

Ancient Astronomical Heritage of Iran: A Linguistic and Cultural Perspective

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Abstract

Language is central to the survival of Iran's astronomical heritage, yet scholarship often treats celestial names, literary imagery, calendrical terms, and ritual symbols as separate evidence. This review examines how Iranian engagements with the sky were preserved and transmitted through language and symbol. It brings together scholarship on Avestan, Middle Persian, New Persian, selected Iranian languages, Persian literature, calendrical traditions, festivals, and astronomical knowledge. The discussion compares established studies from two perspectives, linguistic evidence and culturally situated signification. A diachronic linguistic-semiotic approach traces lexical retention and semantic reanalysis, metaphorical conceptualisation, and calendrical-symbolic representation. Terms including *Tištrya*, *Haftōrang*, *Parvīn*, *Bahrām*, and *Nāhīd* illustrate the interaction of celestial reference with ritual authority and moral association. Solar and lunar imagery extends those associations into descriptions of beauty, sovereignty, fortune, and character. Month names and festivals place meanings within recurrent social time, although direct equations between ancient observances and modern equinoxes or solstices require historical caution. Iranian astronomical heritage emerges as a changing archive whose continuity depends on reinterpretation, translation, and use across periods.

Keywords: *Persian; Iranian languages; cultural astronomy; celestial lexicon; symbol; metaphor*

1. Introduction: Astronomy, Language and Cultural Memory in Iran

Studies of Iran's astronomical heritage are dispersed across philology, religious history, literary criticism, art history, and the history of science, and this disciplinary division often obscures the relations among words, images, calendrical names, and recurring practices. The present article synthesises established scholarship and offers no new empirical study. Its narrower purpose is to ask what existing research permits us to say about the preservation and reinterpretation of celestial knowledge from two perspectives, language and culturally situated symbolism. Holbrook places the sky among the knowledge domains that linguistic fieldwork should document, including naming, timekeeping, and navigation, and Holton shows that assumed translation equivalence or weak control of linguistic detail can produce misleading accounts of another community's sky (Holbrook, 2011, Holton, 2016). These cautions remain useful for historical materials, even though the evidence considered here comes mainly from texts, lexicons, visual studies, and earlier scholarship instead of interviews with living speakers. A social-semiotic perspective further treats words, images, rituals, and calendars as resources through which communities organise meaning, and astronomy literacy accordingly includes the cultural conditions under which celestial objects become noticeable, nameable, and memorable (Kelley & Milone, 2011, Kress & van Leeuwen, 2006, North, 2008, Retrê et al., 2019, Ruggles, 2015, Salimpour & Fitzgerald, 2024).

The article adopts a diachronic linguistic-semiotic approach and follows three connected processes, lexical retention with semantic reanalysis, metaphorical conceptualisation, and calendrical-symbolic representation. These formulations correspond to established accounts of meaning change, contextual inference, and culturally distributed conceptualisation, and they state the comparison being made across periods without presenting it as a new formal model (Durkin, 2009, Geeraerts, 2010, Kövecses, 2010, Lakoff & Johnson,

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1980, Sharifian, 2017, Traugott & Dasher, 2002). López's discussion of symbols in cultural astronomy adds an important restriction. The term *symbol* should not serve as a loose synonym for every image or celestial motif; symbolic meaning depends on socially established interpretive relations and requires distinction from iconic or indexical signs (López, 2024). This is especially important for ancient material, where the relevant interpreters are absent and claims about meaning remain inferential. Astronomical motifs in prehistoric and Achaemenid art confirm that celestial signs circulated visually, but the images alone leave many semantic values unresolved (Mobini & Marnani, 2019, Root, 1979). Linguistic evidence can narrow those interpretations, though it rarely settles them by itself.

2. Naming the Iranian Sky: A Diachronic Study of Celestial Terms

2.1. Iranian Names of Stars and Constellations

Celestial nomenclature raises a basic interpretive problem because an inherited name may preserve an observation, a mythic relation, or a scholarly identification established in a later period. Iranian evidence frequently contains all three in different proportions. Avestan Tištrya, conventionally identified with Sirius, designates a conspicuous star and a rain-bringing yazata whose conflict with drought places stellar observation within an ecological and ritual account (Boyce, 1975, Malandra, 1983, Panaino, 1990). Haptōiringa, continued by Persian Haftōrang, and the Pleiades name continued as Parvīn show comparable lexical depth. Their significance lies less in proving a fixed ancient “constellation system” than in showing that stellar groupings entered language as culturally ranked units. Lexicography records denotation; surrounding texts disclose agency, seasonality, and omen value (Anklesaria, 1956, Bartholomae, 1904, MacKenzie, 1971).

The distinction also bears on modern naming practice. The IAU Working Group on Star Names maintains the official IAU Catalogue of Star Names, standardising names for scientific use while documenting the etymological, historical, and cultural backgrounds of both adopted and alternative names (Hoffmann et al., 2025). Historical Iranian star terminology, however, does not always correspond one-to-one with the individual stars and naming conventions of a modern catalogue.

2.2. Planetary Names and Their Cultural Associations

Planetary vocabulary reveals similar layering more sharply because Iranian and Arabic names remained in active contact. Middle Persian and New Persian sources preserve Kēwān for Saturn, Bahrām for Mars, Nāhīd or Anāhīd for Venus, Tīr for Mercury, and Māh for the Moon. Arabic forms including Zuḥal, Mirrīkh, Zuhra, and Ūṭārid later entered technical and literary registers. Their coexistence allowed writers to choose among inherited religious associations, astrological convention, metre, and audience

(MacKenzie, 1971, Matras, 2009, Schmitt, 1989, Thomason & Kaufman, 1988, Windfuhr, 2009).

The semantic associations also complicate a modern separation of astronomy from astrology. Bahrām joins Mars to a divine name of victory; Nāhīd links Venus with the Iranian reception of Anāhitā; Kēwān becomes a figure of remoteness, slowness, and misfortune in later poetic convention. Such values arose through inherited theology, Hellenistic planetary schemes, and Persian literary use as much as through naked-eye observation (Boyce, 1982, Boyce & Grenet, 1991, de Jong, 1997). The lexicon therefore records negotiated classification and preserves traces of periods in which celestial bodies could be treated as agents, powers, and signs alongside their observational identities.

3. Celestial Imagery and the Human Condition in Persian Literature

3.1. The Sun and Moon as Metaphors of Beauty and Sovereignty

Calling a face māh-rūy, “moon-faced,” intensifies beauty and also places the beloved within a scale of visibility, distance, periodic absence, and collective attention. Solar imagery performs a related operation for power. Expressions such as the “sun of kingship” or the rising of a ruler’s fortune convert political rank into radiance and centrality. Court poetry used these mappings because sovereignty required language capable of presenting hierarchy as part of the cosmic order (Bürgel, 1988, Meisami, 1987, Schimmel, 1992). The metaphor performs evaluation and places the praised figure within a hierarchy of radiance and rank.

The same celestial imagery also supplies limits. A moon wanes and a sun may be veiled or eclipsed. Persian poets use that instability to describe separation, disgrace, ageing, and reversal of fortune. Celestial

comparison, therefore, carries tension between splendor and mutability, which helps explain its durability across panegyric, romance, and lyric verse. The image can legitimise a ruler in one context and expose human dependence on time in another (Davidson, 1994, Davis, 2006, Rypka, 1968). Treating each simile as an isolated decoration misses the evaluative argument carried by the larger pattern.

3.2. Planets, Constellations and the Poetic Construction of Character

Nizāmī's *Haft Paykar* offers the clearest case of celestial classification becoming narrative structure. The seven domes, planetary weekdays, colours, and princesses organise Bahrām Gūr's movement through distinct ethical and affective environments. Astronomy regulates sequence and makes character legible through a cosmological itinerary (Chelkowski, 1975, Meisami, 1995). The poem adapts Persian, Arabic, and Hellenic associations instead of reproducing one technical system unchanged, and patterned difference becomes part of Bahrām's education.

Elsewhere, planetary names and attributes function as culturally shared symbolic shorthand. A single name can activate a cluster of conventional associations accumulated across astronomical, astrological, and literary traditions: Saturn may suggest severity, delay, or distance; Mars may cue aggression; and Venus may evoke music or desire. Such associations allow a poet to sketch temperament, rank, or fate without extended exposition (Meisami, 1987, Schimmel, 1992). Yet their significance remains open to revision within a poem. Anvarī and Khāqānī, for example, could intensify praise by reversing an expected planetary value or by presenting the heavens as subordinate to the patron. This usage presupposes shared cultural literacy, but it is also shaped by genre and rhetorical purpose; celestial symbolism never operates as a fixed psychological taxonomy.

4. Conceptual Metaphors of the Sky in Persian and Iranian Languages

Persian sky expressions form recurrent conceptual patterns. *Čarx* and *falak*, the wheel and the sphere, commonly frame fate through rotation; height and brightness frame rank, and sunrise can frame accession or renewed fortune. These mappings draw on embodied perception, yet their conventional meanings developed within Iranian literary and cosmological histories (Kövecses, 2010, Lakoff & Johnson, 1980, Sharifian, 2017). A single observed pattern can be construed differently across genres. The regular rotation of the heavens may index cosmic order in astronomical prose, yet personified *falak* can signify capricious fate in poetry. Conceptual structure therefore provides possibilities for interpretation without fixing one cultural judgment.

Lexical history makes this variation visible. Semantic change often proceeds through repeated contextual inference, and language contact introduces near-synonyms that divide by register or genre (Durkin, 2009, Geeraerts, 2010, Traugott & Dasher, 2002). Persian *āsmān*, *sepehr*, *falak*, and *gardūn* can all refer to the sky or heavens, but their collocational patterns differ. *Falak* and *gardūn* readily personify the machinery of fate; *āsmān* remains broader and less marked. Lexical selection thus identifies a relevant model of the sky, whether visible expanse, rotating mechanism, moral power, or elevated domain.

4.1. A Comparative Perspective across Iranian Languages

Comparison beyond Persian is necessary, although the evidence is uneven. Old and Middle Iranian sources preserve distinct celestial lexemes, and Eastern Middle Iranian materials show astronomical vocabulary circulating through Sogdian and Khotanese scholarly environments (Bailey, 1979, Kent, 1953, Sims-Williams, 1989). Across modern Iranian languages, solar terms often extend into meanings of day or daylight. Persian *rūz*, Kurdish *roj*, and Balochi *rōč* belong to a broader Iranian pattern in which light structures daily time. Their individual histories differ, so surface resemblance alone offers insufficient evidence for a shared metaphor without phonological and textual comparison (Schmitt, 1989, Windfuhr, 2009).

In this article, Persian carries particular evidential weight because its written record is extensive, continuous across many periods, and geographically influential in Iranian-speaking and Persianate regions. That prominence should not be converted into a claim of linguistic uniformity. Sogdian day names involving *Mihr* or the Moon, Khotanese Buddhist astronomical vocabulary, and regionally distributed Iranian forms reveal other routes between celestial observation and social time (Bailey, 1979, Sims-Williams, 1989, Windfuhr, 2009). The comparative record therefore changes the interpretation of continuity itself. Persian preserves one exceptionally visible trajectory, but inherited forms, loans, semantic extensions, and calendrical terms developed differently in other Iranian languages. Treating the Persian corpus as the whole record would

hide that variation; treating it as one influential archive makes comparison possible and keeps the argument proportionate to the evidence.

5. Astronomical Time in Iranian Language and Culture

5.1. The Linguistic Heritage of Iranian Month Names

Iranian month names preserve a compact religious lexicon inside the civil calendar. Farvardīn recalls the *fravašis*; Ordībehešt continues Avestan *Aša Vahišta*; Khordād and Amordād derive from *Haurvatāt* and *Amrtāt*; Mehr continues *Miθra*; Ābān and Āzar retain associations with water and fire. In current usage, these forms function as ordinary calendrical labels. Their etymologies nevertheless keep earlier sacred categories available for reinterpretation in festivals, personal names, and public discourse (Bartholomae, 1904, Boyce, 1975, MacKenzie, 1971).

Lexical retention implies neither universal awareness of the former theological concept nor an unchanged calendrical structure. Iranian calendrical history includes reform, intercalation problems, regional variation, and changes of epoch (al-Bīrūnī, 1879, Boyce, 1970, de Blois, 1996, Taqizadeh, 1938). The month names survived through repeated institutionalisation in new systems, a process better understood as retention accompanied by recontextualisation. The older lexicon remained usable in administration, ritual memory, and national time, with different meanings becoming salient in each setting.

5.2. Nowruz and the Vernal Equinox

Nowruz brings the article's main processes into one case. Its name, "new day," is transparent in Persian; its calendrical position is tied to the vernal equinox, and its observance renews social relations through recurrent acts. The Solar Hijri calendar maintains close alignment with the tropical year by determining the year's opening around the equinoctial transition, although its legal and computational formulation belongs to modern calendrical history and differs from ancient practice (de Blois, 1996, Reingold & Dershowitz, 2018). Al-Bīrūnī's discussion already shows Iranian chronological traditions being compared, corrected, and debated by learned observers (al-Bīrūnī, 1879).

Nowruz turns an astronomical boundary into a named public event that can be anticipated, measured, narrated, and performed. Salimpour and Fitzgerald treat culturally embedded events as representations through which astronomical concepts become socially intelligible (Salimpour & Fitzgerald, 2024). The Iranian case also shows that ritual practice gives the equinox consequences in domestic time, state calendars, and collective memory. Language identifies the threshold, and recurrence converts that designation into a social fact. This relation is historically strong, though every element of present practice need not derive from the same period.

6. Astronomical Phenomena, Ritual Time and Cultural Memory

6.1. Equinoxes, Solstices and the Organization of Ritual Time

Popular accounts sometimes assign every Iranian festival a direct and timeless relation to an equinox or solstice. Historical calendars make that scheme difficult to sustain. A 365-day year without regular intercalation drifts against the seasons, so the date of a feast and a solar event associated with it may separate over centuries (Bickerman, 1980, Boyce, 1970, Taqizadeh, 1938). Relations between ritual and astronomy therefore require reconstruction for specific periods, based on calendrical history and evidence for actual observance.

Seasonal thresholds nevertheless remained culturally powerful because changes in daylight, temperature, agriculture, and celestial visibility were repeatedly interpreted through named periods. Yaldā and the forty-day čella cycle show that long winter nights could be organised as social time, even though their terminology and customs have complex histories. Equinoxes and solstices supplied observable constraints; communities added segmentation, narrative, and ritual emphasis. Cultural memory depended on repeated adjustment as calendrical positions and ritual meanings changed.

6.2. Tīrgān, Mehrgān and the Celestial Dimensions of Iranian Festivals

Tīrgān demonstrates the value of linguistic evidence. The name Tīr continues Tištrya, the stellar divinity associated with Sirius, rain, and the defeat of drought. Water-related customs in later celebrations become more intelligible when placed beside that semantic history (Boyce, 1975, Panaino, 1990). Assigning the festival a fixed summer-solstice position for every period exceeds the evidence. Calendar drift and regional practice complicate that equation. A stronger claim concerns continuity of association, since a star-name and month-name kept rain, heat, and seasonal relief within the festival's interpretive field.

Mehrgān, held on the day Mehr in the month Mehr, similarly joins a calendrical name with Miθra's inherited semantic domain and autumnal social practice. In later Iranian history it acquired royal, harvest, and communal meanings that arose through more than one historical route (Boyce, 1982, Boyce & Grenet, 1991, Daryaee, 2009). Together, Tīrgān and Mehrgān show calendrical-symbolic representation in practice. Celestial or seasonal knowledge persists when a name coordinates recurring action, even as the action and its explanations change. The evidence supports transformed continuity, with each period selecting and reorganising parts of an inherited field.

7. Language Contact and the Transmission of Astronomical Knowledge

7.1. Translation, Borrowing and the Formation of a Persian Astronomical Lexicon

The Persian astronomical lexicon developed through sustained multilingual exchange. Achaemenid rule placed Iranian elites in direct contact with Mesopotamian scholarly traditions, and later Sasanian and early Islamic environments brought Greek, Indian, Syriac, and Arabic materials into new compilations (Pingree, 1963, 1973, Sezgin, 1978, Steele, 2012). Translation altered categories as well as terminology. A borrowed word could enter beside an Iranian equivalent, narrow its meaning, or become the preferred form in technical prose.

The Abbasid translation movement accelerated this process, and Persianate scholars participated actively in it (Gutas, 1998, Sabra, 1987). Arabic became the principal language of much advanced astronomy, whereas Persian retained older celestial names and later expanded as a medium of scientific exposition. Astronomical tables, instrument traditions, and planetary models circulated through institutions from Baghdad to Marāgha (Kennedy, 1956, King, 2004, Ragep, 1993, Sayılı, 1960). The Marāgha tradition is especially important because it joined observation, mathematical criticism, and teaching within a network crossing linguistic boundaries (Morrison, 2007, Ragep & Ragep, 1996, Saliba, 1994).

The outcome was a stratified lexicon. Persian setāra, māh, Mehr, and Nāhīd coexisted with Arabic kawkab, qamar, šams, and Zuhra; Greek-derived technical concepts arrived largely through Arabic, and Indian parameters entered astronomical tables through translation and recalculation. Language contact thus became a mechanism of continuity, enabling the incorporation of new models alongside inherited categories (Brentjes, 2016, Dallal, 2010, Matras, 2009). Its ancient components remain visible through this uneven layering; mixture itself forms the historical record.

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