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Saturn as the “Sun of Night” in Ancient Near Eastern Tradition*

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[This article tackles two issues in the “proto-astronomical” conception of the planet Saturn, first attested in Mesopotamia and followed by the Greeks and Hindus: the long-standing problem of Saturn’s baffling association with the Sun; and why Saturn was deemed to be “black”. After an extensive consideration of explanations offered from the 5th century to the 21st, as well as some new “thought experiments”, we suggest that Saturn’s connection with the Sun had its roots in the observations that Saturn’s course appears to be the steadiest one among the planets and that its synodic period – of all the planets – most closely resembles the length of the solar year. For the black colour attributed to Saturn we propose a solution which is partly lexical and partly observational (due to atmospheric effects). Finally, some thoughts are offered on the question why in Hellenistic times some considered the “mock sun” Phaethon of Greek myth to have been Saturn].

Keywords: Saturn, planets, Sun, planet colour.

INTRODUCTION

Since the late 19th century scholars have been puzzled by a conspicuous peculiarity in the Babylonian nomenclature for the planet Saturn: a number of texts refer to Saturn as the “Sun” (*dutu/20* or *Šamaš*), instead of its usual astronomical names *Kayamānu* and *mulUDU.IDIM*.¹ This curious practice was in vogue during the period c. 750-612 BC² and is not known from earlier periods, with a single possible exception, discussed below.

Evidence for the association of Saturn and the Sun takes two forms. Direct attestations include the following cuneiform passages, in which Saturn is equated with other astronomical objects:

* We would like to dedicate this article to the memory of Dr Richard Stothers (1939-2011), an astronomer at the NASA Goddard Institute for Space Studies, whose contributions to puzzles in the history of astronomy have been invaluable. The suggestions Stothers offered to us just a few months before his passing have had a defining influence on the present article.

1. For some early discussions, see Lenormant 1878: 137-138; Jensen 1890: 115-116; Bouché-Leclercq 1899: 93, n. 2; Winckler 1901: 260; Kugler I 1907: 8; II 1909: 105; Hommel 1909: 180; Jastrow 1910: 163-167; Weidner 1915: 23.

2. Brown 2000: 57.

#1	^d UDU.IDIM.SAG.UŠ: MUL ^d UTU	Saturn = the Sun ³
#2	^{mul} SAG.UŠ MUL šá ^d UTU	Saturn = the Sun ⁴
#3	mul.gi.gi = MUL <i>kit-tú u me-šar</i> = ^d SAG.UŠ ^d UTU	mul-gi-gi = the star of truth and justice = Saturn / the Sun
	MUL GE ₆ = AN ^{ša-al-me} DÙL = MIN	black (<i>šalmu</i>) star = statue (<i>šalmu</i>) = ditto ⁵
#4	^{mul} UDU.IDIM.SAG.UŠ KIMIN ^{mul} <i>zi-ba-ni-tu</i> ₄ MUL ^d UTU Kayamānu KIMIN Zibānītu kakkab Šamaš	Saturn, also called the Scales (or) star of the Sun ⁶
#5	MUL.GE ₆ = ^d Zi-[<i>ba-ni-tum</i>] ^{mul} <i>Zi-ba-ni-tum</i> = ^d UTU	the black star = the Sca[les] the Scales = the Sun ⁷

Table 1. cuneiform passages associating Saturn with the Sun

Saturn's solar association was also familiar to astrologers responsible for the omen literature, first edited by Reginald Thompson in 1900. In these passages it was not always directly stated, but can sometimes be inferred from the astronomical impossibility of the event if the "Sun" were to be interpreted in the literal sense – a reliable criterion introduced by Morris Jastrow. For example, a reference to Jupiter (SAG.ME.GAR) appearing "in the Sun"⁸ surely refers to a conjunction with Saturn. In quite a few cases, scribes added glosses which confirm that Saturn was referred to. In one text, a Babylonian commentator glossed "the path of the sun" (*ḥar-ra-na* ^dšá-maš) as that of "Saturn" (MUL.UDU.IDIM.SAG.UŠ).⁹ In another, Venus' approach to "the Sun", which would be quite a meaningless condition if taken literally, is clarified with reference to Saturn:

If Venus in month X comes close to the Sun: a great king, variant: a king [of the universe] will come to shame – Venus [comes close to] Saturn ...¹⁰

3. Commentary on *Iqqur Īpuš* (K. 42286), rev. 6, ed. Gadd 1931: plate 39; Labat 1933: 100-101; tr. Parpola II 1983: 342. The preceding line mentions *kakkab zi-ba-ni-tum* ("the constellation de Balance"), ed. Labat 1933: 100-101.

4. *BM* 121206 viii 60', ed. van Driel 1969: 96-97, 113, where DU is emended to UŠ.

5. *ḤAR-gud* = *imrû* = *ballu* (commentary on *ḤAR-ra* = *ḥubullu*), recension B, VI, 39-40, eds. Reiner & Civil 1974: 40, based on tablets K. 260 + 4235 + 4239 + 10093 = 2 R 49, 3. 18-19 (ed. Weidner 1915: 29); compare K. 12619, 2: 4-6 (ed. Weidner 1915: 29). Kugler (1914, suppl. II: 196-197, n. 2) identified the passage "*MUL.GIG* ^{il}(*ša-al-me*) ŠÚR ^{il}SAG.UŠ (*kaimānu*) ^{il}Šamaš" as 2 R 49, 3. 42. Parpola (II 1983: 342) separately listed "^dSAG.UŠ: MUL GE₆: ^dUTU", translated as "Saturn = the black star = the Sun", citing this as 2 R 49, 3. 42 and referring to Weidner 1915: 29. However, said tablet does not appear to have a line 42 and the reference appears to be to the present passage.

6. *MUL.APIN*, 2. i. 38-39 = 64, trs. Hunger & Pingree 1989: 80 = 86.

7. K. 11283 + 79. 7 – 8. 352, 5-6, ed. Parpola II 1983: 343; Weidner 1915: 22. Earlier, Weidner (1913: 211) had stated that Šamaš in this passage connotes the Sun.

8. Bulluṭu, in *Enūma Anu Enlil*: K. 742, ll. 1-2, tr. Hunger 1992: 73 #115.

9. Nabû-aḥḥu-Eriba, in *Enūma Anu Enlil*: Sm. 375, obv. 4, 6, tr. Hunger 1992: 29 #49.

10. K. 42, rev. 4, eds. Reiner & Pingree 1998: 195; cf. Virolleaud 1909: 8.

Jastrow applied his criterion to juxtapositions of the “Sun” and the Moon. Whereas the Sun and the Moon can be visible in the sky simultaneously, they can never do so in close proximity, when the former outshines the latter. Yet some Babylonian omens refer to Šamaš, at face value the Sun, as standing in the vicinity of the Moon. For example:

If the sun stays in the position of the moon: the king of the land will sit firmly on the throne.
[If] a sun disk stands above the moon (and) below the moon: the foundation of the throne will become stable; the king of the land will stay in his truth.¹¹

A comment on the reverse of the tablet reveals that the observation was made at night and concerns the planet Saturn:

Tonight the planet Saturn approached the Moon. Saturn is the star of the Sun, (and) the relevant interpretation is as follows: it means good for the king. Saturn is (namely) the star of the king (too).¹²

Five other omen texts refer to occasions when Šamaš is specifically stationed “in the halo of the Moon” (*ina tarbaš Sin*).¹³ As lunar haloes are only visible after sunset, Šamaš here cannot be the Sun.¹⁴ And in each case, a gloss clarifies that the omen was descriptive of Saturn in that position.

Of a much earlier date (13th century BC) is an astrological text from Emar including two omens in which the “Sun” (“20”) at sunrise approaches respectively “two stars” (“2 mul.meš”) and “the Moon” (“^d30”).¹⁵ Although Saturn is not explicitly mentioned, the evidence reviewed above suggests that it may have been the intended subject.¹⁶ This would make it the earliest attested description of Saturn as the “Sun”.

In the Greek world the planet Saturn was usually associated with the god Kronos, whom the Romans identified with the deity Saturn. However, following the Babylonian tradition, some classical statements identified it as the “star” of Hēlios or Sol, i.e. the Sun (see appendix 1 for an exhaustive

11. “1 ^dUTU *ina man-za-zi* ^d30 GUB-iz / LUGAL KUR *ina* ^{GIŠ}GU.ZA *i-ka-na* / [1] AŠ+ME AN.TA-nu 30 KI.TA-nu 30 GUB-iz / SUHUŠ GIŠ.GU.ZA *i-ka-na* / LUGAL KUR *ina kit-ti-šú* GUB-až”, Balasí, in *Enūma Anu Enlil*: 81-2-4, 80, obv. 1-5, tr. Hunger 1992: 55 #95; cf. Parpola I 1970: 280-281. Compare the similar statement in 24 (25), II b, tr. van Soldt 1995: 22.

12. Parpola I 1970: 280-281 – “... ^{MUL}UDU.IDIM.SAG.UŠ *a-na* ^d30 / *iq-ṭi-ri-ib* ^{MUL}UDU.IDIM.SAG.UŠ / MUL: ^dUTU *šú-ú* / *ki-i an-ni-i-e* / *pi-še-er-šú* SIG₅ *šá* LUGAL *šú-u* / ^dUTU MUL *šar-ri šú-u*”. In volume II (1983: 343) Parpola corrected the translation of the final sentence to: “Sun [*sic*] is the star of the king”.

13. Šapiku of Borsippa, in *Enūma Anu Enlil*: Sm 366+80-7-19.371, verso 5-9, recto 4, tr. Hunger 1992: 271 #491; Nabû-Iqbi of Cutha, in *Enūma Anu Enlil*: 83-1-18, 290, ll. 4-5, tr. 1992: 238 #416; Nabû-aḥḥe-Eriba, in *Enūma Anu Enlil*: Sm 375, ll. 3, 8, tr. 1992: 29 #49; idem, in *Enūma Anu Enlil*: K. 781, obv. 2-8, tr. 1992: 24-25 #40; Thompson 1900: li, 25, No. 90. Compare further K. 2066 28-30, in Kugler II.1 1909-1910: 55, 109-110, cf. 110-112, and Thompson (1900: xxv-xxvi): “The words, ‘When the Sun stands within the halo of the Moon.’ would at first sight appear to prove that the word *tarbašu* does not mean ‘halo’, but we learn from the notes written by the astrologers ... that by the word ‘Sun’ we must understand the ‘Star of the Sun’, i.e., Saturn, and we now know that the omen for the Sun in such a case would be given just as if the Sun were occupying the place of Saturn.”

14. Jastrow 1910: 163-164.

15. Msk 74233d + Msk 74238p + Msk 74238q, 50’, ed. Arnaud 1987: 278 #655. The numbers “20” and “30” are common numerological terms for Sun and Moon.

16. See Koch-Westenholz 1995: 123, n. 3, 142.

collocation of *loci*).¹⁷ These, together with Hindu passages of similar import¹⁸ and a late Egyptian witness,¹⁹ offer abundant evidence that the surprising association of Saturn with the Sun travelled well outside Mesopotamia, probably during the first millennium BC.

Yet despite the familiarity of Saturn's connection with the Sun, its rationale is still far from understood. So classicist Beck: "Why Saturn should be identified with the Sun is far from obvious."²⁰ Moreover, was the matter one of identification or of mere association? The designation of the real Sun in one omen as "Šamaš of the day" (*Šamše u-mi*) shows that Babylonian astronomers perceived a contrast between the "Sun of the day" and a "Sun of the night", which must clearly have been Saturn.²¹ Accordingly, in an old (but still the most thorough) discussion of this subject to date, Jastrow argued that Saturn was not supposed to be physically identical with the Sun, but of all planets was thought to resemble the Sun most closely. Nevertheless, some of the passages cited above seem to clearly *identify* the two. In whatever way, the logic by which Babylonian scribes linked Saturn to the Sun remains elusive.

SATURN ASSOCIATED WITH THE SUN ON LINGUISTIC OR OBSERVATIONAL GROUNDS

In myth and folklore, the Moon is typically regarded as a nocturnal counterpart to the Sun, because of its luminosity, relative size or roundness.²² Could analogous considerations have inspired the Babylonians to link Saturn and the Sun? Alternatively, could folk-etymologies have led to the association? We evaluate eight possibilities, some of which have not been discussed in the existing literature.

Saturn and time

The very earliest attempt at an explanation, in keeping with the penchant for allegories current in his day, was made by the Roman writer Macrobius (5th century AD), who invoked the popular association of Kronos (Saturn) with Chronos (Time):

17. Among the first to draw attention to the comparison of Saturn and Sun in classical literature was von Humboldt (1850: 467, n. 13).

18. Eilers 1976: 93; Scherer 1953: 85; Hunger & Pingree 1989: 147. A range of Sanskrit words referred to Saturn as the Sun or the "son of the Sun", in some cases indicated by the use of a composite noun incorporating terms like *-ja*, *-tanaya*, *-putra*, *-sūta* or *-sūnu*, e.g., Monier-Williams 1960: 89 s.v. "arká", 151 s.v. "Ārki", 449 s.v. "tīkshṇā", 617 s.v. "Pātāṅgri", 751 s.v. "Bhānū", 869 s.v. "rāvī", 1026 s.v. "vaivasvatā", 1051 s.v. "Šani", 1093 s.v. "Šauri", 1196 s.v. "sahasraraśmi", "Sahasrāṅau", 1243 s.v. "Sūra", 1243-1244 s.v. "Sūrya", 1254 s.v. "saura". Most of these designations occur in the *Bṛhad-Jātaka* and *Bṛhat-Saṃhitā* of Varāha-mihira (505-587 AD), and the lexicographers. *Sūryaputra* occurs as early as the *Mahābhārata* (6. 81, Scherer 1953: 85).

19. A list of the five traditional planets on an ostracoon found in Egypt and composed in Demotic (1st century AD) opens with Saturn: *Hr-p3-k3 p3 siw p3-R'*, 'Horus the Bull, that is the star of the Sun', lines 1-2, ed. Spiegelberg 1902: 6.

20. Beck 1988: 86. Cf. Boll 1903: 314, n.: "Der Grund, warum der Saturn nach der Sonne benannt wurde, ist dunkel." Rawlinson (1858: 620) asked: "... how is it possible that the dark and distant planet Saturn can answer to the luminary who 'irradiates the nations like the Sun, the light of the gods?'" He appears to have taken this description from a reference to Ninurta, the only deity the Babylonians are known to have certainly identified with Saturn (for evidence, see Koch-Westenholz 1995: 123). Note, however, that Ninurta is not always Saturn; in the *MUL.APIN*, 2. i. 66, it is Mercury. Cf. Schott 1936: 135.

21. Jastrow 1910: 164-165.

22. e.g., *Genesis* 1.16: "God made two great lights – the greater light to govern the day and the lesser light to govern the night."

Moreover, Saturn, as Cronus, is identified with Time (χρόνος). ... It is said that Saturn used to swallow his children and vomit them forth again, a myth likewise pointing to an identification of the god with time, by which all things in turn are created, destroyed, and brought to birth again. ... And Saturn himself, the author of times and seasons (and therefore, by the change of a letter, called Κρόνος by the Greeks as though for χρόνος, time), must assuredly be understood to be the sun ...²³

As put by Klibansky *et al.*, the equation of Kronos and Chronos “led Macrobius (or rather, Porphyry, whom he follows) to say that Kronos-Chronos was regarded as the sun, whose course established the “ordo elementorum” by measure and by number.”²⁴

In itself, the comparison of Kronos and Chronos should not be dismissed too quickly, as it appears to be attested as early as Pherecydes of Syros (6th century BC)²⁵ while the etymology of neither name has been established with confidence: it cannot yet be determined whether the names are even Indo-European or not.²⁶ Yet be that as it may, the connection of both Saturn and the Sun with time, as construed by Macrobius, seems contrived. And obviously, the etymological reasoning is based on Greek and could never have applied to the Sumerian or Akkadian languages. Nor is there any clear evidence that the Babylonians associated Saturn with notions of time and seasons – these seem to be fallouts from the classical understanding that Saturn occupied the highest known orbit among the planets, as discussed below.

Saturn and El

Writing in 1905, Franz Cumont traced the linkage of Saturn and the Sun to another folk-etymology. Starting from the common Graeco-Roman understanding that Kronos or Saturn equalled the Syro-Phoenician god El,²⁷ the similarity of the latter’s name to *Hēlios* would have suggested an affinity between Saturn and the Sun.²⁸ The “solar syncretists” of the later Imperial Age may well have fostered the idea, even though the association of El with the planet Saturn is hard to prove from Semitic sources. Nevertheless, as before, such wordplay cannot shed any light on the Babylonian association of Saturn and the Sun, which antedates the Graeco-Roman one by centuries.

Saturn’s high orbit

Another early suggestion, considered by Franz Boll in 1919, was that Saturn owed its “solar” status to the high position of its orbit, compared to the other naked-eye planets.²⁹ It is certainly plausible that classical astronomy/astrology regarded Saturn’s lofty position as evidence of its preeminence among the

23. Macrobius, *Saturnalia* 1.8.6,10; 1.22.8, tr. Davies 1969: 64-65, 148.

24. Klibansky, Panofsky & Saxl 1964: 154-155.

25. Kirk, Raven & Schofield 1957: 57, 67. Other early sources are a 5th/4th-century BC inscription from Elateia, which calls Poseidon “son of Chronos” instead of the otherwise expected Kronos (Hoffmann 1893: 174), and pseudo-Aristotle, *On the Cosmos*, 7 (401a). The link also seems to be implicit in Pindar (5th century BC), *Olympian Odes* 2.13-18 and especially 10.43-59.

26. The respective etymologies of χρόνος and Κρόνος are still unknown – see Beekes 2010: 1652; Chantraine II 1970: 586 s.v. “Κρόνος”; IV. 2 1980: 1277-1278 s.v. “Χρόνος”; Frisk 1970: 24-25 s.v. “Κρόνος”; 1122 s.v. “χρόνος”. According to Eisler (1910: 385-386), the two names are etymologically distinct.

27. El was identified as Kronos in a number of classical sources – see Pettazzoni 1978: 89-90.

28. “Die Ähnlichkeit des Klages veranlasste auch eine Verwechslung des Ἥλιος mit Helios ...”, Cumont 1905: 2218

29. Boll 1919: 345; Greßmann 1925: 26. The idea was followed uncritically by Pettazzoni (1978: 90).

planets.³⁰ This is clearly implied in Tacitus' statement that "of the seven planets that rule the fortunes of mankind, Saturn moves in the highest orbit and has the greatest potency".³¹ Echoing Tacitus, Martianus Capella (early 5th century AD) wrote that Saturn's power "was reckoned to exceed all others according as the size of his circle exceeded theirs."³²

The notion of Saturn's exalted station was a popular one among Graeco-Roman scholars. According to Dionysius of Halicarnassus (1st century BC), the "ancients" "regarded him as embracing the whole universe".³³ Isidore of Seville (c. 560-636 AD) explicitly characterised Saturn's position as being *summo caelo, id est in mundi uertice*, "at the height of heaven, that is, at the pinnacle of the world".³⁴ Pseudo-Manetho stated that the Titan Kronos "rules the whole aether" (*pantòs ... aithéros árchei*).³⁵ Some Neo-Platonists went so far as to associate the planet with the pole as the motive agent of the cosmos; for example, expounding on Saturn's association with a sickle and Plato's comparison of the cosmos to a spindle whorl, Proclus noted that the pole as the *ágkistron* or "hook" of the spindle was regarded as the sign of Saturn, "imitating the Mind" of the cosmos.³⁶ In other contexts, the term *pólos* does not refer to the rotational pole but to the entire starry heaven, in its turning aspect.³⁷ The latter usage of the term may underlie the adjective *hypsípolos*, used by Porphyry³⁸ and Nonnus³⁹ to describe Saturn, for which the translation "high in the (starry) sky" seems valid.⁴⁰ Meanwhile, others interpreted the elevated position of Saturn's sphere, adjoining that of the fixed stars, not as a sign of the god's loftiness, but of his exile to the boundary of the cosmos – with a nod to the myth of Kronos' banishment. Thus, Cicero explicitly stated that Jupiter had chained his father Saturn to the stars.⁴¹

A related concept was the late understanding, reported by Diodorus of Tarsus (d. c. 390 AD), that Saturn was actually the largest of the planets, only appearing to be small because it is further away than all the others.⁴²

30. Cf. Sanskrit terms for Saturn, which include *mahāgraha* ("the great planet") and *grahanāyaka* or *grahagrāmanī* ("planet-chief"), which was primarily a solar epithet (Monier-Williams 1960: 795 s.v. "mahāgraha"; 372 s.v. "Grāha").

31. Tacitus, *Histories* 5.4, tr. Moore 1979: 180-181.

32. Martianus Capella, *The Marriage of Philology and Mercury* 2 (197), trs. Stahl & Johnson 1977: 60.

33. Dionysius of Halicarnassus, *Roman Antiquities* 1.38.1, tr. Cary 1937: 120-121.

34. Isidore of Seville, *On the Nature of Things* 23.2; translation after Fontaine 1960: 258-259.

35. pseudo-Manetho, *Apotelesmatics* 4.14, ed. Koechly 1858: 63.

36. *τὸ μὲν Κρόνου τὸν πόλον εἰναί φησι σύμβολον. διὸ καὶ ἀγκίστρον οἰκεῖός ἐρέται, τὸν ἀγκυλωμένῃ ἐκεῖνον ἡὸς ἀλῆθῶς μίμοιμενον* noun. Proclus, *Commentary on Plato's Republic*, ed. Kroll 1901: 213 line 4. For the understanding of Kronos in Neo-Platonism, see Klibansky, Panofsky & Saxl 1964: 151-159.

37. Hardie 1983: 224-225; Liddell & Scott 1996: 1436 s.v. "πόλος"; e. g.: Aeschylus, *Prometheus Bound* 425-430; Aristophanes, *Birds* 179-184, with scholiast; pseudo-Apollodorus, *Library* 2.5.11; Pausanias, *Description of Greece* 6.19.8; Clement of Alexandria, *Miscellanies* 5.6 (36); *Orphic Hymns* 83.7; Simplicius, *Commentary on Aristotle's On the Sky* 231b.12-16, ed. Heiberg 1894: 517; Suidas, *Lexicon*, s. v. "Πόλος", ed. Adler 1935: 161; Photius I of Constantinople, *Lexicon*, s. v. 'πόλου', ed. Naber 1864: 97 s. v. "πόλου". This usage is perfectly justifiable from an etymological point of view, as the "turning" connoted in the underlying Indo-European root **k^wel-* (Pokorny 1959: 639-640 s.v. 'k^wel- 1, k^welə-') applies equally well to the apparent revolution of the starry firmament as a whole and the pivot around which it turns.

38. Porphyry, *Of the Philosophy to be Derived from Oracles*, apud Eusebius, *Preparation of the Gospel* 6.1.4 (237), ed. Mras 1982: 294.

39. Nonnus, *Dionysiaca* 41.350. With Cook (1925: 557, n. 1), we prefer the reading *hypsipóloio* contra Ludwig's *hypsipóroio*, "high-moving" (1911: 331). Oppian (*On Hunting* 3.111) described birds as *hypsípoloi*.

40. Gifford (1981: 255) simply translated "on high".

41. Cicero, *On the Nature of the Gods* 2.25. The earliest reference to Zeus shackling his father comes from Aeschylus (early 5th century BC), *Eumenides*, 640-666.

42. Diodorus of Tarsus, *Against Destiny* 31, apud Photius, *Library* 223 (211b) – see Boll 1903: 314, n. 3; cf. Hyginus, *Poetical Astronomy* 4.18, ed. Viré 1992: 156.

Two authorities derived the notion of Saturn’s cosmic dominion from the “Chaldaeans” – the Greek term for Babylonian astrologers or, more generally, “wise-men”. Epigenes of Byzantium (fl. 200 BC), who is said to have studied “among the Chaldaeans”, stated that Saturn “seems ... to exert the greatest power on all the motions of the celestial bodies”.⁴³ Diodorus of Sicily (1st century BC) combined a similar statement with Saturn’s solar association, alleging that the Chaldaeans called Saturn “Helios” and deemed it the “most conspicuous” (*epiphanéstatos*) of the planets, which “presages more events and such as are of greater importance than the others”.⁴⁴

From the classical sources it is clear that Saturn’s astrological supremacy was linked to the loftiness of orbit. But sound though the reasoning may have been in its own terms, it sheds no light on earlier Babylonian perceptions of Saturn. Diodorus was of course correct in stating that the Babylonians called Saturn “Helios” (i.e. the Sun). But his further statements regarding the prominence and influence of Saturn, like those of Epigenes, clearly reflect a period when “ancient Chaldaean” wisdom had long been heavily influenced by Greek astronomical knowledge about the order of the solar system – with Saturn at the top of the planetary ladder. No cuneiform source seems to assign a supreme status to the planet.

This is not to conform uncritically to the modern consensus that pre-Hellenistic Babylonians could only perceive the planets as moving on one undifferentiated plane, with no concept of the distance of the planets from the Earth.⁴⁵ We have argued elsewhere, from the order of the colours on ziggurats and other evidence, that astronomers of the Neo-Babylonian period *did* have a planetary order based on distance. Nevertheless, the evidence, as far as it goes (mainly from the 8th-7th centuries BC), suggests that they saw Jupiter, rather than Saturn, as the uppermost of the planets, a tradition which can also be detected in New-Kingdom Egyptian documents and an alternative Hellenistic tradition.⁴⁶ Finally, even if Saturn’s “high” placement is interpreted in terms of astrological importance, a logical connection between distance and the Sun is still wanting. Boll’s argument proves to be a red herring.

Saturn as a “mock moon”

As noted above, Saturn – alone of all planets – is referred to as the “Sun” when observed inside a lunar halo.⁴⁷ Apart from “Sun”, another term used to describe Saturn in this position was *AŠME*, as in the passage cited earlier (see footnote 11 above). Corresponding to Akkadian *šamšatu*, this is a Sumerian technical term meaning “mock sun (parhelion) or moon (paraselene)”.⁴⁸ A Babylonian commentator specifically related omens concerning discs (*AŠME*) above or below the moon to Saturn:

43. Epigenes of Byzantium, apud Seneca, *Natural Questions* 7.4.2, tr. Corcoran 1972: 234-235.

44. Diodorus of Sicily, *Library* 2.30.3, tr. Oldfather 1946: 448-449. Liddell & Scott (1996: 670 s.v. “ἐπιφανής”) translate *epiphanēs* as “manifest, evident ... of men, conspicuous, notable, distinguished ... famous, renowned ... of things, remarkable”.

45. e.g., Vernant 1983:176-189; Rochberg-Halton 1988a: 323; Lloyd 1991: 294-295; Pedersen 1993: 63; Evans 1998: 320

46. James & van der Sluijs 2008: esp. 69.

47. A possible exception is: “If stars stand in front of a disk – Mars stands in front of (another) planet.” *Enūma Anu Enlil*, 24 (25), C c obv., 1, tr. van Soldt 1995: 47, cf. 3.

48. Brinkman *et al.* 1989: 332 s.v. “šamšatu”; cf. van Soldt 1995: 17; Jastrow 1910: 164, n. 1; Kugler II 1909: 105, 109. These terms relate to the Sun when a daytime phenomenon is indicated, but in astrological omens are also used for nighttime events – Brinkman *et al.* (1989: 334): “*AŠ.ME SAG.UŠ* is translated as “the normal solar disk ... When *AŠ.ME* signifies parhelion, the true solar disk is termed *AŠ.ME SAG.UŠ* ..., to be read possibly *šamšatu kajamāntu* (or *kajāntu*).” Passages include *Enūma Anu Enlil*, 24 (25), III 5-64, C b obv. 9-14, rev. 1, C c obv. 1-8; 25 (26), I 18, ed. van Soldt 1995: 22-36, 44-45, 46-47, 54. The Babylonian practice of referring to mock suns as ‘Suns’, sometimes employing the term *šamšē* (Kugler II 1909: 108), is analogous to the Roman usage of the word *sol* for the same phenomenon, e.g., Seneca, *Natural Questions*, 1. 13. 1, 3; Pliny, *Natural History*, 2. 31-32 (98-100); Stothers 2009: 34.

If a disk stands above or below the moon – refers to Saturn.⁴⁹

Jastrow speculated that the comparison of Saturn to a Sun may have derived from the application of this term to Saturn, wondering “whether the appearance of mock-suns may not have suggested to priests of a speculative turn of mind, but ignorant of the laws of the heavens, the idea that Saturn was a “steady” or “permanent” mock-sun – performing the same function of furnishing light at night that Šamaš performed during the day.”⁵⁰ This, Jastrow reasoned, could help to explain “the origin and meaning of this interesting association of the Sun with Saturn, leading to the wide spread usage of the signs for Šamaš (An-UT and Anna) to represent Saturn.”⁵¹

The difficulty with this explanation is that Saturn’s natural appearance hardly warrants its comparison to a mock sun or a mock moon; as even small mock moons considerably exceed the apparent size of planets, Saturn would have to have been more conspicuous than it is at present – a challenge Jastrow did not confront. Moreover, if Jastrow were right, one would expect other planets appearing inside a halo to have also been styled *AŠME* or *šamšatu*, but the title is unique to Saturn. To describe Saturn as a “parhelion” is no less puzzling than to call it a “Sun”, but can be seen as an alternative expression of the same idea: Saturn was a “Sun” when outside a halo and a “parhelion” when inside one. That the application of the term *šamšatu* to Saturn was a derivation from Saturn’s comparison to the Sun follows from the fact that the very same omen text described Saturn as ^dUTU (*Šamaš*) two lines earlier.

Saturn and Libra

In Babylonian astronomy, every planet is assigned a unique *bīt* or *ašar niširti* (“secret place”), a system that may well go back to the time the *MUL.APIN* was written.⁵² Saturn’s “secret place” was the constellation of Libra or “Scales”. As cited in Table 1, #4, the *MUL.APIN* (c. 1000 BC)⁵³ and one other text equate Saturn as the star of the Sun with ^{mul}*zi-ba-ni-tu*, which is Libra.⁵⁴ The Sun’s “secret place” is Aries. As Libra and Aries are separated by six zodiacal signs, Libra rises when Aries sets, and *vice versa*. Hunger and Pingree tentatively suggested that the association of Saturn and the Sun arose from this observation.⁵⁵

Although this correlation itself appears to be valid, there is no *astronomical* reason for associating Saturn with Libra. The Babylonian astrological system of “secret places” of the planets undoubtedly influenced the more developed Greek concept of *hypsōmata*, positions of greatest astrological influence often linked with exaltations or highest elevations,⁵⁶ but its origins and rationale are unclear. As Rochberg-Halton noted: “The original reasons for choosing the specific positions of the planets’ *bīt niširti*, or *hypsōmata*, remain obscure, but the *hypsōmata* of the sun in Aries and the moon in Taurus, suggest some underlying calendaric rationale, since these “planets” occupy these signs at the beginning

49. “AŠ.ME AN.TA-nu Sin ù KI.TA-nu Sin GUB áš-šú ^dUDU.IDIM.SAG.UŠ”, *Enūma Anu Enlil*, 24 (25), C a, obv. 9, tr. van Soldt 1995: 40, 42, commenting on II b, tr. 1995: 22.

50. Jastrow 1910: 171.

51. Jastrow 1910: 169.

52. Reiner & Pingree 1998: 14.

53. But see Geller 1990.

54. Cf. Gössmann 1950: 124 s.v. ‘333. ^{mul}SAG-UŠ’. In a listing of the heliacal risings of the planets (Sp. II 38. 6), Saturn is paired with Libra (Kugler I 1907: 40).

55. “If this is so, the occurrence of an *ašar niširti* in *MUL.APIN* would be the earliest attestation of this idea yet known.” Hunger & Pingree 1989: 146-147; compare Weidner 1915: 23.

56. See e.g. Ptolemy, *Tetrabiblos* 1.19.

of the year.”⁵⁷ Thus it may be precisely *because* Saturn was regarded as the Sun’s counterpart that its “secret place” was identified with the constellation opposite that of the Sun; the reasoning employed by Hunger and Pingree here may well be inverted. Parpola viewed “the fact that Saturn had its *hypsōma* or “house” in the constellation Libra, the cosmic scales of life and death where the sun stayed during the autumnal equinox” as a secondary, and not a primary, “link between Saturn and the sun”.⁵⁸ Moreover, as Koch-Westenholz notes, while the concept of a *hypsōma* is first attested in cuneiform sources from the 7th century BC, the association of Saturn and the Sun “is certainly older and far more entrenched in the tradition than warranted by such arcane speculations”.⁵⁹

Saturn’s steadiness

Another point touched on by Jastrow is the idea that Saturn’s solar aspect was inspired by the steadiness of its apparent course through the ecliptic. Jastrow hypothesised that the Babylonian priests conceived

... the idea that Saturn was a “steady” or “permanent” mock-sun – performing the same function of furnishing light at night that Šamaš performed during the day. Being inferior in strength to Šamaš, it was natural that his light should be considerably weaker, but such light as the night had was supposed to be due to the “lieutenant” of the great orb of the day – to the brilliant planet, uninterruptedly conspicuous for an extensive and continuous period in the heavens.⁶⁰

The same solution was offered by Gössmann⁶¹ and, more recently, Parpola: “Saturn’s association with the sun naturally had its basis in the planet’s slow and steady motion”.⁶² Depending on atmospheric conditions, Saturn can be visible for between 10 to 11 months a year.⁶³ As the Roman poet Hyginus correctly remarked, Saturn, “the star of the Sun” (*Solis stella*), “is seen to be carried constantly through the twelve signs ... every year being invisible for neither less than thirty days nor more than forty.”⁶⁴

Saturn could be said to be the steadiest of all naked-eye planets for three observational reasons: its retrograde intervals (at 138 days) last the longest; these (at 36%) represent the highest percentage of the synodic periods for each planet (see below); and their spatial extent (at 6.8°) is the smallest.⁶⁵ These

57. Rochberg-Halton 1988b: 57. The *hypsōmata* may have signified the presumed positions of the planets at the time of creation or the beginning of a chronological era. Conman (2006-2009) fingers the Egyptian decans as the starting point.

58. Parpola II 1983: 343.

59. Koch-Westenholz 1995: 123.

60. Jastrow 1910: 171, cf. 170; Jensen 1890: 114.

61. Gössmann (1950: 124 s.v. ‘333. ^{mul}SAG-UŠ’): “Saturn ist der ‘beständige’, weil er unter den Planeten am wenigsten Anomalien aufweist ... Aus diesem Grunde wurde er auch Sonne genannt, und zwar Nachtsonne im Gegensatz zur Tagessonne ...”

62. Parpola II 1983: 343. It is a mystery why Brown (2000: 69) decided that “Parpola’s suggestion that the Sun and Saturn were associated because of the latter’s steady motion can be ignored.”

63. According to Price (2000: 307), Saturn, during each of its synodic cycles, is visible for 360-18 = 342 days and invisible (due to close proximity to the Sun) for the remaining 36 days. This means that, for a solar year, Saturn is visible at a minimum of 365-36 = 329 days and at a maximum of 342 days, i. e., c. 10.9 to 11.4 months.

64. Tr. van der Sluijs. Hyginus, *Poetical Astronomy* 4.18 (626-631), ed. Viré 1992: 156: “... *hic per duodecim signa assidue ferri videtur ... quotannis non apparere non minus dies triginta nec amplius quadraginta.*” Boll (1911: 374, n. 1) observed: “... um so einleuchtender ist es, dass jenes assidue (»beständig« ...) Uebersetzung des babylonischen Kaimānu ist, durch griechische Vermittlung”. The “stars of the Sun itself” (*solis ipsius sideribus*), with which Saturn is associated in the same passage, may have referred to Libra, as discussed above.

65. Price 2000: 140, Table 7.1.

effects are all due to the fact that Saturn's orbital period is the longest of all naked-eye planets, so that the planet's apparent motion against the fixed stars is the slowest.

Its comparatively steadfast course, including the long stationary phases preceding its retrogradations, fits well with the meaning of the planet's proper Babylonian name, *Kayamānu*, which was derived from *kānu*, "to be firmly in place / to be stationary (said of planets)" or, perhaps a better reading in some contexts, "to remain qualitatively constant".⁶⁶ Thus Brown: "... Saturn is associated with the name 'the steady, constant planet' because it moves more slowly than any other planet against the background stars."⁶⁷

One Babylonian text describes the Sun as *kayamānu* or "steady" in the sky:

i-šá-ru ina AN-e ka-aja-ma-nu at-ta

O Just One, you are steady in the sky ...⁶⁸

The Babylonians will certainly have noticed that the comparatively stable pattern of Saturn's orbit, of all the planets, most closely approximates the path of the Sun: neither the Sun nor Saturn go through a cycle of waning and waxing phases, as the Moon and Venus do; neither are restricted to the eastern and western parts of the twilight sky, as Venus and Mercury are; neither are prone to relatively frequent and wild retrogradations in mid-course, as Mercury, Venus and Mars are given to do.

To the Babylonian mind, a connection between Saturn and Sun might have been reinforced by their joint association with the concept of *kittu* or "righteousness", metaphorically linked with the idea of steadiness and hence reliability. Not only was the sobriquet *kayamānu* etymologically related to *kittu*, but the latter title was used for the Sun as well as Saturn. As Parpola spelled out: "... Saturn's name *kajamānu* 'the steady one', derived from the root *kūn*, provided an etymological connection with *kittu* 'truth, justice' and hence an association with Šamaš, the protector of justice in heaven and earth."⁶⁹ (For Saturn, see the table above, #3.)

Moreover, if Saturn was linked to the Sun for the regularity and steadiness of its path, a similar line of reasoning could explain why the Babylonians, followed by Indian astronomers, regarded Mercury as the counterpart or the "son" of the Moon.⁷⁰ Changing direction every 98 days, Mercury can be seen as the epitome of mobility among the planets, akin to the Moon's fast pace. This might indicate that the comparison of Saturn and the Sun based on their motion was part of a system.

66. Civil *et al.* 1971: 160 s. v. "kānu".

67. Brown 2000: 69, cf. 64; Reiner 1995: 3. Hindu lexicographers likewise referred to Saturn as *Śani*, "prob. "slow-moving" (Monier-Williams 1960: 1051 s.v. "Śani"), *Sthira*, "firm, hard, solid ...; fixed, immovable, motionless, still, calm ...; firm, not wavering or tottering, steady ...; ... constant, steadfast ..." (1960: 1264 s.v. "Sthirā"), *manda*, "slow, tardy" (1960: 787-788 s.v. "Manda"), and *Mridú*, "slow (gait)" (1960: 830 s.v. "Mridú").

68. 4 R 28, 1: 8, cf. Parpola II 1983: 343, n. 636 = Jensen 1890: 115.

69. Parpola II 1983: 343, n. 636; cf. Jensen 1890: 115; Weidner 1915: 23.

70. Reiner & Pingree 1998: 12: "The substitution of Saturn for the Sun and of Mercury for the Moon reminds one of the Indian tradition, appearing first in the Sanskrit *saṃhitās* or omen collections that were strongly influenced by Mesopotamian sources, that Saturn is the son of the Sun and Mercury the son of the Moon (for the Indians also Mars is the son of Earth)." Cf. Hunger & Pingree 1989: 147. *E.g.*: "... Mercury is named ... Bodhana, and Chandraputra (the son of the Moon) ... Saturn is named ... Suryaputra (the son of the Sun) ...", Varāhamihira, *Bṛhad-Jātaka* 2.2, tr. Vijnanananda 1912: 38. A possible Babylonian attestation of this double association is: "If Venus wears the Sun's crown – she becomes very bright, Saturn stands in front of her / If Venus wears the Moon's crown – she is very small, Mercury[?] stands in front of her ..." (*Enūma Anu Enlil*: K. 148. 15-16, trs. Reiner & Pingree 1998: 58-59, cf. 33-34.).

Saturn’s synodic period

Somewhat surprisingly, scholars appear to have overlooked a precise characteristic that would have strongly reinforced a perceived connection between the “steadiness” of Saturn and the Sun.

The synodic period of a planet is the time required for it to reappear at the same point in the sky relative to the Sun (though not to the fixed stars) from an Earth-bound perspective. Babylonian astronomers were aware of what we call the synodic cycles of the planets, which they conceived as successions of periods of visibility and invisibility. So profound was the interest in these periods that it may have coloured the ancient myth of *Inanna’s Descent*, in which Venus’ invisibility is represented in terms of the goddess’ sojourn in the Netherworld.⁷¹

The *MUL.APIN* offers a list of the periods of invisibility for each of the planets, followed by one for the periods of visibility. Significantly, the statement for Saturn mentions its association with the Sun in the same breath:

DIŠ^{mul}UDU.IDIM.SAG.UŠ ina^dUTU.ŠÚ.A TÛM-ma 20 u₄-mi ina AN-e uḫ-ḫa-ram-ma ina KASKAL^dUTU IGLLÁ ... DIŠ^{mul}UDU.IDIM.SAG.UŠ KIMIN^{mul}zi-ba-ni-tu₄ MUL^dUTU ina^dUTU.È IGLLÁ-ma MU 1 KAM ina AN-e GUB-ma ina^dUTU.ŠÚ.A TÛM ...

Kajamānu ina ereb Šamši itabbalma 20 ūmī ina šamē uḫḫaramma ina ḫarrān Šamši innammar ... Kajamānu KIMIN Zibanītu kakkab Šamaš ina šīt Šamši innamarma šanat ina šamē izzazma ina ereb Šamši itabbal ...

Saturn disappears in the West, remains (invisible) in the sky for 20 days, and becomes visible in the path of the sun. ... Saturn, also called the Scales (or) star of the Sun, becomes visible in the East, stands in the sky for one year, and disappears in the West.⁷²

As the *MUL.APIN* used an idealised year-length of 360 days,⁷³ its Saturn-cycle totals 380 days. This is remarkably close to the actual figure of 378.1 days.⁷⁴ Moreover, of all the planets known to the ancients, the synodic period of Saturn approximates the annual cycle of the Sun most closely.⁷⁵ The similarity to the solar year would have been most striking at an early time when astronomers had not yet conceived of planetary courses in terms of circular orbits and still regarded planetary retrogradations as real, physical turnings in the sky.

It is relatively easy to see that the daily rising and setting of the Sun is comparable to the daily rising and setting of Saturn – along with all other celestial bodies. At an archaic stage of astronomical speculation, long before Greek philosophers posited the concept of orbits, the synodic period of a planet would have been the next larger discernible cycle of a planet after the diurnal. This was then compared to the year as the next larger cycle in the Sun’s movement.

The synodic period of an outer planet will, historically, have been discovered before its “orbital” period, as the latter requires a longer period of observation. Again, with respect to the outer planets, the orbital (or “sidereal”) period is the next larger cycle after the synodic. Hence while Saturn’s synodic period is just over a year, the return of the planet to the same position with respect to a given

71. See e.g. Heimpel 1982: 59-60; Cooley 2008b: 164 & n. 14.

72. *MUL.APIN*, 2. i. 53, 64-65, trs. Hunger & Pingree 1989: 83, 86, cf. 148. Jupiter’s course, too, is stated to equal a year, 2. i. 60.

73. Hunger & Pingree 1989: 139.

74. Hunger & Pingree 1989: 149; 1999: 74.

75. The second closest figure to that of the Sun is Jupiter’s synodic period at 399 days.

constellation (its orbital period) is 29.6 years. It was only after the Greek introduction of the concept of orbits that a physical model was supplied for these observations and “orbital” periods became explicable in geometrical terms (albeit from a geocentric perspective, necessitating the awkward device of epicycles). Finally, with the advent of a heliocentric model, the synodic period of a planet could verifiably be reduced to a mere artefact of the earth’s revolution around the Sun.⁷⁶

The periodicity of planets – synodic or orbital – was clearly a matter of concern to other ancient cultures as well. The question of the earliest knowledge of orbital periods is, surprisingly, rarely raised. The oldest source credited with any figures was the Greek scientist Eudoxus of Cnidus (mid-4th century BC), apparently lacking any Babylonian precursors. Accordingly, it is not generally thought that the Egyptians were aware that the orbital period of Saturn is 30 years, but the attractive conjecture has long been made that there was a connection between the planet and the *heb sed* (“tail festival”).⁷⁷ This was a royal jubilee, on which occasion the pharaoh would wear his ceremonial bull’s tail as a symbol of kingship.⁷⁸ Saturn was known as *Heru-(p3)-k3-(pet)* or “Horus (the) Bull (of heaven)”.⁷⁹ As a bull, Saturn seems to have been seen as a celestial embodiment of kingship, perhaps akin to the nostalgic perception of Kronos/Saturn as the exemplary king in the classical world.⁸⁰ The *heb sed* was associated with a cycle of 30 years,⁸¹ either marking the 30th regnal year of a long-lived monarch or, as Petrie preferred, a fixed astronomical cycle that was independent from regnal periods; Petrie offered instances which in his opinion “show absolutely that the cycle was not a regnal feast but an astronomical one of regular recurrence.”⁸²

As seen, knowledge of a planet’s orbital period presupposes familiarity with its synodic period. Eudoxus cited figures for the orbital and synodic periods of the planets, giving the orbital periods of Saturn and Jupiter as 30 and 12 years respectively, and the same synodic period for both: nearly 13 months.⁸³ He may have acquired this information wholesale from Egypt, for Seneca stated that “Eudoxus was the first one to bring knowledge of these [planetary] orbits from Egypt into Greece.”⁸⁴ Nineteenth-

76. The logical inconsistency that Saturn’s synodic period is measured relative to the Sun while the solar year is measured relative to the fixed stars would have been recognised at a later, Hellenistic time, when the respective types of orbits were clearly distinguished.

77. Letronne 1840: 33; Sellers 1992: 235; cf. Kelley & Milone 2005: 261.

78. Morris 2010: 212.

79. *e.g.*, on the southern panel of the ceiling of the tomb of Senmut, Theban tomb number 353, in Clagett 1995: 114, 226; Neugebauer & Parker 1969: 175, 178; Plate 60; DeYoung 2000: 506. From at least the 18th dynasty, the epithet “Strong Bull” was regularly included in the Horus name of the pharaohs. On the astronomical ceiling of Senmut, Saturn is called the “Mother of the Bull of Heaven”, in deference to the gender of the reigning monarch, Hatshepsut, Belmonte & Shaltout 2009: 328.

80. Versnel 1993-1994: 95. It may not be coincidental that a Babylonian glossator co-opted the solar epithet “MUL *šar-ri*” (“star of the king”) for the planet Saturn, as seen above, note 12. Compare the rare solar epithet *LUGAL DINGIR^{MES}* (“King of the gods”), K. 583 = ABL 5, l. 18 (670 BC), ed. Parpola I 1970: 112-113), analogous to the king as a “mundane sun” (Parpola II 1983: 130), and K. 42, rev. 4, cited in note 10: “If Venus in month X comes close to the Sun: a great king, variant: a king [of the universe] will come to shame – Venus [comes close to] Saturn”.

81. On the Rosetta Decree, hieroglyphic version, line 2, Ptolemy V was accorded the title *neb heb sed* (“lord of the *heb sed*”), translated in the accompanying Greek as *kyriou triakontaetēridōn* (“lord of the thirty-year festivals”) – see Budge 1904, I: 170, 185; II: 100-101.

82. Petrie 1896: 33; cf. Frankfort 1948: 79, 366.

83. Eudoxus, apud Simplicius, *Commentary on Aristotle’s On the Sky* 222a40-222b9, ed. Heiberg 1894: 495-496. Although Simplicius wrote in the 6th century AD, the accuracy of the figures he reported for Eudoxus is vouchsafed by his reliance (via Sosigenes) on Eudemus (fl. 330 BC), a student of Aristotle – see Heath 1913: 6. The 30-year orbit for Saturn is also confirmed in a papyrus *On the Art of Eudoxus* of the 2nd century BC (see appendix 1).

84. Seneca, *Natural Questions* 7.3.2, tr. Corcoran 1972: 233. Strabo stated that both Eudoxus and Plato spent a number of years in Heliopolis and claimed to have been shown the houses of the priests with whom they studied: “... these priests

century scholars such as Lewis and Rawlinson had no compunction in thinking that Eudoxus received both his orbital and synodic figures from Egypt.⁸⁵ Here we deplore the cynicism of Neugebauer who wrote: “I see no good reason to deny the possibility of his travels to Egypt. It seems to me certain, however, that there was nothing to learn from the Egyptians themselves ...”⁸⁶ More recently, DeYoung countered Neugebauer’s minimalist attitude: “... the fact that the ancient Egyptians did not apply mathematics to their astronomy should not be taken to indicate a lack of interest in or study of the movements of the heavenly bodies.”⁸⁷

In China, the *Chū Bōshū* (silk manuscript) testifies to awareness of Jupiter’s synodic period (given as 395 days) during the 4th to 3rd century BC. The Chinese designation of Jupiter as “year star” (*Suixīng*) from at least the 2nd century BC onwards⁸⁸ may have been based on this, as Jupiter’s synodic period, at 398.88 days, is the second closest to that of the Sun.

The Central-American Maya of the Classic period (c. AD 250–900) were aware of the synodic periods of the outer planets and Venus.⁸⁹ Interestingly, historians of astronomy Kelley and Milone observed that a possible Saturnian deity among the Maya played a “role as pseudo Sun”; as to the motivation for this, they proposed that it “may refer to the Saturnian synodic period of 378 days, closest of the anciently known planetary periods ... to the tropical year.”⁹⁰ Assuming Kelley and Milone are correct, the Mayan tradition counts as a striking conceptual parallel to the thinking which seems to underlie the Babylonian association of Sun and Saturn.

Saturn’s colour

A final factor that could have played a role in the ancient association of Saturn with the Sun is its colour. It is known that, in Babylonian star lore, “Jupiter could signify the moon in what seems a contrived parallel to Saturn signifying the sun.”⁹¹ If the correspondence between Jupiter and the Moon was rooted in the conspicuous whiteness of both bodies, Saturn – as the only one of the naked-eye planets with a reasonably consistent yellow colour⁹² – might naturally invite comparison with the Sun. Indeed, whereas the Babylonians variously linked the Moon with Mercury, for its agility, and with Jupiter, for its whiteness, the Sun would seem to agree with Saturn in respect of both its motion and colour. What colour do ancient sources attribute to Saturn? We start with an overview of Saturn’s colour in classical sources and then proceed to the more surprising Babylonian material.

In Greek myth, the deity Kronos was believed to have ruled the “golden race” (*chrýseon génos*) of a past age, as first recorded by the 8th-century BC poet Hesiod.⁹³ From the Hellenistic period onwards, of course, Saturn was viewed as this god’s planet. As gold would, of course, suit the yellowish colour of

excelled in their knowledge of the heavenly bodies, albeit secretive and slow to impart it ...”, Strabo, *Geography* 17.1.29, tr. Jones 1967: 82-85.

85. Lewis 1862: 156-157; Rawlinson 1881: 300-301.

86. Neugebauer 1957: 151.

87. DeYoung 2000: 475; cf. Lull & Belmonte 2006: 374.

88. Kelley & Milone 2005: 36 table 2. 7, 315, 328; Harper 1999: 836.

89. Milbrath 1999: 219-223, 235, 240-244.

90. Kelley & Milone 2005: 362.

91. Koch-Westenholz 1995: 121; also Jeremias 1913: 96.

92. Venus’ colour is occasionally reported as yellow (Bezold 1916: 141; Plato, *Republic* 10.14 (617A); *scholia Basileensia* (9th century AD) on Germanicus Caesar, *Aratus’ Phenomena*, ed. Breysig 1867: 103; Ptolemy, *Tetrabiblos* 2.9), but white or blue is a far more common description, as discussed below.

93. Hesiod, *Works and Days* 109-120.

Saturn, it is tempting to speculate that Hesiod's Kronos already bore a relationship to Saturn, just as the succeeding "silver race" of Zeus might be paired to Jupiter. However, it is unclear whether an association of Kronos with the planet Saturn could go back this early.

To date, this leaves Plato as the earliest classical source to link Saturn with yellow. In a cryptic portrayal of the universe, Plato called the second and fifth of the cosmic circles (counting inwards from the outermost, heavenly, circle) "more yellow" (*xanthóteros*) than the others.⁹⁴ Strictly speaking, this term applied not to the planet *per se*, but to the circles. The context demands that these circles belonged to Saturn and Mercury respectively. In a possibly Carthaginian tale, as related by Plutarch, Kronos inhabits a cave glowing with golden light on a far western isle; an astronomical aspect to the tale is clear from the description of the expeditions sent to the island every thirty years, when the planet Saturn – called *Nyktouros* ("Night-watchman") – entered the constellation Taurus.⁹⁵ Vettius Valens (2nd century AD) noted that Saturn was "like castor" (*kastorízōn*).⁹⁶ Although a 17th-century French classicist, Claudius Salmasius, associated this with the black glandular secretions of beavers,⁹⁷ a likelier referent is the oil of the castor plant, widely known for its medicinal properties in antiquity,⁹⁸ which has a saffron colour.⁹⁹ Ptolemy cited two astrological colours for Saturn: "greenish yellow, pale" (*hypochlōros*)¹⁰⁰ and "black" (*mélas*).¹⁰¹ A related passage states that those born under Saturn can have skin that is "honey-coloured" (*melichrōs*).¹⁰² Apparently borrowing from Ptolemy, the 6th-century Byzantine antiquarian John Lydus gave exactly the same two colours, *hypochlōros* and *mélas*.¹⁰³

The yellow colour of Saturn (Kronos) also seems to have prompted its association with a particular type of comet known as the *diskeús*, in what seems to have been a Hellenistic experiment to link individual planets with classes of comet: "The 'discus', called Kronos, round and colored like Kronos, both being golden [*electron*]. Around its circumference it pours forth its beams."¹⁰⁴

94. Plato, *Republic* 10.14 (617A).

95. Related by a 'stranger' to Sulla, apud Plutarch, *Moralia: The Face on the Moon* 26 (941C), tr. Cherniss 1984: 184-185. See Bos (1989: 24, n. 19) on Kronos as a planet in this tale, as indicated by the mention of a 30-year interval for the expeditions allegedly made to the island in the west where he slept. The annual sacrifice of "thirty effigies made in the likeness of men" in the early Roman cult of the god Saturn (Dionysius of Halicarnassus, *Roman Antiquities* 1.38.3, tr. Cary 1937: 122-125) similarly suggests a relation to the planet.

96. Vettius Valens, *Anthologies* 1.1, tr. Bara 1989: 28-29; compare Porphyry, *Introduction to Ptolemy's Tetrabiblos*, in Salmasius 1648: 621.

97. Porphyrius *intelligit tincturam nigram castorinarum vestium. ... Hodieque nigricantis in colore luminis proprium genus castorinum vocamus*. (Salmasius 1648: 622).

98. See, e.g., Dawson 1929; Manniche 1989: 142-143.

99. Bara 1989: 29, n. 8.

100. Liddell & Scott 1996: 1902 s.v. 'ὕπόχλωρος'. Robbins' translation "livid" (1971: 192-193) is less clear.

101. Ptolemy, *Tetrabiblos* 2.9.

102. Ptolemy, *Tetrabiblos* 3.11. Misleadingly, Robbins (1971: 308-309) offered "dark-skinned". The translation of Ashmand (1822: 155) as "yellowish" is superior.

103. Lydus, *On Divination* 9a, ed. Wachsmuth 1897: 20-21; for a discussion, see Williams 2008: 298-299. Useful information from other classical writings is rare. Pliny's *candidus* (*Natural History* 2.16 (79)) is best translated not as a colour as such, but as "bright" (Lewis & Short 1955: 277), as it appears in a list which is otherwise clearly based on Latin translations of the Greek astronomical names for the planets, e.g. *Phaenon* ("shining") for Saturn and *Pyroeis* ('fiery') for Mars, given by Pliny as *igneus*. Pseudo-Manetho (*Apotelesmatics* 4. 188, ed. Koehly 1858: 69) referred to purple rays emanating from the planet. For planetary colours in general, see the helpful table in Boll 1916: 20.

104. Petosiris (late 4th century BC), Fr. 10, apud Hephaestio of Thebes (c. 380 AD), *Apotelesmatics* 1.24.9, ed. Pingree 1973: 75, trs. Irby-Massie & Keyser 2002: 90. Cf. Avienus, apud Servius Auctus, *Commentary on Virgil's Aeneid* 10.272; Campester, apud Lydus, *On Divination* 15a, ed. Wachsmuth 1897: 44. Compare Keyser 1994. Stothers' (2009: 34, n. 19) opinion that the *disceus* in Pliny (*Natural History*, 2. 22 (89)) must be a meteoric bolide must be rejected, as Pliny explicitly states that it and related phenomena last no shorter than 7 days.

Remarkably, a comparison of the yellowness of Saturn to that of the Sun is never explicitly stated in any ancient source, though the idea is possibly approached by Hyginus, who, in describing Saturn as “the star of the Sun”, said that it is “large of body, as well as fiery in colour ...”¹⁰⁵ Even then, in the same passage he described Saturn’s “fiery” colour as similar to that of the star on the right shoulder of the constellation Orion, Betelgeuse, which is conspicuous for its red or orange-red colour.

With respect to Mesopotamia, evidence linking the planet Saturn to a yellow colour remains elusive. To the best of our knowledge, no text states this directly, but there may be an association via the obscure deity En.me.šár.ra (“Lord of all the *me*”). First, while his constellation was ^kŠU.GI, that is Perseus with a portion of Taurus north of the Hyades,¹⁰⁶ there is a possibility that En.me.šár.ra was also identified with Saturn.¹⁰⁷ In a late text that appears to form part of a drama performed at the annual *Akītu* festival, Marduk addresses En.me.šár.ra with the title *kai(a)mānu*,¹⁰⁸ a familiar sobriquet of Saturn, as seen. In addition, a star list identifies ^dEn-me-šár-ra with ^{mul}LU.LIM, the “deer-star”,¹⁰⁹ while a mid-7th century Neo-Assyrian lexical text listing the seven traditional planets equates ^{mul}LU.LIM with ^dUDU.IDIM.SAG.UŠ (*kayamānu*), the planet Saturn.¹¹⁰ And according to an earlier (Kassite) list, the god En.me.šár.ra corresponds to the metal “gold”.¹¹¹ On the other hand, En.me.šár.ra may simply have been a form of the Sun-god during his sojourn in the netherworld – *kayamānu*, as seen, was also an epithet of the Sun; the Sun is commonly associated with gold; and in the same Kassite list it is the metal lead which is associated with Ninurta,¹¹² who is Saturn, as seen. Other texts emphasise En.me.šár.ra’s chthonic function as a lord of Arallû,¹¹³ a “netherworld” where gold was thought to be in abundance,¹¹⁴ while the Sun-god, Šamaš, was himself seen as the supreme judge of the dead, perhaps on the understanding that when he was not visible in the sky he had travelled beneath the earth into the netherworld.¹¹⁵ Summing up, the argument that En.me.šár.ra represented Saturn in its “golden” aspect is circuitous at best.

Otherwise, according to one passage in the *MUL.APIN*, Saturn’s colours are Sumerian “BE-ma SA₅ BE-ma UD”, Akkadian *šumma sām šumma peši*, that is, “either red or white”.¹¹⁶ *Peši* may also mean “pale”;¹¹⁷ accordingly, Hunger and Pingree suggested regarding this passage: “... it appears simply that the brighter a star the redder it appeared, the darker the paler. It has no connection with the association of one color with each planet ...”¹¹⁸

105. Tr. van der Sluijs. Hyginus, *Poetical Astronomy* 4.18 (624-629), ed. Viré 1992: 156: *Solis stella ... corpore est magno, colore autem igneo, similis eius stellae quae est in humero dextro Orionis ... Hanc stellam nonnulli Saturni esse dixerunt ...*

106. Weidner 1938: 397.

107. Compare Pinches 1908: 78-79. The identification was assumed rather than documented in de Santillana & von Dechend 1969: 266-267.

108. Pinches 1908: 77-83; Langdon 1914: 35, n. 4, col. 1. 12 and 36, n. 4. Compare Pallis 1926-1927: 258-260.

109. 5 R 46, obv. 21, in Civil *et al.* 1973: 241 s.v. “lulīmu”. For the tablet, compare de Meis & Hunger 1995-1996.

110. K. 4386 = *An-ta-gál*, G. 303-309 = 2 R 48. 48-52, ed. Cavigneaux *et al.* 1985: 229; ed. Kugler I 1907: 9; Civil *et al.* 1973: 241 s.v. “lulīmu”. Weidner (1938) identified ^{mul}LU.LIM as the constellation Andromeda, adjacent to ^kŠU.GI.

111. CBS 6060 obv. 10 and duplicates, ed. Livingstone 1986: 176-177.

112. CBS 6060 obv. 13 and duplicates, ed. Livingstone 1986: 176-177.

113. Langdon 1914: 34, 35, n. 4; Ebeling 1938.

114. For Arallû as a “mountain of gold”, see Horowitz 1998: 284.

115. See Heimpel 1986.

116. *MUL.APIN*, 2. i. 65, trs. Hunger & Pingree 1989: 86

117. Biggs *et al.* 2005: 328 s.v. “pešû”.

118. Hunger & Pingree 1989: 150.

As for Saturn's standard colour, this is almost invariably *black* – both in Babylonian sources and derivative astrological traditions in the Hellenistic world, medieval Judaism and India.¹¹⁹ In Babylonian astronomy, as in its successors, each of the planets was associated with such a “canonical” colour: the Sun with gold, the Moon with silver, Mercury with pale red or brown, Venus with blue or green, Mars with red, Jupiter with white, and Saturn with black.¹²⁰ This is especially clear in the following passage:

The white star is Jupiter, the Red Star is Mars, the Green star is Venus, the Black star is Saturn, variant: Mercury.¹²¹

Two further examples of Babylonian texts explicitly styling Saturn as black were given in Table 1, #3.

If Saturn was most commonly associated with black, rather than any brighter colour, it follows that it was not that colour that prompted an association with the Sun in the Babylonian mind, barring the exceptional case of solar eclipses, discussed below.

Of the factors reviewed above, the “steadiness” of Saturn and its synodic period emerge as the most likely to have inspired a comparison with the Sun. This leaves the outstanding question of why the yellowish planet Saturn was paradoxically portrayed as black.

“BLACK” SATURN: THOUGHT EXPERIMENTS

The 17th-century scholar Salmasius argued that Kronos / Chronos was black as Time obscures everything.¹²² This argument is clearly an elaboration of the classical word-play involving Kronos and Chronos, dealt with above.

Parpola's pithy explanation that “Saturn was a “black” star through his identification with Ninurta”¹²³ needs clarification. Presumably, Parpola's argument was based on Ninurta's association with lead, noted above, as astrologers widely identified lead as the metal of Saturn.¹²⁴ Alternatively, Parpola may have taken his cue from the idea that in the art of the 9th century BC, *Šalmu* has been thought to refer to Ninurta.¹²⁵ In Table 1, #3, the association of Saturn with the Sun is explained folk-etymologically by a pun “based on the homophony of *šalmu* ‘black’ and *šalmu* ‘statue’”,¹²⁶ the latter

119. Bezold 1916: 139-144; Gössmann 1950: 28 s.v. “^{mul}GIG₂”, 124 s.v. “333. ^{mul}SAG-UŠ”; Brown 2000: 57; K. 148. 10, trs. Reiner & Pingree 1998: 12, 58-59, 248-249; Eilers 1976: 93. The Sumerian terms used for Saturn as a black star are ^{mul}gíg, “dark star”, and ^{mul}MI. Classical sources are Ptolemy, *Tetrabiblos*, 2. 9; Nigidius Figulus, apud Lucan, *On the Civil War* 1.651-657 (see Getty 1941: 17); and Firmicus Maternus, *Mathesis* 1.2.1. For the Jewish tradition, see Maimonides, *Commentary on the Mišnā: ‘Aboda Zara* 3.1. In Sanskrit texts, the planet Saturn is called *ásita*, “dark-coloured, black” (Monier-Williams 1960: 120 s.v. “*ásita*”) as well as *kāla*, “black, of a dark colour, dark-blue” (1960: 277 s.v. “*kāla*”), while its *avatar*, Śani, was “represented as of a black colour or dressed in dark-coloured clothes”, 1960: 1051 s.v. “**Śani**”. Perhaps the Chinese association of Saturn with the element of earth, as expressed in the designation *Tūxīng* or ‘earth star’ for the planet, also reflects the planet's black colour.

120. James & van der Sluijs 2008: 67-68.

121. K. 2346. 54, in Reiner & Pingree 1998: 249; cf. Brown 2000: 143.

122. Salmasius (1648: 620): “Saturni stella nigra est, quia χρόνου, temporis, signum est. Res enim longo tempore obscuratæ in apertum tandem prodeunt.” The idea is echoed in Shanzer 1986: 102.

123. Parpola II 1983: 343, n. 636; cf. Williams 2008: 299.

124. Apart from the above-mentioned Kassite correspondences tablet, see Celsus, apud Origen, *Against Celsus* 6. 22; Proclus, *Commentary on Plato's Timaeus* 1.43.6; Firmicus Maternus, *Mathesis* 1.10.14; Martianus Capella, *The Marriage of Philology and Mercury* I (14, 16); further Shanzer 1986: 96.

125. e.g., Black & Green 2004: 142-143 s.v. “Ninurta”, 186 s.v. “winged disc”.

126. Parpola II 1983: 343; cf. Brown 2000: 69; Jensen 1890: 115.

term also being an acknowledged epithet of the Sun or even of the symbol of the winged disk.¹²⁷ Be that as it may, these word-plays only worked because Saturn’s black colour was presupposed; it did not derive from them – black hardly suggests a solar quality.

We have considered a variety of other hypotheses. In theory, ancient observers may have perceived a parallel between the yellow and black colours associated with Saturn and the transformation of the Sun into a pitch-black body as seen during solar eclipses, be they total or annular. The fleeting darkness experienced during a solar eclipse, superstitiously interpreted as a “miniature night”, may have suggested that the Sun at such times was showing its nocturnal face. At a time when people were still divided about the whereabouts of the Sun at night, observations of Saturn may have been interpreted as glimpses of the Sun on its way from the west back to the east. While a tempting speculation, it is completely unsupported by any ancient testimony and other possibilities remain to be explored.

Second, it might be suggested that Saturn was associated with black because, in classical mythology, the god Kronos/Saturn was thought to have been banished to some dark cosmic extremity¹²⁸ – be it the depths of Tartaros, the dark underworld bereft of the Sun’s rays;¹²⁹ islands at the edge of the world,¹³⁰ thought by some to be in the far west where the Sun sets;¹³¹ in the midnight land of the southern hemisphere;¹³² or the outermost planetary sphere, furthest from the Earth.¹³³ However, while these motifs may provide fascinating insights into ancient Graeco-Roman cosmological traditions, they have no bearing on Babylonian beliefs; no similar stories were related about the god Ninurta. Besides, inhabiting a dark place does not necessarily imply being dark oneself.

As another thought experiment, if the Babylonians regarded Saturn as a nocturnal counterpart to the Sun, they might have conceived it as black so as to match the darkness of the night and contrast it with the brightness produced by the “Sun of day”. Yet this is an *argumentum e silentio*, never spelled out in any of the sources. It would only work if Saturn’s natural appearance did suggest a dark component, just as the light of day does match the bright white or yellow colour of the Sun. The same objection applies to Winckler’s idea that Saturn’s dark colour represented winter, when the Sun is “dead”.¹³⁴

Alternatively, starting from the inauspicious, even evil, influence of Saturn in classical astrology, Pannekoek opined that “the colour attributed to the stars and planets by Roman authors often indicates their astrological, rather than their physical, character; thus was Saturn referred to as ‘black’.”¹³⁵ Supposing this were true, would the same apply to Babylonian astrology? According to the latter, Saturn and Mars were malefic planets, contrasting with the benefic Jupiter and Venus and the ambiguous Mercury.¹³⁶ This system dictated the order for the planets typically followed in Seleucid literature.¹³⁷

127. Black & Green 2004: 159 s.v. “Šalmu”.

128. See Gantz 1993: 44-47.

129. Homer, *Iliad* 8.478-481; 14.204, 274; 15.225; Hesiod, *Theogony* 721-733; Ovid, *Metamorphoses* 1.113-114.

130. Hesiod, *Works and Days* 169-174; Pindar, *Olympian Ode* 2.70

131. Plutarch, *Moralia: The Face on the Moon*, 941A-B, F. For Saturn as a great ruler of the west, especially Italy, see Cicero, *On the Nature of the Gods* 3.17 (44); Virgil, *Georgics* 2.173; *Aeneid* 1.569; 8.314-329, 357-358; Dionysius of Halicarnassus, *Roman Antiquities* 1.34-38; Diodorus, *Historical Library* 5.66. 5; Clement of Alexandria, *Exhortation* 2.26; Arnobius, *Against the Nations* 4.25; Tertullian, *To the Nations* 2.12; and confirmation in Cook 1925: 554, n. 3.

132. Manilius, *Astronomy* 2.929-937. This place was identified with Tartaros by Crates of Mallos (2nd century BC), apud Stephanus of Byzantium, *Ethnica*, s.v. ‘Tártaros’. Compare also Virgil, *Georgics* 1.231-251.

133. Cicero, *On the Nature of the Gods* 2.25, cf. 2.20.

134. Winckler 1901: 247.

135. Pannekoek 1961: 157.

136. Rochberg-Halton 1988a.

137. Rochberg-Halton 1988a: 323-325; cf. Neugebauer 1957: 169. As Rochberg-Halton (1988a: 328) observed, “the bare traces [of the schema] ... are already found in apodoses of *Enūma Anu Enlil* and its Old Babylonian forerunners.”

This is amply illustrated by a Seleucid text which gives the following order of planets, with accompanying glosses: Jupiter (“favourable”) – Venus (“calm”) – Mercury (“heroic”) – Mars (“ambiguous”) – Saturn (“dark, disturbed”, where “dark” translates *MI.MI*).¹³⁸ So does Saturn’s putative black colour relate to its astrological maleficence? As we discussed briefly elsewhere, it may be significant that the most auspicious planets Jupiter and Venus are the two brightest, and the malefic Saturn the dimmest.¹³⁹ At the very least, therefore, one might suspect a correlation between relative brightness and ethical disposition, with the evil planet Saturn usually being assigned the darkest colour possible.¹⁴⁰ Achilles (3rd century AD) described Saturn, called *Phainōn*, as *amaurōtatos*, the “dimmest” or “faintest” of the planets.¹⁴¹ In similar vein, Brown suggested:

The simplest explanation for Mercury and Saturn’s association with blackness is that they are the dimmest of the planets ... the association between Saturn and “black” may be *observational* for it is the dimmest planet ...¹⁴²

Whether expressed in terms of auspiciousness or brightness, the argument seems unsatisfactory, as it flouts the underlying logic that can be seen in the Babylonian choice of colour for all other planets – where, clearly, colour has dictated the choice. The earliest documented examples come from the texts dated to the 8th-7th centuries BC, which systematically describe the Sun as gold, the Moon as silver, Mars as red and Jupiter as white – just as they appear. Though less clear from the sources, our understanding is that Mercury was associated with pale red (brown, according to the medieval scholars of Harran in northwestern Mesopotamia), and the planet can appear orange-brown in colour.¹⁴³ The “green” colour ascribed to Venus can be read as green or blue, as there was no distinction between these colours in the Sumerian and Akkadian languages.¹⁴⁴ The apparent difference between this and the generally white appearance of Venus is a subject we will return to below.

If anything, Saturn’s associations with “evil” or the underworld would seem to have derived from its darkness, not the other way around. However, just how Saturn’s blackness could have been intended as a natural colour remained mysterious.

As it happens, the planet Saturn exhibits a combination of colours, with dark grey and brown clouds forming belts or bands around an otherwise yellow atmosphere. But this, of course, is as we see it with the aid of telescopes and satellites. Even though pre-Galilean naked-eye observations of Jupiter’s moons have been claimed and have been calculated as theoretically possible,¹⁴⁵ and even allowing the possibility of ancient telescopes (the lenses were certainly available,¹⁴⁶ while Temple has made a compelling case at least for ancient Greek knowledge of the telescope¹⁴⁷), it seems very unlikely that the

138. Tr. Rochberg-Halton 1988a: 325.

139. James & van der Sluijs 2008: 72.

140. With respect to Saturn, see Jeremias 1929: 177: “Die Farbenbezeichnung, die der Wirklichkeit des ganz weiß leuchtenden Sterns widerspricht, könnte andeuten, daß man dabei an Unglück dachte.”

141. Achilles, *Excerpts from the Introduction* 17 (136 / 956), ed. Maass 1898: 43; cf. Liddell & Scott 1996: 78 s.v. “ἄμαυρός”.

142. Brown 2000: 68-69.

143. See James & van der Sluijs 2008: 66-68.

144. Landsberger 1967: esp. 139.

145. Frazier 1982.

146. James & Thorpe 1994: 157-163, 628.

147. Temple 2000: esp. 121-168; see especially Strabo, *Geography* 3.1.6 for a reference to distant objects increasing in apparent size when seen through “tubes”.

mixture of dark bands and yellow background in Saturn’s atmosphere could have been seen clearly enough in antiquity to prompt its description as being either black or yellow.

A further hypothesis, which we published in *The Observatory*,¹⁴⁸ involved the enormous Phoebe Ring discovered around Saturn in 2009.¹⁴⁹ With a radius of between 128 and 207 times that of Saturn, a vertical thickness 40 times Saturn’s radius and an inclination of about 27 degrees with respect to the main ring plane, it incorporates Saturn’s moon Phoebe, from which its dust is thought to derive through impacts. Some 100 times larger in diameter than the nearest rings inside it, at opposition it is estimated to “span the width of two full moons’ worth of sky, one on either side of Saturn.” As visualised, a ring of light surrounds a gigantic black space, within which the planet itself appears only as a small dot of brightness at the centre. Though the ring is presently invisible from a terrestrial standpoint, were anything like this to have been visible from the Earth in the ancient past, an explanation would readily offer itself of why ancient observers regarded Saturn as black: perceiving the ring as the perimeter of the planet, the “body” of the object would appear to be black. A scenario such as this seemed the only possible way that Saturn could have appeared “black” to an observer against the background of the night sky. This would require that the amount of dust in the Phoebe ring was considerably higher in the recent past due to an episode of cometary or asteroidal impact activity. If so, could sunlight have reflected off the particles in a process akin to the zodiacal light, producing a ring, at least partially, as seen from the Earth? We left the question open, as it would take an astrophysicist to perform the necessary mathematics.

HELIAL CAL COLOURS OF PLANETS

The first astronomer to comment on the Phoebe Ring scenario was Richard Stothers, of the Goddard Institute for Space Studies, who in private correspondence and then in a letter to *The Observatory*,¹⁵⁰ suggested an attractive alternative. Atmospheric-optical factors appear to offer a much simpler solution. The apparent colours of planets – as well as stars – as seen from the earth are a function of the body’s intrinsic colours, modulated optically by the intervening portion of the earth’s atmosphere. As the atmosphere is thicker closer to the horizon, objects observed at lower altitudes tend to acquire a darker hue than at higher elevation. Pliny was aware of this when he wrote: “The colours of the planets vary with their altitudes ...”¹⁵¹ This pertains especially to the *heliacal* risings and settings of planets and stars, defined as the moments when these bodies are first and last visible within their cycles, following or preceding their phases of invisibility. Stothers notes the effect on Saturn: “A rather faint object like Saturn (two magnitudes fainter than the brightest star Sirius) appears dim gray when seen through the thick layers of the atmosphere near the horizon. This is because the human eye cannot distinguish colours at low light levels. Thus the choice of “yellow” or “black” by the Babylonians would have come down strongly in favour of ‘black’ as the dominant colour of Saturn.”¹⁵²

In all likelihood, the notion of heliacal colours offers the key to the problem of Saturn’s traditional blackness in astrology. It is known that Babylonian astronomers accorded special significance to heliacal phenomena. For example, a Middle Babylonian *Prayer to the Gods of the Night* from Boğazköy lists a

148. James & van der Sluijs 2010.

149. Verbiscer *et al.* 2009.

150. Stothers 2011.

151. Pliny, *Natural History* 2.16 (79), tr. Rackham 1979: 222-223.

152. Stothers 2011: 254.

number of stars in the sequence of their heliacal risings.¹⁵³ The *MUL.APIN* lists the heliacal risings of some 36 stars and constellations;¹⁵⁴ it specifically recommends observation and veneration of the planet-gods at their heliacal risings:

[These are the gods (?) who] keep changing their positions and their glow
[and] touch [the stars of the sky]; on the day their stars become visible, you observe their risings, their glow,
[their ...], where they become visible, and the wind that blows: on the day they become visible,
you present offerings to them ...¹⁵⁵

An astronomical text of the 7th century BC gives three names for Jupiter (styled the star of Marduk), according to the planet's altitude in the sky: at its heliacal rising, it is called "Šulpae"; when two (?) hours high, SAG.ME.GAR; and when at the zenith Nibiru.¹⁵⁶

Given this, the door is opened to a lexical approach to the question of Saturn's "blackness". The Sumerian word *gíg* and its notation *MI* are usually translated as "black" or "dark",¹⁵⁷ while a term for "grey" appears not to be known.¹⁵⁸ Likewise, Akkadian *šalmu* is translated as "black (as a natural color)" or "dark (as a morbid or otherwise abnormal discoloration)",¹⁵⁹ but no words meaning specifically "grey" are identified in this language.¹⁶⁰ It is common for the meanings "black" and "dark" to be combined into a single lexeme; additional examples are Greek *mélas* and Sanskrit *kāla*.¹⁶¹ Yet whereas "black" denotes a colour, "dark" describes a degree of brightness. In contexts concerned with colours, "dark" must be discounted as a legitimate translation, except when it means a dark colour, such as black or grey. It is conceivable that in some of these contexts the Sumerian and Akkadian words for "black" were employed to fill the semantic gap for "grey". Applied to the subject at hand, "grey" would be a realistic description of Saturn's low-altitude appearance to the unaided eye, as noted by Stothers.¹⁶²

In some astronomical contexts, it is hard to ascertain whether the word *MI*, usually translated as "black", was intended to mean "dark" or "grey"; examples include the following references to Venus and a lunar halo:

Venus is . . . with white and black.
Venus – her rear (?) is [. . .] white and black.¹⁶³
If the moon is surrounded by a black halo ...¹⁶⁴

153. KUB 4. 47.

154. *MUL.APIN*, I ii 36 - iii 12; II i 25-37, eds. Hunger & Pingree 1989: 40-47, 77-80.

155. *MUL.APIN*, II i 40-43, eds. Hunger & Pingree 1989: 80-81.

156. Langdon 1930-1931: 173. For Šulpae as heliacal Jupiter and SAG.ME.GAR, see Brown 2000: 55, 58; Reiner 1995: 4 n. 9; Gössmann 1950: 125 s. v. "334. ^{mu}SAG-ME-GAR". Schott (1936) discussed such titles for Jupiter.

157. Halloran s.v. "gíg, ḡíg, ḡi₆, ḡe₆, ḡi₆, ḡe₆, mi, mé, ku₁₀"; anon. 1974-: s.v. "MI", "giggī".

158. J. Halloran, pers. comm. 7 January 2010.

159. Gelb *et al.* 1962: 77-78 s.v. "šalmu".

160. The closest candidate is *šibtu*, "grey hair", but this is exclusively used for people.

161. Liddell & Scott 1996: 1095-1096 s.v. "μέλας"; Monier-Williams 1960: 277 s.v. "kāla".

162. It is doubtful that Greek *mélas* may have also meant "grey". Greek had two other terms: *pólios*, most commonly applied to grey-haired people, and *phaiós*, used more generally. Neither is known to have been used for the planet Saturn.

163. K. 9493, 14', 16', trs. Reiner & Pingree 1998: 19, cf. 192-193. Compare VAT 10218, trs. Reiner & Pingree 1998: 95, for a parallel in a reconstructed passage.

164. *Enūma Anu Enlil*: 82-5-22, 89, obv. 10, tr. Hunger 1992: 286.

In the last instance, Thompson was almost certainly correct in translating “dark” halo.¹⁶⁵ Yet in other cases, the context leaves little doubt that actual colours were intended; hence, “black” must refer to “grey”. For example:

Venus is . . . with black, variant red, green, black, green.¹⁶⁶

As a parallel, a Hindu astronomical treatise characterises Saturn as alternately variegated, yellow, red, blue and *ásita* (“dark-coloured, black”) – and two translators render the latter word as respectively “ash-coloured (i.e. grey)” and “ashy”.¹⁶⁷ As Greek and possibly also Hindu tradition apparently understood Saturn’s natural colour as genuinely black, spawning the astronomical conundrum of a black Saturn, it may be surmised that the occasional Babylonian interpretation “grey” for terms for “black” has been “lost in translation”; it will have been a subtlety early translators failed to spot.

Reading the term “black” for Saturn as “grey” sheds fresh light on a number of related questions. It would mesh with the common astrological association of Saturn with lead, which is grey rather than black in colour. The concept of a “grey Saturn” could have fed into the classical image of Kronos or Saturn as an old man with grey hair¹⁶⁸ and a slow pace reminiscent of the ponderosity of lead¹⁶⁹ – especially compared to the planets below him, the apparent velocity of which may have suggested the greater vigour one would expect of his son Zeus (Jupiter) and grandchildren Ares (Mars), Aphrodite (Venus) and Hermes (Mercury).¹⁷⁰ And if the “black” colour attributed to Saturn was due to its observation in heliacal positions, the question arises whether the canonical colours of the other planets, as listed above, also relate to heliacal phases.

Intriguingly, the same explanation can apply just as well to Venus and Mercury as to Saturn. As noted earlier, a “green” colour was ascribed to Venus – there is evidence for a blue-green Venus from both inside and outside Mesopotamia,¹⁷¹ as well as a red one.¹⁷² While Venus generally appears white, in heliacal positions it often shifts from white to yellow or red, sometimes accompanied by a green or blue flash.¹⁷³ Thus, as Reiner and Pingree realised, variations in the colour of Venus, as reported in Babylonian omen texts, are probably due to “the refraction of Venus’ light into green and red components when it is near the horizon”.¹⁷⁴

165. Thompson 1900: lvii.

166. Reiner & Pingree 1998: 19.

167. Varāhamihira (505-587 AD), *Brhat Samhitā* 1.10.20-21, tr. Bhat 1981: 120; tr. Iyer 1884: 66.

168. Lucian, *Saturnalia* 1.5, using the term *polìon* for “grey-haired”. The theme may also have drawn on the proto-Phoenician perception of El as aged, bearded and the “father of years” – see Pettazzoni 1978: 90.

169. e.g., Martianus Capella *The Marriage of Philology and Mercury* 1 (70). See Klibansky, Panofsky & Saxl 1964: 144.

170. See Klibansky, Panofsky & Saxl 1964: 136.

171. James & van der Sluijs 2008: 68.

172. From at least the Ur III period, Inanna, the goddess of Venus, was also called Ninsianna, which may be translated as “Red lady of heaven” and refers to the goddess in the evening sky, Heimpel 1982: 60-61. For a possible Babylonian report of Venus remaining red even at its zenith, see Bjorkman 1973: 122-123; Bezold 1916: 144-145. The Absaroka people (of Montana) styled Venus *Ihkawaaláaxe* (“Crazy Star”), because of “its erratic cycle coupled with its varying brightness and color: red, white, green, and blue.” (McCleary 1997: 44). And the Chamacoco (of Paraguay) attributed “a red sparkle” to Venus (*yo’hle*), Métraux 1943: 118.

173. e.g., Evershed 1923: “The striking thing about the setting of Venus was the sudden appearance of a reflected image moving upwards to meet the descending image, and the instantaneous and conspicuous change of colour from dull red to green at the moment of meeting of the two images.” Evershed’s observation of a mirage effect accompanying this shift in colour may explain the mention of ‘crowns’ (*aga*) of various colours in Babylonian omen texts – see e.g. Reiner & Pingree 1998: 42-43, 58-59, 64-65 and below.

174. Reiner & Pingree 1998: 19.

Due to its orbit, Mercury never appears to be very far from the Sun; hence it is only visible to the naked eye when it is low on the horizon, in the twilight just before sunrise or just after sunset. Thus, while it lacks the intrinsic red colour of a planet like Mars (due to the iron oxide dust on its surface), often appearing dull white in colour, it is fairly common for it to appear orange brown, pinkish or red¹⁷⁵ for the same reason that sunrises and sunsets typically take on this hue – the longer path of the Sun’s light through the atmosphere scatters shorter wavelengths and leaves the longer wavelengths, orange and red, dominant. This would explain why Mercury is described as “red” in the canonical colours passage cited above.¹⁷⁶ A variant of the same text gives “black” for Mercury, as seen. If, as in the case of Saturn we read this as “grey”, the darker colour observed would simply be due to similar atmospheric conditions. In this sense both of the colours recorded for Mercury are ‘heliacal’ as the planet is only visible when close to the horizon.

For Jupiter the matter is less straightforward. Jupiter’s standard colour is white, as seen, yet Mesopotamian astrologers often reported it – as SAG.ME.GAR – to be red (SA₅) at its appearance,¹⁷⁷ with three passages explicitly locating the planet “where the sun shines forth”, i.e., the east.¹⁷⁸ Further, a Middle Assyrian “astrolabe” states: “The red star, which stands at the rising of the south-wind after the gods of the night have finished their duties and divides the heavens, this star is Neberu, Marduk.”¹⁷⁹ As in both cases a heliacal position is clearly indicated, the use of the labels SAG.ME.GAR and Nibiru is at variance with their non-heliacal definitions in the 7th-century tablet cited above. Other texts in which Nibiru is said to have “lit” up also suggest, as Brown notes, “its rising and proximity to the horizon”.¹⁸⁰ Much later sources also attribute other colours to Jupiter than white, but unfortunately they do not relate these to any specific positions. Vettius Valens (2nd century AD) described Jupiter as ‘grey or rather white’ (*phaiòs kai mallon leukòs*).¹⁸¹ Echoing this, Rhetorius (6th/7th century AD) qualified Jupiter as *phaiòs*.¹⁸² Medieval Harranian scholars described the planet as green.¹⁸³

In addressing reports of this kind, the variability of atmospheric refraction must always be borne in mind. The heliacal colours of astronomical bodies, as seen, are a function of the amount of dust in the earth’s atmosphere, which varies over time. A higher concentration of dust may result from cometary activity or volcanic eruptions, the latter well known to have dramatic effects on sunsets and the colour of Moon and Sun.¹⁸⁴ This would result in a greater incidence of “heliacal” colours, even if the planets were at higher altitudes. Moreover, dust levels closer to the surface of the earth vary in the course of a day, albeit with different outcomes in different locales: “At some places the sunset sky is more beautiful than the sunrise, and at other places the reverse. This depends on where clouds tend to lie ... In any location the local weather pattern has much to do with whether the sunset or sunrise is brilliant.”¹⁸⁵ For example,

175. *e.g.*, Dunlop 2006: 148.

176. During the total solar eclipse observed in Spain on 28 May 1900, Mercury was reported as being “bright red gold” and “red golden brown” (see Botley 1983).

177. Assyrian examples are reports of Issar-šumu-ereš (K. 750. 11-12), Bulluṭu (K. 742. 1-5), Bamaya (K. 871. 3-7) and an anonymous person (K. 1317. 3-4), ed. Hunger 1992: 6 #4, 73 #115, 100 #170, 118 #211. A Babylonian example is a report of Ašaredu the Older (K. 1394. 5), ed. 1992: 185 #326. See further Bezold 1916: 144; Gössmann 1950: 126 s. v. “334. ^{mm}SAG-ME-GAR”; Brown 2000: 60; and *Enūma Anu Enlil: Ištar*, 17. 10-11, ed. Virolleaud 1909: 21.

178. Cf. Hunger & Pingree 1999: 126-127.

179. KAV 218 B ii 29-32, tr. Horowitz 1998: 159.

180. Brown 2000: 58.

181. Tr. van der Sluijs. Vettius Valens, *Anthologies* 1.4, ed. Bara 1989: 28-29.

182. Rhetorius, *On the Nature of the Planets*, ed. Boll 1908: 216, l. 9.

183. James & van der Sluijs 2008: 66.

184. For comets: Bailey *et al.* 1994: 512, 517. For volcanoes: Meinel & Meinel 1983.

185. Meinel & Meinel 1983: 34-35.

do the Babylonian observations reveal a closer association of a red Jupiter with either mornings or evenings? If they do, the planet’s canonical colour may have been based on that associated with the other part of the day.

For Saturn, a difference between morning and evening appearances seems discernible in Ptolemy’s intimation, seen above, that when Saturn is in the east it gives his “subjects” honey-coloured skin, and when setting black. Some intriguing parallels to this colour dichotomy occur in omen texts which explain the “crowns” of different colours worn by Venus by the close presence of other planets. In one, two crowns, one of which is black (*MI*), the other renders her “very bright” (*i-ba-il*), are explained by the proximity of Saturn:

If Venus wears a black crown [Satur]n stands in front of her ...

...

If Venus wears the Sun’s crown – she becomes very bright, Saturn stands in front of her ...¹⁸⁶

This can be related to another text in which the bright, Sun-like crown is associated with the east:

[If Venus wears the crown of the Sun: ...] ... she rises in the East, Saturn stands in front of her.¹⁸⁷

Completing the parallel with Ptolemy, one Assyrian astrological report records that Saturn appeared “faint” (*unnut*) and with a “fallen” (*maqtu*) radiance, as “the star of the Westland” (MUL šá KUR-MAR.TU).¹⁸⁸

Granted this, one wonders if the classical theme of “Saturn in the far west” may have been intrinsic to the god’s *mythos*, rather than being a reflection of the westward expansion of cultural horizons, as others suggested.¹⁸⁹ The two colours of the planet Saturn may relate to the paradoxical duality of Kronos/Saturn in Greek myth, commented upon by various scholars.¹⁹⁰ The question then arises whether it was the appearance of Saturn that inspired the myth of an aged former king of heaven retreated to a dark extremity of the cosmos or, conversely, a myth of that type was linked with the planet. This is a complex problem best reserved for a separate discussion.

Intriguingly, at least one medieval alchemist seems to have been well aware of Saturn’s shift from “lead” to “gold”, co-opting it for the common alchemical purpose of transmuting metals from “low” to “high”, from the “basest” of elements to the “purest” – with the aid of the “philosophers’ stone”. The obscure Dutch alchemist John Isaac Holland (possibly 15th century AD) stated that “there is no higher nor greater Secret than in *Saturn*”, which is “a black thing”, “for internally it is good Gold, herein all Philosophers agree, and it wants nothing else, but that first you remove what is superfluous in it, that is, its impurity, and make it clean, and then that you turn its inside outwards, which is its redness, then will it be good Gold ...” Explaining that this is accomplished by the extraction of Mercury from “Saturn”, which is evidently lead, Isaac indirectly compared Saturn to *Sol*, the Sun: “... this *Mercury* or

186. *Enūma Anu Enlil*, K. 148. 10, 15, trs. Reiner & Pingree 1998: 58-59.

187. VAT 10218, 19, eds. Reiner & Pingree 1998: 43.

188. Šapiku of Borsippa (Sm 366 + 80-7-19.371), recto 9-11a, ed. Hunger 1992: 271 #491. See Cooley 2008a: 183 for a mythological dimension to the terminology used in this passage.

189. *e.g.*, Versnel 1993-1994: 97: “As the geographical horizon expanded, Kronos moved ever further to the West, where he was identified with similar deities, such as Saturnus. Eventually we find him on a Utopian island west of Britannia, where he is represented as either asleep or in chains.”

190. *e.g.*, Klibansky, Panofsky & Saxl 1964: 134-135; Rose 1964: 43-44; Versnel 1993-1994: 97-98.

Quintessence of *Saturn* is as good in all works as the *Mercury* of *Sol*, they are both alike good, and herein all Philosophers agree.”¹⁹¹

CONCLUDING REMARKS

To sum up, the planet Saturn was widely associated with the Sun in many cultures of the Old World, including Babylonia, the Graeco-Roman region, and India. No direct evidence for such an association is known from the Americas, the Far East, Africa or Oceania. Indeed, it is clear that both the classical and Hindu civilisations ultimately borrowed the Saturn-Sun link from Mesopotamia, where it is attested as early as the late 2nd millennium BC.

Through a wide-ranging review of its possible origins, we can exclude various hypotheses, some of which depend on Greek concepts, others on secondary associations: these include Saturn’s elevated orbit, its association with time, the name of the West Semitic god El, a link with the constellation of Libra or with mock moons, and a folk-etymological play based on *kittu*, “righteousness”. We conclude that only two explanations remain viable. One is Saturn’s yellow colour, comparable to that of the Sun, yet such a comparison is unattested in extant Babylonian sources. This leaves the planet’s steady course, coupled with its synodic period, as the most plausible explanation. Surprisingly, previous discussions seem to have completely overlooked the striking fact that Saturn’s synodic period of 378.1 days closely approximates the solar year. It surely cannot be coincidence that the Babylonians, who were aware of the synodic period of the planets, associated Saturn with the Sun – especially as the association between Saturn and the Sun was first made at an early time when the orbital periods of the planets had not yet been worked out. Like the year, Saturn’s synodic period therefore simply appeared to be the next larger cycle after its diurnal motion.

Once Babylonian scholars had made the link between Sun and Saturn, it is easy to see how secondary considerations, including the mutual association with justice and the constellation Libra, could have arisen.

Paradoxically, given its (often) yellow colour and the solar association, Saturn was described as “black” in Babylonian, classical and Hindu sources. Unconvincing explanations for this include a folk-etymological connection with the word *šalmu* or an association with the god Ninurta, a solar eclipse, the darkness of the night, some dark corner of the cosmos to which the deity of Saturn was exiled, the planet’s astrological inauspiciousness and Saturn’s Phoebe Ring. Instead, we propose a lexical solution to the problem, in that the Sumerian and Akkadian terms in this context meant “grey” – rather than “black” *per se*. Hindu and especially Greek astrologers may have inadvertently translated the word as “black”. A “grey” colour suits Saturn’s astrological association with lead and its later mythological link with old age. It also accords perfectly with the grey colour which Saturn can assume when viewed in heliacal positions. It would appear that the heliacal rising and settings of the planets were of particular importance to the Babylonians and possible colours in heliacal positions also match Babylonian descriptions of other planets: Venus as green-blue, Jupiter as red, grey or green, and Mercury as red or “black”.

A number of early 20th-century scholars wondered whether the Babylonian concept of Saturn as a nocturnal Sun was a reflex of an archaic belief that Saturn was the Sun itself surfacing in the night sky, at a greater distance – as an answer to the primitive question, “where does the Sun go when the day

191. Holland 1670: 185, 203, 216; compare the discussion in Schwabe 1951: 492.

has ended?”¹⁹² The question may provide an important pointer in terms of the broader development of cosmological ideas in Mesopotamia. By c. 1000 BC, the Babylonians had developed the concept of seven planets as a set of bodies that moved counter to the fixed stars along the same “path”, the ecliptic.¹⁹³ While some overlap in concepts is likely, it seems clear that an equation of Saturn and Sun must predate the “discovery” that there were “seven” planets, a grouping in which the Sun is physically distinct from Saturn. Once the latter step had been made, the impetus would have been in place to remove the question of Saturn’s solar identity from the realm of practical observational astronomy. Thus, the archaic linkage of Saturn and Sun was necessarily relegated to astrology *per se*, drawing in secondary associations. It survived in classical and Hindu astrology, a vestigial, yet important and very longstanding artefact of a rudimentary stage in the history of planetary astronomy.

One outstanding question is just why no Babylonian qualification of Saturn as yellow is found in any extant texts. Is this simply due to the fragmentary nature of the material at our disposal? Or is it conceivable that colours now associated with heliacal positions may have been observed more commonly during the 2nd millennium BC or earlier due to higher dust levels in the atmosphere? This question seems legitimate, as Babylonian texts similarly characterised Venus as blue-green rather than white or yellow, while Jupiter is typically white as expected. Interdisciplinary work with palaeoclimatologists will be required to shed further light on this matter.

APPENDIX 1: A COLLOCATION OF *LOCi* FOR THE ASSOCIATION OF KRONOS AND HĒLIOS

- Anonymous, *On the Art of Eudoxus* (193-165 BC; papyrus Musée du Louvre, 1), 5. 20, ed. Blass 1887: 16, cf. 7 = Leptines, *Didascalica Caelestis* 14, tr. Tannery 1893: 287: “Phainon, l’ étoile d’Hélios, (Saturne), parcourt le cercle du zodiaque en 30 ans.”
- Diodorus of Sicily, *Library* 2.30.3, tr. Oldfather 1946: 448-451: “But above all in importance, they say, is the study of the influence of the five stars known as planets, which they call “Interpreters” when speaking of them as a group, but if referring to them singly, the one named Cronus by the Greeks, which is the most conspicuous and presages more events and such as are of greater importance than the others, they call the star of Helius ...”
- Pseudo-Eratosthenes of Cyrene, *Catasterisms* 43, tr. Condos 1997: 167: “The second star is not large. It is called Phaethon [“radiant”] and is named for Helius.”
- Ptolemy, *Tetrabiblos* 2.3 (64), tr. Robbins 1971: 138-139: “... for they [the inhabitants of the southern part of Greater Asia, from India to Mesopotamia; MAS] revere the star of Venus under the name of Isis, and that of Saturn as Mithras Helios.”

192. Cumont 1912: 48; Kugler 1914, suppl. II, 196, n. 2; Bezold 1918: 6, 57; Boll 1919: 345.

193. James & van der Sluijs 2008: 66-67.

- Hyginus, *Poetical Astronomy* 2.42.2, tr. Grant 1960: 228:
“The second star is that of Sol; others say of Saturn. Eratosthenes claims that it is called Phaethon, from the son of Sol.”
- Hyginus, *Poetical Astronomy* 4.18, tr. le Bœuffle 1983: 146:
“L’astre du Soleil, nommé Phaéthon (le Splendide), est de grosseur importante et couleur de feu; il ressemble à l’étoile située sur l’épaule droite d’Orion. On le voit continuellement graviter à travers les douze signes. Parfois même il se montre avec les feux solaires, tantôt à quelques degrés sur le cercle. Pour quelques-uns, c’est l’astre de Saturne; il revient à son signe de départ en trente ans et chaque année il n’est invisible ni moins de trente jours ni plus de quarante.”
- Theo of Smyrna, *Mathematics*, ed. Hiller 1878: 130-131:
“... hōn hēliós te phéretai kai hē selēnē kai hoi loipoi plánētes, phaínōn te ho tou Krónou prosagoreúomenos, hōs dé tines Hēlíou, kai phaéthōn ho tou Diós, éti dè pyrōeis, hōn Áreōs kalousin, hoi dè Hērakléous, kai phōsphóros, hōn phasin Aphrodítēs, touton dè kai heōsphóron kai hēperon onomázousi, prōs dè toutois stílbōn, hōn kalousin Ermou.”
- Pseudo-Manetho, *Apotelesmatics* (c. 400 AD?) 4.34, ed. Koechly 1858: 76:
“Pampháinōn d’astēr hopót’an polioio Krónoio Ēlíou seláessin an’ouranōn ēi isómoiros, tēníka phyoménōn brephéōn gennētora prōton mētēros eis Aídēn pémpsei nekyostólos Aida, ktémata t’exolēsei patrōia kai polyn ólbon.”
- pseudo-Manetho, *Apotelesmatics* 1 (5). 327-333, ed. Koechly 1858: 97-98:
“Pampháinōn d’astēr kyanochrótoio Krónoio Ēlíou seláessin an’ouranōn ēn isómoiros, tēníka phyomēōn brephéōn gennētora prōton mētēros eis Aídēn pémpsei nekyopólos Aisa, ktémata t’ekbállei patrōia kai mégan ólbon, kai te kasignētōn thánaton horóōsi proóntōn, kak pollōn thanátōn plouton mégan auxēsousin.”
- Servius, *Commentary on Virgil’s Aeneid* 1.729, eds. Thilo & Hagen 1923: 203:
“QVAM BELVS primus rex Assyriorum, ut supra diximus, quos constat Saturnum, quem et Solum dicunt, Iunonemque coluisse, quae numina etiam apud Afros postea culta sunt. unde et lingua Punica Bal deus dicitur. apud Assyrios autem Bel dicitur quadam sacrorum ratione et Saturnus et Sol.”
- Macrobius, *Saturnalia* 1.22.8, tr. Davies 1969: 148:
“And Saturn himself, the author of times and seasons (and therefore, by the change of a letter, called Κρόνος by the Greeks as though for χρόνος, time), must assuredly be understood to be the sun ...”
- Nonnus, *Dionysiaca* 40.393, tr. Rouse 1940: 182-183:
“Belos on the Euphrates, called Ammon in Libya, thou art Apis by the Nile, Arabian Cronos, Assyrian Zeus! ... Be thou called Sarapis, the cloudless Zeus of Egypt; be thou Cronos, or Phaëthon of many names, or Mithras the Sun of Babylon, in Hellas Delphic Apollo; be thou Gamos ..., ... painquelling Paieon, or patterned Heaven; be thou called the Starclad ...”
- Simplicius, *Commentary on Aristotle’s On the Sky* 495.28, tr. Mueller 2005: 35:
“Accordingly, he says that the second sphere completes <its circuit> in a year in the case of Mercury and the Morning Star, in two years in the case of Mars, in twelve years in the case of Jupiter, and in thirty in the case of Saturn (which earlier people called the star of Helios).”

- *Scholia Basileensia* (9th century AD) on Germanicus Caesar, *Aratus’ Phenomena* 43.8-9, ed. dell’Era 1979: 370:
“Secundus Phaethon, qui cognominatus dicitur ab Solis filio Phaethonte. Post fulminis ictum caelo receptus. Hanc stellam quidam Saturni dicunt.”
- *Scholia Stroziana* (14th century AD) on Germanicus Caesar, *Aratus’ Phenomena* 46.47-52, ed. dell’Era 1979: 231
“Saturni NAMQVE sidus, a quo se tarditatem accipere opinabantur, Phaethontem Solis ET CLYMENAE filium esse dixerunt et quia paternos cursus affectans sibi atque mundo concremationis detrimenta conflixerit, ab Ioue fulmine percussus in Eridanum deciderit FLVVIVM (SICVT HESIODVS REFERT) et a Sole patre inter sidera collocatus.”

In the *Epinomis*, Teucer of Babylon, Ptolemy and pseudo-Cebes of Thebes, the names “Kρόνος” and “Hēlios” vary between manuscripts and it is not always clear which variant was original:

- Pseudo-Plato, *Epinomis* 987C, tr. Lamb 1964: 470-471:
“And now there remain three stars, of which one is distinguished from the others by its slowness, and some speak of it under the title of Saturn; the next after it in slowness is to be cited as Jupiter; and the next after this, as Mars, which has the ruddiest hue of all.”
- Manuscript Parisinus 1807 is the only one offering *hēliou*, where others have *Kρόnou*. Stallbaum (1860) preferred *Kρόnou*, but this was challenged by Bidez (1905) and others in the wake of cuneiform discoveries in Babylonian astronomy and astrology. Tarán (1975: 308-309) reverted to the view that *Kρόnou* was the original reading, essentially because *hēliou* rested on only one manuscript tradition; because the name *Kronos* for the planet was in vogue as early as Aristotle; and because Aetius (*Placita Philosophorum* 2.15.4) as well as Alcinous (*Daidaskalikos* 14.7) cited Plato (presumably the *Epinomis*) as calling Saturn “Kronos”. While these points are fair, even as an emendation *hēliou* does not need to have been late. Perhaps the original text included either both terms (as proposed by Cumont, in Tarán 1975: 309, n. 738) or neither, if an astrological symbol was used to denote the planet (as touched on by Tarán).
- Teucer of Babylon (1st century AD?), *On the Twelve Signs*, apud Rhetorius (6th century AD), ed. Boll 1908: 203 and n.:
“καὶ πάλιν ἐν τῇ δεξίᾳ πτέρυγι τοῦ καλοῦμένου Προτρυγῆτῆς μοίρας ἑπτῶν ἰσ', βόρειος, μεθέθους γ', κράσεὸς Κρόνου καὶ Ἑρμοῦ.”
- *Hēliou* for *Kρόnou* in manuscripts Codex Berolinensis, 26, fol. 139, and Codex Vaticanus Gr. 191 (14th century), fol. 232ff.:
- Ptolemy, *Tetrabiblos* 2.3 (67), tr. Robbins 1971: 144-145 and n. 2:
“Of the third quarter, which includes the northern part of Greater Asia, the other parts ... are ... governed by Saturn and Jupiter in oriental aspect. Therefore the inhabitants of these lands worship Jupiter and Saturn, have much riches and gold, and are cleanly and seemly in their living ...”
- *Kρόνον* (earliest 15th century AD) in the manuscripts Parisinus Gr. 2425, Oxoniensis Laud Gr. 50, Norimbergensis Cent. V and Camerarius; *hēlion* (earliest 13th century AD) in

Vaticanus Gr. 1038, Venetus Marcianus 314, Vaticanus Gr. 208, Parisinus Gr. 2509, Monacensis Gr. 419 and Vaticanus Gr. 1453.

- Pseudo-Cebes of Thebes (1st century AD?), *Tablet 1*, trs. Fitzgerald & White 1983: 60-61, with Boll 1919: 344:
“We happened to be strolling in the temple of Cronus, looking at the many different votive offerings in it.”
- For the word *Krónou*, one finds *hēliou* in the margin in Codex Parisinus Gr. 1774 chart. (16th century) and in Codex Meibomianus (date unknown). The phrase *tu Krónou hierōi*, “in the temple of Cronus”, does not require a planetary aspect and one should not rule out that, in these, *hēliou* was a correction possibly prompted by the rarity of “emples of Krónos.”

Two witnesses testify to a combined cult of Krónos and Hēlios – an inscription at Beirut and a report of a double altar for the two at Olympia. The passages are:

- A stele (3rd century AD) discovered in 1869 behind the French cemetery at Beirut, ed. Ceccaldi 1872: 253-254, in Boll 1919: 342; compare Stephanus of Byzantium, *Ethnica*, s.v. “Bērytós”:
“*KRONOU / ĒLIOU / BŌMOS*” or “altar of Kronos Helios.”
- Anonymous, *Etymologicum Magnum* (c. 1150 AD) 1217 s.v. “Ἡλις”, ed. Gaisford 1967: 426:
“*Prò tou Díá ktésasthai tēn Olympían parà tēs Gēs, autēn pareilēphesan Hēlios te kai Krónos. Gnōrisma dè tou ktématos koinós esti bōmòs amphoin autoin en Olympíai.*”

According to Lydus, the Latin god Ianus was not only identified with Saturn, but, by Lutatius, also with Hēlios, as it commands the two gates of west and east:

- Lutatius (fl. 100 BC), *Communis Historia*, apud Lydus, *On the Months* 4.2, ed. Wuensch 1898: 65; cf. 4:
“*kai en tēi kath’hēmas Philadelphéiai éti kai nyn íchnos tēs archaiótētos sōzetai. en gār tēi hēmérai tōn Kalendōn próeisi eschēmatisménos autòs dēthen ho Ianòs en dimórphōi prosōpōi, kai Satournon autòn kalousin hoion Krónon. ho ge mēn Loutátios Hēlion parà tò hekatéras pýlēs árchein, anatólēs ísōs kai dýseōs.*”

Finally, the astrological association of Saturn with the Sun may have been a contributing factor in the connection between Saturn and the *ourobóros* or tail-biting serpent, attested since the 4th century AD,¹⁹⁴ as the *ourobóros* had traditionally been an attribute of the Egyptian Sun god.¹⁹⁵

194. e.g., Martianus Capella, *The Marriage of Philology and Mercury* 1 (70); Claudian, *On the Consulate of Stilicho* 2.424-430.

195. van der Sluijs & Peratt 2009: 17-18.

APPENDIX 2: PHAETHON AS A “MOCK SUN” AND AS SATURN

A possible mythological dimension to Saturn’s role as a “counter-sun” is furnished by the Greek myth of Phaethon, the son of Helios, who nearly destroyed the world with fire when he caused the solar chariot to crash down from the sky into the river Eridanus. Various passages indicate that Phaethon – or his soul – was eventually placed in the sky as a planet or asterism, but the sources disagree on the identity of Phaethon’s “star”. Hyginus credited Eratosthenes with the identification of Phaethon as the planet Saturn:

The second star is that of Sol; others say of Saturn. Eratosthenes claims that it is called Phaethon, from the son of Sol. Many have written about him how he foolishly drove his father’s chariot and set fire to the earth. Because of this he was struck with a thunderbolt by Jove, and fell into the river Eridanus, and was conveyed by Sol to the constellations.¹⁹⁶

This association of the demigod Phaethon with the planet Saturn is atypical in the sense that Hellenistic astronomers more commonly applied the name “Phaethon” to Jupiter and “Phaenon”, which Hyginus reserved for Jupiter,¹⁹⁷ to Saturn.¹⁹⁸ How can this vexing nomenclature be explained?

The earliest mythological texts in the Greek world customarily applied the epithet *phaéthōn*, “radiant, shining”, to the Sun, without any specific association with the demigod of that name.¹⁹⁹ Apparently, within the Greek language, the term *phaéthōn* was traditionally linked with the Sun. When Greek mythographers introduced the tragic character of that name into their tradition, they may have selected the name “Phaethon” not only because the hero’s precursors in various Near Eastern sources bore names with the same meaning,²⁰⁰ but also because of the solar connotation of the name. As a “mock sun” *par excellence* and a denizen of the night sky, Greek astrologers must have understood Phaethon’s name as a reference to Saturn.²⁰¹

In addition, it must be significant that the poet Gaius Valerius Flaccus (1st century AD) characterised the charred remains of Phaethon and the chariot as *ater globus*, a “black ball” or a “dark globe”. Slavitt rendered this term as a “charred cinder”,²⁰² Dräger as “ein schwarzer Klumpen”,²⁰³

196. Hyginus, *Poetical Astronomy* 2.42.2, tr. Grant 1960: 228.

197. Hyginus, *Poetical Astronomy* 2.42.1; cf. Heraclides of Pontus, Fr. 66b, ed. F. Wehrli, in Bos 1989: 80. Compare pseudo-Eratosthenes and the scholia on Germanicus in appendix 1. Cicero (*On the Nature of the Gods* 3.21; cf. Arnobius, *Against the Pagans* 4.14) mentioned a “Sun” who was the son of Jupiter.

198. Plato, apud Aetius, *Opinions of the Philosophers* 2.15; pseudo-Aristotle, *On the Cosmos* 2.23-26 (392a); Cicero, *On the Nature of the Gods* 2.20 (52); Philo, *Questions and Answers on Exodus* 2.75; Geminus, *Elements of Astronomy* 1; Martianus Capella, *The Marriage of Philology and Mercury* 8 (884, 886). Some manuscripts of Hyginus also swap the names *Phaenon* and *Phaethon*, so that the usual Hellenistic assignment of Phaethon to Jupiter and of Phaenon to Saturn is restored, but Phaethon or Jupiter occupies the highest orbit (le Bœuffle 1983: 178, n. 7). See further Condos 1997: 253, n. 4; Scherer 1953: 91; Roscher 1902-1909: 2523. Theo of Smyrna (*Mathematics*, ed. Hiller 1878: 130) identified Phaenon with Saturn as well as the Sun.

199. The title *ēēlios phaéthōn* occurs in Homer, *Iliad* 11.735-736; *Odyssey* 5.479; 11.16; 19.441; 22.388; *Homeric Hymn to Helios* 31.2; Hesiod, *Theogony* 760. For a discussion, see van der Sluijs 2008: 227.

200. James & van der Sluijs 2012: add page number when known; van der Sluijs 2009: 269, 275-277; 2008: 244.

201. Compare: “... *φαέθων* ist ursprünglich wohl für den Saturn verwandt, weil er für Homer ein Epitheton der Sonne war, und die Sonne nach chaldäischem Glauben zu dem Planeten Saturn irgend welchen Bezug hatte ...”, von Wilamowitz-Möllendorff 1883: 421. According to Jastrow (1910: 176, n. 1), Hyginus co-opted the myth of Phaethon to account for the association of Saturn and the Sun.

202. “... Phaethon, fallen out of the runaway car he has driven / to land as a charred cinder in the Eridanus’ waters ...”, Valerius Flaccus, *Argonautica* 5.471-478 (429-432), tr. Slavitt 1999: 100.

language that is strongly suggestive of a meteorite.²⁰⁴ As it is likely that, from an ancient point of view, “a black meteorite, or a black stone resembling a meteorite, was thought to be a piece of the ‘Black Planet’”,²⁰⁵ astrologers would have had another reason to associate Phaethon’s charred corpse with the planet Saturn.

Pseudo-Eratosthenes’ choice of Saturn as Phaethon’s catasterism must have reflected this interpretation. On pseudo-Eratosthenes’ scheme, this Saturnian “Phaethon” was regarded as the second highest planet, placed below “Phaenon” or Jupiter. It can be demonstrated that the sequence featuring Jupiter as the first planet, followed by Saturn and the remaining planets was archaic, historically preceding the familiar understanding of the planet Saturn as the highest one of the planets, orbiting above Jupiter, in both Babylonia and Egypt.²⁰⁶ When astronomers eventually realised that Saturn’s orbit is actually placed above that of Jupiter, a few may have swapped the designations *Phaenon* and *Phaethon* along with the relative positions of Saturn and Jupiter, while a majority retained the name “Phaethon” for the second planet, reinterpreting it as Jupiter and perhaps arguing that the mythical Phaethon was, after all, the *son* of the Sun.

Although it may never be possible to retrieve the arcane reasoning behind such arbitrary assignments of gods to planets, it seems that the mythical characters Kronos and Phaethon at some stage competed for an association with Saturn in the minds of Hellenistic-Roman scholars. Both were “fallen” or “failed” contenders for a form of cosmic dominion, while they shared a paradoxical association with both radiance and blackness. While Kronos was an attractive candidate for the planet because of his banishment to the periphery of the world, Phaethon more adequately illustrated Saturn’s astrological role as a “fake Sun”. And with the flexibility that typifies the mythographer, rationales were readily available for the god’s emplacement either in the first or the second orbit below the fixed stars: whereas the first orbit might connote genealogical primacy (Kronos being the father of Zeus) or exile to the furthest reaches, the second orbit would have befitted a “fall” or, if placed below Saturn, Phaethon’s origin as a *son* of the “Sun”.

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203. “... ein schwarzer Klumpen fiel in den erbebenden Strom des Eridanus ...” Dräger 2003: 190-191; cf. Wijsman 1996: 209.

204. Kugler 1927: 38.

205. Lewy 1950: 348, associating the black stone of Mecca and the ‘foundation stone’ of Jerusalem with Saturn on these and other grounds.

206. James & van der Sluijs 2008: 69.

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