences that characterise the movements of the sun itself, differences caused by movements of the sun, and differences – such as that of κλίμα – that affect the movements of the sun. It seems apparent that, for Geminus, παραλλαγή was a technical astronomical term when it pertained to the sun and its effects.

48. Robert H. Baker, *Astronomy*, 8th ed. (D. van Nostrand, Affiliated East-West Press, 1965), 74.

49. *Intr.* 5.20-27; 5.58-61; 10.3-4; 16.13-17; 17.18-19.

4.4 παραλλαγή in other astronomers and geographers

Eudoxus (fourth century BC), in one surviving fragment, discusses the imperceptible παραλλαγή associated with the difference between a year of 365 days and one of 365¼ days, which results in a drift in the date of the winter solstice, and its accumulative effect as the years pass. The account matches, word for word, that related by Geminus, using παραλλαγή in all its astronomical senses.⁵⁰ Evidently, Geminus was popularising technical material which had been circulating for centuries.

Hipparchus (second century BC) was considered the greatest of the astronomers, but little of his work remains. His one surviving use of παραλλαγή assures his readers that using slight approximations for the positions of stars results in an ‘insignificant difference’.⁵¹

Posidonius (first century BC) uses παραλλαγή nine times in extant fragments, each time to describe some sort of difference. Two uses are non-astronomical. Seven uses concern the movements of the sun or differences caused by its movement: different (παραλλαγή) phenomena are produced as the sun traverses different κλίματα. The temperature generated by the sun in certain latitudes ‘differs to be sure (διαφερόουσας), but shows no violent changes (παραλλαγήν) from hot to cold’. In discussing the waxing and waning of the sun and moon Posidonius mentions ‘such a difference’ (τοσαύτη παραλλαγή) in the apparent size of orbiting bodies between apogee and perigee.⁵² Three of the seven uses are preserved more fully by Strabo and are discussed below. In addition, Posidonius describes different effects (διαφορά) of the sun in different places, often contradictory.

For Strabo the geographer (63 BC–AD 23), astronomy was foundational but never the focus. He discusses κλίμα, but as a practical tool for mapping (*Geogr.* 1.4.1–2). He touches on the sun’s movement through the zodiac, or its height at different latitudes, in general terms only (*Geogr.* 1.2.24, 2.1.18, 2.3.2, 2.5.2). He defers to Hipparchus for details, because the geographer ‘need not busy himself with what lies outside of our inhabited world’ (*Geogr.* 2.5.34 (Jones, LCL)). His usual term for ‘difference’ is διαφορά. He uses παραλλαγή only three times, each time borrowed from Posidonius. He contrasts the small latitudinal difference (κεκλίσθαι παραλλαγήν) when small countries are concerned with

50. F. Lasserre, ed., *Die Fragmente des Eudoxos von Knidos* (De Gruyter, 1966), frag. 241d.7–10, 13, <https://doi.org/10.1515/9783110828931>; cf. *Intr.* 8.21–23.

51. Hipparchus, in *Arati et Eudoxi phaenomena commentariorum libri III*, ed. and trans. Karl Manitius (Leipzig, 1894), 2.4.6.

52. W. Theiler, ed., *Posidonius, Die Fragmente*, vol. 1 (De Gruyter, 1982), 290a.154.25, 77.6, 355.4 respectively.

the very great difference (διαφορά) when the circle of the inhabited world is concerned (*Geogr.* 1.1.13). He observes that while the annual tidal difference (διαφορά) at Heracleium was not seen at full moon on the summer solstice, the sun's conjunction (σύνοδος) with the moon produced a μεγάλην παραλλαγήν in a certain backwater, compared to previous changes (*Geogr.* 3.5.9). And he refutes the idea that the sun passes more quickly over arid than moist regions with the fact that 'the speed of the sun's [παραλλαγή] is everywhere equal' (*Geogr.* 17.3.10 (Jones, LCL)). Jones translates παραλλαγή 'transit'; LSJ suggests 'apparent motion'.

In a series of lectures, Cleomedes (usually placed between about 50 BC and AD 200) gave a 'relatively unsophisticated' account of astronomy, drawing on Posidonius.⁵³ His astronomy is similar to Geminus, but at a more elementary level, illustrated by analogies suited to teaching. He uses παραλλαγή six or seven times, all relating to solar phenomena affected by κλίμα, for example, gradual variations in the length of the day as one moves from the equator to the pole.⁵⁴ These latitudinal changes are consistent with the usage of Geminus. Cleomedes also uses διαφορά. Its fifteen uses almost always describe large differences between things: the zones of the earth, the sizes of earth and moon, the shapes of the sun's shadow on the moon, etc.⁵⁵ He uses both words together in a passage discussing differences in conditions (temperature, flora, fauna) between diverse κλίμα. He explains that 'The Sun is, in general, the cause of virtually all the variety (διαφορά) found among things on the Earth, since the Earth shows considerable contrast (παραλλαγή) at some latitudes (κλίμα).'⁵⁶

Ptolemy (second century AD) uses παραλλαγή twenty times across six works. Eleven come in *Harmonica*, a work of musical theory whose Greek seems not to have been regular and consistent, and which we have therefore excluded from this study.⁵⁷ His book of astrology, *Tetrabiblos*, uses παραλλαγή three times, unrelated to the sun (1.2.19, 2.2.6, 3.15.7). His *Geographia* uses παραλλαγή three times (1.9.2, 1.18.2, 8.1.6). Berggren and Jones render ἀνωμαλίαν καὶ παραλλαγήν as 'variation and shifting' (i.e. of winds over a long time) and παραλλαγή as 'distortion', which is either 'grave through gradual changes' or

53. Alan C. Bowen and Robert B. Todd, *Cleomedes' Lectures on Astronomy: A Translation of The Heavens with an Introduction and Commentary* (University of California Press, 2004), xii, <https://doi.org/10.1525/california/9780520233256.003.0001>.

54. *Cleomedis Caelestia* (Μετέωρα), ed. R. Todd (Teubner, 1990), 1.4.150, 186, 189, 196; 1.5.36, 377, <https://doi.org/10.1515/9783110967777>. The text of the further occurrence in 2.5.61 is uncertain (see Bowen and Todd, *Cleomedes' Lectures*, 148 n. 10).

55. *Cleomedis Caelestia*, 1.4, 2.3, 2.5.

56. Translation by Bowen and Todd, *Cleomedes' Lectures*, 120.

57. Jon Solomon, *Ptolemy Harmonics: Translation and Commentary* (Brill, 2000), 3 n. 7.

‘significant’.⁵⁸ This semantic variety maps on to the meanings of παραλλαγή given in LSJ, but none of these uses concern astronomy or the sun. Ptolemy’s astronomical writings were intended for the scientific community and do not address the elementary matters dealt with by Geminus and the other popularisers. He uses παραλλαγή once in *Planetary Hypotheses*, to explain that a compromise between precise theoretical models and useful observational instruments will result in ‘small variations’ (μικρά ... παραλλαγή).⁵⁹ *Almagest*, an advanced exposition of mathematical astronomy, uses παραλλαγή twice, both times to describe minuscule differences: (1) a *change* in the position of planets due to a shift in their apogees, cumulative errors in measurement of which needed correction, although it will remain negligible for a very long time; and (2) a *difference* in the longitudinal positions of planets which is not noticeable since they are so small.⁶⁰

BDAG considers παραλλαγή an astronomical term in Antiochus of Athens. However, Antiochus is explaining the astrological significance of astronomical configurations. παραλλαγή in Antiochus’s system is unrelated to the sun; it concerns stars which ‘pass by the degree of another star either bodily or by figure’.⁶¹ Equally unhelpful is Vettius Valens, an astrologer who uses παραλλαγή in connection with horoscopes.⁶²

To summarise, while astronomers other than Geminus use παραλλαγή with a range of meanings, its astronomical uses almost always describe small changes or differences, usually of a different order to those described by διαφορά, and generally related to the differences caused by the sun’s movements or effects as it traverses the latitudes. Insignificant differences can accumulate and become significant (Eudoxus, Cleomedes, Ptolemy).

4.5 παραλλαγή in James

As with any *hapax* we should ask why James chose to use παραλλαγή rather than the common word μεταβολή if he merely wanted to say that God does not

58. *Ptolemy’s Geography*, trans. J. Lennart Berggren and Alexander Jones (Princeton University Press, 2020).

59. *Claudii Ptolemaei Opera Quae Exstant Omnia: Vol. 2, Opera Astronomica Minora*, ed. J. L. Heiberg (Teubner, 1907), 72; Elizabeth Anne Hamm, ‘Ptolemy’s Planetary Theory: An English Translation of Book One, Part A of the Planetary Hypotheses with Introduction and Commentary’, PhD thesis (University of Toronto, 2011), 46.

60. *Almagest*, trans. G. J. Toomer (Duckworth, 1984).

61. Antiochus of Athens, *The Thesaurus*, trans. Robert Schmidt (Golden Hind, 1993), 28 n. 2.

62. Vettius Valens, *Vettii Valentis anthologiarum libri*, ed. W. Kroll (Weidmann, 1908), 9:147.10, 301.2, 315.15, 17.

change. Μεταβολή was used by Herodotus to refer to an eclipse and by Plato to describe the reversal of the direction of motion of the sun and stars.⁶³ It is also used in an astronomical context in Wisdom 7:18. James used παραλλαγή without qualification, expecting his readers to understand him. What astronomical meaning for παραλλαγή could he have shared with his readers?

We do not expect that people like James understood technical details and mechanisms, but we would expect them to know that παραλλαγή in astronomical settings describes tiny changes in the sun's motion which can build up and have profound effects, much as a modern lay person may be able to talk about the 'butterfly effect' on the weather without understanding chaos theory or use technical terms for computer hardware without possessing technical understanding of the hardware itself.

An inference from the usage of Geminus and others that would fit the context of James 1:17 is that παραλλαγή reflects metaphorically the initially insidious and eventually extravagant effects of sin and temptation, and so mirrors James's metaphor about the conception and birth of sin in 1:14-15. However, since God cannot tempt or be tempted (1:13), there is no subtle irregularity in him such as that exhibited by the sun.

5. τροπή in Geminus, the Septuagint, and James

τροπῆς ἀποσκίασμα forms a more recognisable astronomical phrase. James is not contrasting three phenomena with God's character and activity, but two, conjoined by καί – παραλλαγή and τροπῆς ἀποσκίασμα.

LSJ gives τροπή two main meanings. With transitive force it can mean *the turning about of the enemy, putting to flight or routing him*, and it is used thus in the LXX, always in the singular.⁶⁴ However, its main meaning, which can have several senses, concerns a point or process of turning. It can describe: (1) each of the two solstices; (2) an internal 'turn', such as wine turning sour, or the weather turning; (3) a turn of speech or trope. The first of these is the most frequently attested.

Specifically, τροπή describes the reversal of the movement of the shadow cast by a γνῶμων (sundial pointer) at the solstices. It was used with this sense, either alone or with ἥλιος, and usually in the plural, from the time of Hesiod.⁶⁵ Geminus consistently uses the singulars τροπή θερινή (summer solstice) and τροπή χειμερινή (winter solstice) in his *Eisagōgē* and starts his calendar ἀπὸ

63. Herodotus, *Hist.* 1.74; Plato, *Pol.* 271c.

64. For example, Exod 32:18; 1 Macc 4:35; 2 Macc 12:27.

65. Hesiod, *Op.* 479.

τροπῆς θερινῆς. He does not use τροπή to describe other types of turning, such as the rotary motion of the heavenly bodies, for which he uses στρέφω and περιστροφή.⁶⁶

τροπή is used in the LXX three times to refer to the sun's seasonal movements. Of these, Muraoka and *NETS* translate τροπῶν in Wisdom 7:18 as 'solstices'.⁶⁷ Deuteronomy 33:13-14 (ἡλίου τροπῶν, Muraoka: 'solar cycle') could also refer to the solstices and be a way of referring by metonymy to the alternation of summer and winter. Dibelius, Ropes, and Vlachos detect a reference to the solstice here.⁶⁸ Vlachos also finds a reference to the solstice in Job 38:33 (τροπὰς οὐρινοῦ).⁶⁹ The phrase does not refer specifically to the sun and could refer to the daily turning that characterises all heavenly objects, referred to by Geminus as 'the motion of the universe' (τὸν κόσμον κινεῖσθαι) (*Intr.* 1.19). However, τροπαί is the usual expression for the solstices, and on balance the astronomical context supports this meaning for Job 38:33.

It is difficult to resist the conclusion that τροπή, conjoined with ἀποσκίασμα, refers to the solstice in James 1:17.

6. ἀποσκίασμα and sundials

The normal word for 'shadow' is σκία. Cleomedes and Ptolemy both use it of the earth's shadow.⁷⁰ Diodorus Siculus and Geminus reserve the less common σκίασμα for the earth's ecliptic shadow when the moon enters it, though neither use τροπή to describe the motion of the sun or moon in this context.⁷¹ However, ἀποσκίασμα, though used often by the Church Fathers under the influence of James, has just three independent citations in TLG before AD 200, including James 1:17.

The fourth-century BC historian Theopompus uses ἀποσκίασμα of 'the shadow from the light cast by the sun',⁷² but the fragment lacks any explanatory context. Democritus uses ἀποσκίασμα when explaining how the dark patches

66. *Intr.* 7.2; 5.3-4,7,12,34,62-63; 6.2; 11.1-4 with diagram.

67. T. Muraoka, *A Greek-English Lexicon of the Septuagint* (Peeters, 2009), 687.

68. Dibelius, *Commentary* 100; Ropes, *Epistle of St James*, 164; Vlachos, *James*, 49.

69. Vlachos, *James*, 49.

70. Bowen and Todd, *Cleomedes' Lectures on Astronomy*, 146.19-20; 192.21,26; Ptolemy, *Syntaxis Mathematica*, ed. J. L. Heiberg (Leipzig, 1898), 479.21; 480.2.

71. Diodorus Siculus, *The Library of History* 2:31.6 (Oldfather, LCL); Geminus, *Intr.* 8.14; 11.1-4 with diagram.

72. *Fragmenta Comica*, 3B:742 addenda, in F. Jacoby, *Die Fragmente der griechischen Historiker* (Brill, 1923-1958, repr. 1954-1969).

on the moon make it earth-like.⁷³ Perhaps he intended the ἀπο- to be intensive in view of the size of such shadows, although Dibelius detected a qualitative nuance ('a sort of shadow').⁷⁴

LSJ derives its definition exclusively from James: 'a shadow cast by turning'. It provides a second meaning, *illusion, deceit*, from the sixth-century AD diplomat Menander, who used ἀποσκίασμα to describe the fraudulent behaviour of the Persians.⁷⁵ This metaphorical transference of meaning is frequent in the church fathers, who use ἀποσκίασμα to describe such things as a corrupt life, 'shadow', and 'obscuration'.⁷⁶ The selection of this second gloss suggests that LSJ reads something negative out of James's expression; however, this interpretive tradition may well have left the cultural context of James's world behind.

Usage from James's time is too scanty to advance our earlier conclusion, namely, that ἀποσκίασμα and τροπῆς belong together in James 1:17 as a reference to the solstice, specifically, *the shadow cast at the solstice*. However, we can make some headway by remembering that the shadow in question was cast on to a sundial, or σκιοθήρης ('shadow-viewer').⁷⁷ Vitruvius (a first-century BC architect and engineer) explains the importance of sundials for finding 'the operation of the sun in the universe', remarking on the 'very great wonder ... that the shadow of gnomons [sundial pointers] at the equinox' is different at different places in the world and increases in length until winter solstice.⁷⁸

The normal word for the shadow on a sundial is not ἀποσκίασμα but σκία (cf. 4 Kgd 20:9-11). For example, regarding the sundial (σκιοθήρης), Geminus states that 'the tip of the shadow (σκία) of the pointer (γνώμων) stays on the lines of the tropics for about 40 days' (*Intr.* 6.32). There is an exception to this norm in Plutarch, when Pericles must decide whether a deformity in a goat's horn carries a divinatory meaning despite the fact that its cause was determined to be a growth:

[T]hose who declare that the discovery of the cause, in any phenomenon, does away with the meaning, do not perceive that they are doing away

73. Jaap Mansfield and David T. Runia, *Aëtiana: The Method and Intellectual Context of a Doxographer*, *Philosophia Antiqua* 114 (Brill, 2008), 2:628.

74. Dibelius, *Commentary*, 101 n. 167.

75. R. C. Blockley, *The History of Menander the Guardsman* (F. Cairns, 1985), 234: οὐδὲν ἕτερον ἢ δόκησις καὶ ἀποσκίασμα καὶ φενακισμοί, 'nothing other than fancy, deceit and quackery'.

76. Lampe, *Patristic Greek Lexicon*, s.v.

77. E.g. Diogenes Laërtius, *Lives* 2.1; Vitruvius, *The Ten Books on Architecture*, trans. Morris Hicky Morgan (Oxford University Press, 1914), 1.6.6; Strabo, *Geogr.* 2.5.24; Cleomedes, *Caelestia* (Μετέωρα), ed. R. Todd (Teubner, 1990), 1.5.62.

78. Vitruvius, *Ten Books*, 9.0.18, 9.1.1.

not only with divine portents, but also with artificial tokens, such as the ringing of gongs, the language of fire-signals, and the shadows of the pointers on sundials [καὶ γνωμόνων ἀποσκιάσµους]. Each of these has been made, through some causal adaptation, to have some meaning. (Plutarch, *Per.* 6.4 (Perrin, LCL))

Plutarch's term for 'shadow' is ἀποσκίασµος, a cognate of ἀποσκίασµα found only in this passage. This raises the possibility that James uses ἀποσκίασµα with the sense of an *ominous* shadow, a shadow used in divination. Ropes is convinced that James's choice of this 'heavy and explicit compound' is significant, but he does not agree that there is any connection to sundials, because ἀποσκίασµα and ἀποσκίασµος are different words. His guess for ἀποσκίασµα is an intensive (he suggests 'shadowing').⁷⁹ However, Ropes's conclusions follow from his belief that παραλλαγή is not an astronomical term and τροπή is 'semi-astronomical', and he seems unaware that σκία, not ἀποσκίασµος, is the normal word for the shadow on a sundial.

James would have been familiar with sundials, which had been in daily use in Judea since the first century BC, 'possibly suggesting that their introduction into more "scientific" circles occurred some time earlier' (see §3.2 above).⁸⁰ He would have been equally familiar with astrology and divination, which permeated every layer of Graeco-Roman society. Despite the strong disapproval of such things in the Jewish Scriptures (Deut 4:19; Jer 10:2), many second-temple Jews practised astral divination. The Qumran community used astrology to decide the timing of ceremonies, to assess people's characters, and to predict the future.⁸¹ For example, *4QBrontologion* gives predictions about the nation and its people 'based on the moon's position in the zodiac on the ominous day of thunder'.⁸² Significantly for James 1:17, the Jewish astrological calendar revolved around the equinoxes and solstices. In 1 Enoch 72, the first and sixth gates of the sun are at the winter and summer solstices. The year itself begins in the vernal equinox.⁸³ In Qumran, 'the spring phenomenon of 1 Nisan

79. Ropes, *Epistle of St James*, 165.

80. Eshbal Ratzon, 'Jewish Time: First Stages of Seasonal Hours in Judea', *Studies in History and Philosophy of Science Part A*, 75 (2019): 23, <https://doi.org/10.1016/j.shpsa.2018.11.003>.

81. Hanna Tervanotko, 'Jewish Divination in the Greco-Roman Era', *Religion Compass* 18.11 (2024): 1–8, <https://doi.org/10.1111/rec3.70008>.

82. Helen R. Jacobus, 'Aramaic Calendars in the Dead Sea Scrolls and the Question of Divination', in *Unveiling the Hidden – Anticipating the Future: Divinatory Practices among Jews between Qumran and the Modern Period*, ed. Josefina Rodríguez-Arribas and Dorian Gieseler Greenbaum (Brill, 2021), 50, https://doi.org/10.1163/9789004445703_004.

83. Jacobus, 'Aramaic Calendars', 72–74.

coinciding with the vernal equinox every 19 years is an ideal year with which to commence the nineteen-year cycle'.⁸⁴ This provides another connection to Geminus, who addressed the nineteen-year cycle at length (*Intr.* 8.48-60). Pliny the Elder (AD 23-79) reported that, as well as rains and storms, harmful ailments descend on people and their crops at winter solstice and autumnal equinox.⁸⁵ Indeed, 'the broad significance across cultures of the solstices as astronomical "targets" is self-evident and widely attested'.⁸⁶

These observations are far from conclusive. Even assuming that ἀποσκίασμος has a divinatory meaning for Plutarch, a single passage is insufficient grounds for concluding that James used the prefix ἀπο- to add divinatory significance to σκίασμα. Neither can we be confident that James was thinking of divinatory practices on the solstice. And yet his choice of ἀποσκίασμα requires some explanation, and the considerations we have adduced have a certain cumulative force, which convinces us that this is currently the likeliest possibility for the choice of this elusive *hapax*. It also provides a point of purchase for the development of the word's meaning by the church fathers.⁸⁷ We therefore suggest that for James, τροπῆς ἀποσκίασμα signified an ominous pause in the sun's motion, marked by an unmoving shadow.

7. Conclusion

James contrasts two features of the sun – the most constant object in creation, by which all life is ordered – with its creator, the Father of lights. In contrast to God's steadfast and consistent goodness, the sun is *not* absolutely consistent in its motion. Its trajectory moves in arcs which change continually in miniscule increments, which in turn cause changes on the earth that can accumulate catastrophically. Moreover, twice a year, the sun pauses, casting an ominous shadow, which is used by some to blaspheme the name of God. Even the most glorious object in the universe, a good gift of the Father, is tainted by human sin.

84. Jacobus, 'Aramaic Calendars', 85.

85. Pliny the Elder, *Nat. Hist.* 2:41 (Rackham, LCL).

86. Iván Ghezzi, 'Chankillo, Peru', in *Heritage Sites of Astronomy and Archaeoastronomy in the Context of the UNESCO World Heritage Convention: Thematic Study no. 2*, ed. Clive Ruggles (ICOMOC and IAU, 2017), 72.

87. As far as we know, it has never been suggested that James coined the word (it is not even among the candidates Allison rejects as possibilities in *Epistle of James*, 85 n. 443); however, if he did, the prefix ἀπο- suggests something coming from or caused by a solstice shadow, which feels similarly ominous.

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