Mesopotamian journal of Quran studies
Vol.2026, **pp**. 1–7
DOI: https://doi.org/10.58496/MJQS/2026/001 ; ISSN: 3005-9933
https://mesopotamian.press/journals/index.php/MJQS

An Astronomical and Dualistic Interpretation of the "Ten Nights" in the Qur'an

تفسير فلكي وثنائي لـ«ليال عشر» في القرآن الكريم

Fatih Kara[1,*]

[1] *Graduate School of Social Sciences, Kafkas University, Turkey.*

فاتح كارا [١،*]

ABSTRACT

Classical commentaries offer no consensus on the interpretation of the expression "ten nights" in Surah al-Fajr. This expression is found in the verse just prior to the verse that draws attention to even and odd. Even and odd bring to mind a dualistic perspective, suggesting that ten nights might be understood in the same context. The present study explores how ten nights may be understood, considering both its textual and historical setting.

الخلاصة

لا تتفق التفاسير الكلاسيكية على تأويل تعبير «ليال عشر» في سورة الفجر. يظهر هذا التعبير في الآية التي تسبق مباشرة الآية التي تشير إلى «الزوجي والفردي». يستحضر مفهوم الزوجي والفردي منظورًا ثنائيًا، مما يوحي بأن «ليال عشر» قد تُفهم في سياق مماثل. تستقصي هذه الدراسة كيفية فهم «ليال عشر» آخذةً في الاعتبار كلًا من سياقها النصي وتاريخها .

Keywords

الكلمات المفتاحية

Ten Nights, Dualism, Decans.

ليال عشر، الثنائية، العشريات الفلكية.

Received	**Accepted**	**Published online**
استلام البحث	**قبول النشر**	**النشر الالكتروني**
8/2/2026	3/3/2026	24/3/2026

1. INTRODUCTION

In the second verse of Surah al-Fajr, attention is drawn to the "ten nights". There are various narrations suggesting that the ten nights mentioned in the Qur'an refer to the first ten nights of Dhul-Hijjah, the month of Hajj; the first ten nights of Muharram, the first month of the Hijri year; or the last ten nights of Ramadan, the month of fasting (al-Razi[1]; al-Tabari[2]). However, the phrase "ten nights" clearly appears in a context emphasizing duality. For instance, the next verse (Qur'an, al-Fajr 89:3) draws attention to "even and odd," a duality commonly highlighted in discussions of dualism [1]. For this reason, it may be concluded that the opening verses of Surah al-Fajr should be interpreted from a dualistic perspective. In the first verse, the term fajr refers to the initial "brightening" of the sky after "darkness" as sunrise approaches, which may be understood as indicating a form of duality. It may also be said that a duality is expressed in the fourth verse because as the "night" passes, the "daytime" approaches. Here, the question may arise: What kind of duality is described by the verse "ten nights"? This article examines, from a dualistic perspective, the possible astronomical phenomenon with which the expression "the ten nights" may be associated.

[1] al-Razi, F. al-D. (2000). *al-Tafsir al-Kabir* (Mafatih al-Ghayb) (3rd ed.). Beirut: Dar Ihya al-Turath al-Arabi.
[2] al-Tabari, A. J. M. ibn J. ibn Y. (2001). *Jami' al-Bayan 'an Ta'wil Ay al-Qur'an* (Tafsir al-Tabari) ('Abd Allah ibn 'Abd al-Muhsin al-Turki (ed.)). Cairo: Dar Hajar.

*Corresponding author fatihkara65@hotmail.com

2. DUALISM

Dualism is a philosophical concept that asserts the existence of two opposing realities -such as life and death, beginning and end, or east and west- pervading the universe [2]. In ancient Chinese philosophy, the principle of yin and yang embodies this polarity: yin represents femininity, even numbers, the earth, the Moon, and darkness, whereas yang symbolizes masculinity, odd numbers, the sky, the Sun, and light [3]. In ancient Greek philosophy, Pythagoras' table of opposites encompasses dualities such as odd and even, male and female, light and darkness, good and evil, and right and left [4]. The Qur'an draws attention to the dualities inherent in the universe and emphasizes that the dualities in human behavior will lead to two distinct outcomes. In Surah al-Fajr, the Qur'an emphasizes the concepts of even and odd; in Surah Ash-Shams, it highlights contrasts such as the Sun and the Moon, day and night, sky and earth, and right and wrong; and in Surah al-Layl, it underscores the dualities between night and day, as well as male and female. These verses likely appeared in a context in which the Prophet Muhammad was admonished in Surah Abasa and subsequently consoled in Surah Ad-Duhaa and Surah Ash-Sharh. Numerous dualities are mentioned in Surah Ad-Duhaa, and Surah Ash-Sharh reminds that ease accompanies hardship.

3. DECANS IN ANCIENT EGYPT

The influence of observable astronomical phenomena on the formation of philosophical thought and belief systems is widely recognized. During early antiquity, three distinct astronomical reference systems emerged: the decans in Egypt, the zodiac in Mesopotamia, and the lunar mansions in India [5]. The decan system consisted of thirty-six individual stars or small constellations, each characterized by their heliacal rising and setting [6]. In this section, the astronomical phenomenon underlying the decan system will first be explained, and in the following section, the influence of this system on subsequent periods will be examined.

The star Sirius is the brightest star visible in the night sky and has attracted human attention throughout history because of this feature [7], [8]. The star Sirius is also referenced in the Qur'an (Qur'an, An-Najm 53:49). The period during which Sirius is not visible in the sky ends when it is first seen on the horizon before sunrise; this moment is known as its heliacal rising [8]. The heliacal rising of Sirius was attributed special significance in various cultures [9]. For example, the Persians associated the heliacal rising of Sirius with the beginning of the rainy season, which was a vital necessity for farmers during the hot summer months [9], [10]. Similarly, in Ancient Egypt, since the Nile floods occurred very close to the heliacal rising of Sirius, the star's reappearance was considered an important event signaling the flood season, abundance, rebirth, and the beginning of the new year [9], [11]. After its reappearance, Sirius rises slightly earlier each night, and after ten nights, it becomes difficult to link its rising directly with the sunrise [12], [13]. Therefore, in Ancient Egypt, ten-night divisions (decans) were created, with a different star or star group used for each ten-night period, resulting in a total of 36 decans marking the passage of time [6], [12]. Each decan follows a cyclical pattern: it rises and becomes visible (i.e., is born), remains visible for a period (i.e., lives), and eventually sets and becomes invisible (i.e., dies) [6], [14].

4. FROM ANCIENT EGYPT TO EARLY ISLAM: TEN-DAY DIVISIONS OF THE MONTH

The preservation of decan lists in Egypt extends from the early second millennium BC into the first centuries AD [15]. Separately from the Egyptian decan system, the zodiac emerged in Babylonia in the late fifth century BC [16]. The zodiac is an abstract division of the ecliptic—the Sun's apparent annual path—into twelve segments, historically associated with the constellations along the ecliptic [16]. During the Hellenistic period, the ancient Egyptian decans were subsumed under the Babylonian zodiac, three decans being associated with each zodiacal sign [6], [13], [17]. The Dendera Zodiac, dated to the first century BCE and currently displayed in the Louvre Museum, provides a striking visual example of the synthesis between the ancient Egyptian decans and the Babylonian zodiacal tradition during the Hellenistic period [6]. The synthesis of the Babylonian zodiac system, which divides the year into twelve segments, with the Egyptian decan system, which divides the year into thirty-six segments, may be interpreted as having encouraged the conception of each month as consisting of three ten-night periods (Figure 1). Furthermore, the idea of dividing the month into three ten-day units may predate the Hellenistic synthesis, extending back to the Old Babylonian period [18] and to ancient Egyptian calendrical

traditions [19]. In ancient Greek calendrical practice, each month was divided into the following three ten-day periods: the rising month, the middle of the month, and the waning (or dying) month [20].

Fig. 1. Hellenistic synthesis of the Egyptian decans and the Babylonian zodiac.

Rectangular plaques discovered at several settlement sites in Iron Age II Judah suggest that time may have been conceptualized in ten-day units in ancient Israel [19]. These plaques contain a total of thirty perforations arranged in three rows of ten and appear to have functioned as peg-based devices, with pegs inserted into the holes and advanced sequentially to mark the progression of days within the month [19] (Figure 2).

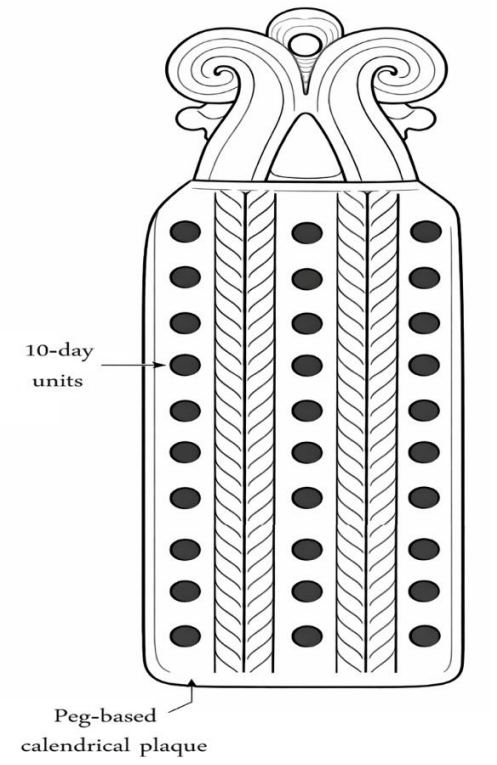

Fig. 2. Peg-based calendrical plaque from Iron Age II Judah: a schematic reconstruction based on published archaeological material.

Tishtrya, a deity in ancient Iranian religion, was associated with the star Sirius [21]. According to the Avesta[3], before confronting Apaosha, Tishtrya undergoes three successive transformations, each lasting ten days: first as a man, then as a bull, and finally as a horse. Astronomically, these transformations likely correspond to the period from the heliacal rising of Sirius in July to the occurrence of meteor showers between August and September [22]. At the end of the story, Tishtrya defeats Apaosha, thereby making the rainfall possible in autumn. This legend is also noteworthy for its portrayal of contrasting dualities, such as drought versus rain and the white horse versus the black horse [17]. In pre-Islamic Arab society, the month may have been conceived as consisting of ten-day segments. This conception is reflected, for instance, in the pre-Islamic Jāhiliyya practice of ʿatīra, which was observed during the first ten days of Rajab[4] [23], [24]. Moreover, the fact that numerals used in day-datings in Ancient South Arabian inscriptions never exceed ten has led scholars to conclude that Sabaic months were divided into three ten-day periods [20]. Islamic tradition likewise preserves numerous indications that lunar months were understood as comprising three such segments [20], as evidenced by the distinct treatment of the first ten days of Dhu'l-Hijjah[5] and the last ten days of Ramadan[6].

5. THE ANWA SYSTEM

In pre-Islamic Arabian culture, stars served as indicators of different phases of the year, for example when the heliacal rising or setting of a star coincided with a season of rain or wind [25], [26]. This system of determining time periods is known as "anwa" [25], [26]. Hindu astrology places great importance on the Moon [5]. The nakshatras (lunar mansions) of ancient India, referred to as manāzil in the Islamic tradition, are constellations located along the Moon's orbit that it traverses [27], [28]. In pre-Islamic Mecca, the Moon was also a determining factor, and the year consisted of twelve lunar months [29], [30]. Initially, the anwa system employed a diverse range of stars, but over time it came to rely on those associated with the lunar mansions [25]. The lunar mansions consist of 27 or 28 stations, and the Moon passes through each of these stations in one day [26], [31]. Dividing the year by the number of lunar mansions resulted in periods of roughly thirteen days [26], [32]. However, an important point must be emphasized: in early periods, the anwa system was not directly connected to the lunar mansions [25], [31]. Indeed, some of the stars used in the anwa system lay outside the Moon's path [25], [26]. Over time, however, the tradition of lunar mansions of Indian origin influenced and transformed the anwa system [25]. This raises the following question: before being influenced by the number of lunar mansions, on what length of periods was the anwa system based? It may be speculated that the original anwa system was organized around ten-day periods, much like the decan system of Ancient Egypt. Some evidence may be cited in support of this speculation. For instance, linking the heliacal risings and settings of stars to the rainy season was a well-established pre-Islamic Arab tradition[7], reflecting a notable parallel with the Ancient Egyptian decan system that connected Sirius' heliacal rising with the Nile floods. Moreover, the anwa system shows some correlations with the Hellenistic zodiac, especially in its alignment with the equinoxes and solstices [25], [26], [33]. In this context, the Qur'anic expressions "*the two easts and the two wests*" (Quran, 55:17) and "*the easts and the wests*" (Quran, 70:40) may be associated with the two solstices and the risings and settings that occur between them. It is noted that following the late-summer rising of Canopus (Suhayl), which is associated with the onset of the autumn rains, several forty-day periods—tracked in ten-day intervals—are used to define local seasonal phases [34], [35], [36], [37]. Accordingly, the autumn season lasts approximately forty days, from the rising of Canopus (Suhayl) until the rising of Alpha Virginis (Simak) [34]. Subsequently, the wasm period commences with the heliacal setting of the Pleiades (Thurayya) [34]. Arab folk tradition commonly held that the Pleiades were absent from the sky for a period of about forty days [36]. After the wasm rains, the cycle enters a forty-day winter period (al-arbainiyah) [34], [37]. Forty-day intervals are commonly employed in the tradition, as illustrated by the phrases "the forty days of sayf" and "the forty days of kharif" [36], [37], [38], [39].

[3] Avesta, Tishtrya Yasht (Yasht 8).
[4] Sunan Abi Dawud, Kitab al-Dahaya, 16:46.
[5] Sunan Ibn Majah, Kitab al-Siyam, 7:90.
[6] Sahih al-Bukhari, Kitab Fadl Laylat al-Qadr, 32:11; Mishkat al-Masabih, Kitab al-Sawm, 7:128.
[7] Sahih al-Bukhari, Kitab al-Adhan, 10:238.

6. CONCLUSION

In ancient astronomical and calendrical practices, three visible celestial bodies—the Sun, the Moon, and the stars—played a central role. Three major civilizations, situated along the Tigris-Euphrates, Ganges, and Nile river regions, each developed distinct astronomical reference systems. The Babylonians developed a system that divided the year—defined as the interval between the equinoxes—into twelve segments corresponding to the zodiac. In Indian astronomy, the Moon's motion was associated with 27 nakshatras, with each nakshatra representing one day of the Moon's movement. Ancient Egyptian star-based systems employed 36 decans, structured according to the heliacal risings of stars or constellations. The buruj (constellations), manazil (lunar mansions), and anwa (stellar weather indicators) in ancient Arabia were likely influenced by the traditions of these civilizations (Figure 3).

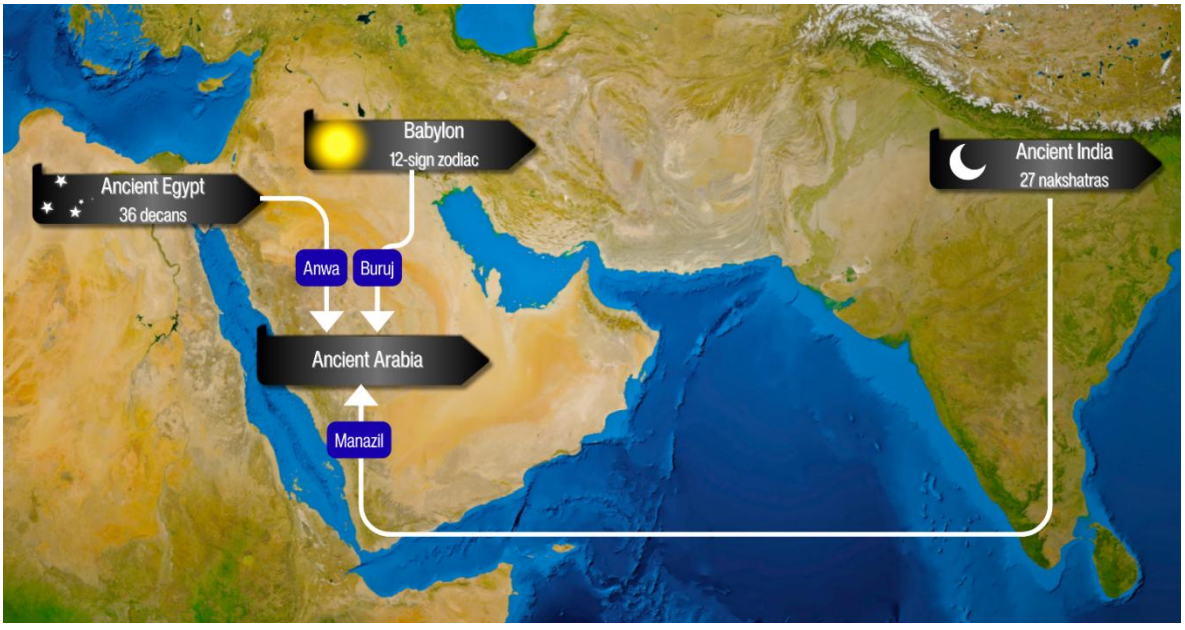

Fig. 3. The ancient Arabia may have been influenced by the cultural practices of three major civilizations.

All ancient Egypt decans are stars or constellations rising heliacally at intervals of ten days and remaining invisible for a certain period [5], [40], [41]. So, the term ten nights refers to the period during which a star or constellations becomes visible again after a prolonged period of heliacal invisibility [42]. This astronomical phenomenon involves an alternation between disappearance and reappearance, that is, a dual nature.

The use of the helical rising of stars as a timing tool existed not only in Ancient Egypt but also among the Sumerians, Babylonians, and ancient Greeks, and moreover, it was widespread all over the world, from the Māori of New Zealand to the Indigenous peoples of the Great Plains [43]. The Arabs also had a system called anwa, which linked the heliacal risings and settings of stars to seasonal changes and weather phenomena such as rainfall, wind, temperature, and cold.

The nakshatras of Indian origin fundamentally divide the lunar month into 27 parts. Although the precise timing is disputed, it is clear that this system also influenced the Arabs. However, dividing not a month but an entire year by the number of nakshatras — or by that number plus one — is both unusual and appears to be a later development. There is strong evidence that seasonal phases linked to the heliacal risings and settings of stars were conceived in ten- and forty-day intervals from antiquity to the present. In light of this evidence and the dualistic context of the relevant verse, the Quranic expression "ten nights" may be read as referring to the reappearance (heliacal rising) of stars that had set and to seasonal transitions.

In conclusion, all the opening verses of Surah al-Fajr may be interpreted as symbols of the transition from negativity to positivity, as follows: (Verse 1) the re-emergence of the sun that had set (the time of dawn, fajr); (Verse 2) the reappearance of stars that had set (the ten-night segments); (Verse 3) the shift from a fragmented, divided, and unstable condition to an

integrated, solid, and stable state (the even versus the odd); (Verse 4) and the passage from darkness into light (the departing night). Interpreted in this way, a parallel may be drawn between Surah al-Fajr and both Surah ad-Duhaa and Surah Ash-Sharh: "*The latter is better for you than the former."* (Quran, 93:4) and "*Where there is hardship, there is also ease."* (Quran, 94:5). Moreover, the first two verses of Surah al-Fajr may be emphasizing temporal cycles and transitions within a day (fajr) and within a year or a month (ten nights).

Conflicts of Interest

The author declares no conflicts of interest.

Funding

This research received no external funding.

Acknowledgment

None.

References

[1] V. Ilievski, "The Presocratics on the Origin of Evil," *Religions*, vol. 15, no. 10, p. 1260, Oct. 2024, doi: 10.3390/rel15101260.
[2] A. Dadvar and R. Rouzbahani, "The Role of Natural Contradictions in Creation of Good and Evil Beliefs," *Asian Social Science*, vol. 12, no. 7, p. 129, Jun. 2016, doi: 10.5539/ass.v12n7p129.
[3] Y. Nishiyama, "A Study of Odd- and Even-Number Cultures," *Bulletin of Science, Technology & Society*, vol. 26, no. 6, pp. 479–484, Dec. 2006, doi: 10.1177/0270467606295408.
[4] O. Goldin, "The Pythagorean Table of Opposites, Symbolic Classification, and Aristotle," *Science in Context*, vol. 28, no. 2, pp. 171–193, Jun. 2015, doi: 10.1017/S0269889715000046.
[5] O. Neugebauer, "The Egyptian 'Decans,'" in *Astronomy and History: Selected Essays*, New York, NY, USA: Springer, 1983, pp. 205–209, doi: 10.1007/978-1-4612-5559-8_11.
[6] T. Ainsworth, "A Timeline of the Decans: From Egyptian Astronomical Timekeeping to Greco-Roman Melothesia," Queen's University, 2018.
[7] H. E. Bond *et al.*, "The Sirius System and Its Astrophysical Puzzles: Hubble Space Telescope and Ground-based Astrometry," *Astrophysical Journal*, vol. 840, no. 2, p. 70, May 2017, doi: 10.3847/1538-4357/aa6af8.
[8] T. de Jong, "The Heliacal Rising of Sirius," in *Ancient Egyptian Chronology*, Leiden, Netherlands: Brill, 2006, pp. 432–438, doi: 10.1163/9789047404002_029.
[9] S. H. Taqizadeh, "The Old Iranian Calendars Again," *Bulletin of the School of Oriental and African Studies*, vol. 14, no. 3, pp. 603–611, Oct. 1952, doi: 10.1017/S0041977X00088558.
[10] T. Andrews, *Dictionary of Nature Myths: Legends of the Earth, Sea, and Sky*. Oxford, U.K.: Oxford University Press, 2000.
[11] R. Gautschy *et al.*, "A New Astronomically Based Chronological Model for the Egyptian Old Kingdom," *Journal of Egyptian History*, vol. 10, no. 2, pp. 69–108, Nov. 2017, doi: 10.1163/18741665-12340035.
[12] H. A. Anadualem and B. S. Goshu, "Exploring the Interplay between Human Perception, Astrophysics, and the Nile River: Unravelling the Significance of Sirius," *Harla Journal of Applied Science and Materials*, vol. 1, no. 1, pp. 43–77, 2023.
[13] R. Parker, "Ancient Egyptian astronomy," *Philosophical Transactions of the Royal Society A*, vol. 276, no. 1257, pp. 51–65, May 1974, doi: 10.1098/rsta.1974.0009.
[14] O. Neugebauer, "The Egyptian 'Decans,'" *Vistas in Astronomy*, vol. 1, pp. 47–51, Jan. 1955, doi: 10.1016/0083-6656(55)90011-8.
[15] S. Symons, "Contexts and elements of decanal star lists in Ancient Egypt," in *Traditions of Written Knowledge in Ancient Egypt and Mesopotamia*, D. Bawanypeck and A. Imhausen, Eds., Münster, Germany: Ugarit-Verlag, 2014, pp. 91–122, doi: 10.2307/j.ctv1t4m1wb.7.

[16] J. Steele, "The development of the Babylonian zodiac: Some preliminary observations," *Mediterranean Archaeology and Archaeometry*, vol. 18, no. 4, pp. 97–105, 2018, doi: 10.5281/zenodo.1472282.
[17] A. Panaino, "The Decans in Iranian Astrology," *East and West*, vol. 37, no. 1–4, pp. 131–137, 1987.
[18] C. Michel, "Calendars in Old Assyrian Sources," 2021, pp. 77–98, doi: 10.13173/978334715957.077.
[19] J. Ben-Dov, "A 360-Day Administrative Year in Ancient Israel: Judahite Portable Calendars and the Flood Account," *Harvard Theological Review*, vol. 114, no. 4, pp. 431–450, Oct. 2021, doi: 10.1017/S0017816021000298.
[20] F. De Blois, "The month and its divisions in ancient South Arabia," *Proceedings of the Seminar for Arabian Studies*, vol. 28, pp. 15–20, 1998.
[21] W. W. Malandra, *An Introduction to Ancient Iranian Religion: Readings from the Avesta and the Achaemenid Inscriptions*. Minneapolis, MN, USA: University of Minnesota Press, 1983.
[22] A. Panaino, "Tištrya," *Encyclopaedia Iranica*, 2005.
[23] S. Aksoy, "The Impact of Religious Practices on Shaping Cultural Habits: The Case of Child Sacrifice among the Pre-Islāmic Arabs from the Qur'ānic Perspective," *Religions*, vol. 15, no. 8, p. 1019, Aug. 2024, doi: 10.3390/rel15081019.
[24] H. Ünal, "Atîre," *Encyclopaedia of Islam*, İstanbul, Turkey: TDV Publishing, 1991.
[25] N. B. Ayash, "Evolution of Arabic Astronomy in Relation with the Translation Movement in the Early Abbasid Era," *Culture and Cosmos*, vol. 21, no. 1, pp. 233–247, 2017, doi: 10.46472/CC.01221.0101.
[26] D. M. Varisco, "The origin of the anwa in Arab tradition," *Studia Islamica*, vol. 74, pp. 5–28, 1991.
[27] K. V. Sarma, "Lunar Mansions in Indian Astronomy," in *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures*, 2nd ed., H. Selin, Ed., Dordrecht, Netherlands: Springer, 2008, pp. 1241–1242, doi: 10.1007/978-1-4020-4425-0_9579.
[28] H. D. Jones, "Historical Note: The Origin of the 28 Nakṣatras in Early Indian Astronomy and Astrology," *Indian Journal of History of Science*, vol. 53, no. 3, Aug. 2018, doi: 10.16943/ijhs/2018/v53i3/49463.
[29] H. Ioh, "The Calendar in Pre-Islamic Mecca," *Arabica*, vol. 61, no. 5, pp. 471–513, Jul. 2014, doi: 10.1163/15700585-12341319.
[30] I. Zein and A. El-Wakil, "On the Origins of the Hijrī Calendar: A Multi-Faceted Perspective Based on the Covenants of the Prophet and Specific Date Verification," *Religions*, vol. 12, no. 1, p. 42, Jan. 2021, doi: 10.3390/rel12010042.
[31] E. Savage-Smith, "Celestial mapping," in *The History of Cartography*, J. B. Harley and D. Woodward, Eds., Chicago, IL, USA: University of Chicago Press, 1992, vol. 2, pp. 12–70.
[32] D. M. Varisco, "Islamic Folk Astronomy," in *Astronomy Across Cultures*, H. Selin and S. Xiaochun, Eds., Dordrecht, Netherlands: Springer, 2000, pp. 615–650, doi: 10.1007/978-94-011-4179-6_21.
[33] D. M. Varisco, "The Rain Periods in Pre-Islamic Arabia," *Arabica*, vol. 34, no. 2, pp. 251–266, 1987.
[34] D. M. Varisco, "Qatar's Intangible Heritage Revisited," *Qatar University Research Magazine*, no. 6, pp. 10–12, 2015.
[35] N. A. Miller, "Seasonal Poetics: The Dry Season and Autumn Rains among Pre-Islamic Naǧdī and Ḥiǧāzī Tribes," *Arabica*, vol. 64, no. 1, pp. 1–27, Mar. 2017, doi: 10.1163/15700585-12341437.
[36] D. M. Varisco, "The Agricultural Marker Stars in Yemeni Folklore," *Asian Folklore Studies*, vol. 52, no. 1, p. 119, 1993, doi: 10.2307/1178453.
[37] G. F. Steiner, "Archaeoastronomy and Bedouin star-lore in the rock art of the Negev desert," *Mediterranean Archaeology and Archaeometry*, vol. 17, no. 3, pp. 243–260, 2017, doi: 10.5281/zenodo.1005588.
[38] R. A. Abdula, "The Historical Astronomic Observatory and Calendar of the Village of Graw, Northern Iraq," *Acta Via Serica*, vol. 8, no. 2, pp. 25–52, 2023, doi: 10.22679/avs.2023.8.2.002.
[39] C. Bailey, "Bedouin star-lore in Sinai and the Negev," *Bulletin of the School of Oriental and African Studies*, vol. 37, no. 3, pp. 580–596, Feb. 1974, doi: 10.1017/S0041977X00127491.
[40] S. Piperakis, "Decanal Iconography and Natural Materials in the Sacred Book of Hermes to Asclepius," *Greek, Roman and Byzantine Studies*, vol. 57, pp. 136–161, 2017.
[41] S. Symons, "A Star's Year: The Annual Cycle in the Ancient Egyptian Sky," in *Calendars and Years: Astronomy and Time in the Ancient Near East*, J. M. Steele, Ed., Oxford, U.K.: Oxbow Books, 2007, ch. 4, pp. 1–34.

[42] O. Neugebauer and R. A. Parker, *Egyptian Astronomical Texts*. Providence, RI, USA: Brown University Press, 1960.
[43] A. A. Galal and M. G. Rashed, “Heliacal rising of the new moon as a precursor of the beginning of Hegri lunar month,” *NRIAG Journal of Astronomy and Geophysics*, vol. 1, no. 2, pp. 156–158, Dec. 2012, doi: 10.1016/j.nrjag.2012.12.011.