Reconsidering the *Bundahishn* through Cultural Astronomy

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Abstract

The relationship between myth and astronomy began long before telescopes. Celestial change was followed through observation, memory, ritual, and narrative, allowing practical knowledge of seasons and stars to pass across generations. This review examines Zoroastrian cosmology, especially the *Bundahishn*, and considers its use in astronomy education. It brings together cultural astronomy, science education, Iranian myth studies, and research on narrative learning. Henning's analysis shows that the astronomical chapter coordinates inherited Avestan material with pre-Achaemenian conceptions, Babylonian zodiacal knowledge, and elements of Greek astronomy in a single cosmological compilation. The Tishtrya tradition offers a focused example in which seasonal concern, ritual time, and Sirius meet within a memorable account. Comparative evidence further suggests that culturally grounded storytelling can connect astronomical concepts with identity without presenting myth as an empirical model. The article proposes a three-stage teaching framework moving from narrative encounter to observational checking and critical interpretation, with particular relevance to historically informed astronomy literacy among younger learners in Iran today.

Keywords: *Bundahishn; Zoroastrian cosmology; cultural astronomy; science education; storytelling; history of astronomy*

1. Introduction

The history of astronomy begins before instruments, in sustained watching, memory, and the effort to account for changes in the sky. Early cosmologies brought together records of observed events with explanations of their significance and narrative forms through which knowledge could be recalled and transmitted. Although these accounts differ from modern scientific models, their organisation was often closely related to seasonal timing, stellar appearances, and weather patterns of practical importance.

Research in science education shows that learning astronomy involves more than mastering equations or memorising the names of planets since learners approach the sky through prior conceptions shaped by language, culture, and personal experience. These conceptions may support new understanding or interfere with it (Galili, Weizman & Cohen, 2004). Zoroastrian cosmology, especially the account preserved in the *Bundahishn*, is useful in this context as it presents an ordered universe in which celestial structure is closely connected with time, ritual, and moral life.

This article brings together several studies and perspectives from cultural astronomy, comparative myth, Iranian philology, and research on storytelling in science education. Henning's source analysis of chapter 2 provides a distinctive historical point. The astronomical compilation places early Iranian cosmological assumptions beside knowledge of the zodiac and planets acquired through Babylonian contact, and later elements of Greek astronomy such as stellar magnitudes and planetary elongations (Henning, 1942). This layered composition matters for education as it shows astronomical knowledge being selected and coordinated across periods instead of developing within an isolated tradition.

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2. The *Bundahishn* as a Cosmological Compilation

The *Bundahishn*, usually translated as "Primal Creation," is a major Middle Persian work of Zoroastrian cosmogony and cosmography. Henning (1942) identifies *Zand-agahih* as its more exact title and glosses it as an exposition of information supplied by the Pahlavi version of the Avesta. He treats the work as an original cosmological compilation, whose compiler coordinated dispersed Avestan teachings and drew on several sources. The surviving recensions were transmitted and revised over a long period, so their chapters preserve materials from different historical layers.

The astronomical chapter begins with the creation of the Lights and distinguishes fixed stars, non-fixed stars, the moon, and the sun. It then sets the twelve zodiacal constellations on a sphere formed in the likeness of the year, each sign corresponding to a month and each thirty-degree division to its days (Henning, 1942). The chapter also assigns celestial commanders to the directions. The Great Bear, or Haftoreng, governs the north and is linked through seven tethers to the seven continents, a cosmographic arrangement in which observable star groups acquire administrative and protective functions.

Henning's reading reveals an unusually composite astronomical scheme. Early assumptions about the order and distance of the celestial bodies remain beside the Babylonian ecliptic and zodiac; the planets and later Greek elements, including stellar magnitudes and calculated elongations. The same chapter refers to the zodiacal sphere, lunar mansions, and the sphere of the Unmixable Stars. These technical strata give a more precise basis for studying the *Bundahishn* than broad descriptions of an ordered sky, and they show how the compiler reconciled inherited authority with astronomical materials of different origins and dates.

3. Myth as Encoded Astronomy in Bahar's Reading

In some science classrooms myth is still presented as a discarded stage that rational inquiry had to leave behind. Bahar (1998), drawing on Iranian and Indo-European materials, offers a less rigid account in which myths compress repeated encounters with weather, seasonal change, animals and the sky into forms that can be remembered and taught. Symbolic meaning and measurement remain different forms of knowledge, yet narrative may preserve relationships among events long after the circumstances of the first telling have disappeared. Its evidential value must therefore be assessed case by case.

The Tishtrya cycle provides a strong Iranian example. Tishtrya is associated with Sirius, the brightest star in the night sky, and Yasht 8 recounts his contest with Apaosha, a demon of drought, ending with rain and the release of waters. Read beside the seasonal calendar, the episode connects the return of a conspicuous star with concern over water and expected changes in weather on the Iranian plateau (Krupp, 2003, Panaino, 1995). The climatic correspondence requires caution because stellar visibility, latitude, and historical calendar practices vary; yet, the recurring conjunction of Sirius, ritual time, and rain gives the association a structure that exceeds a casual resemblance.

Panaino (1995) places Tishtrya within the Zoroastrian month-name system and ritual year, where the episode could serve as a cognitive index linking an ecological concern with a celestial marker and then binding both to communal obligation. Bahar's approach helps explain the durability of such an account as several forms of information could be carried together without being treated as identical kinds of knowledge. Henning's translation adds a further detail from the astronomical chapter, where Tishtrya appears as the General of the East and assists the wind, clouds and lightning-fire in bringing down rain (Henning, 1942).

4. Cultural Astronomy, Literacy and Identity

Cultural astronomy approaches the sky as measured experience and interpreted environment. Groups observing similar stars may draw different figures, names and moral associations from them, with those differences shaped by geography, language and social history. Astronomy education gains little when culture is treated as an optional decoration. Salimpour & Fitzgerald (2024) argue that culture can provide a starting point for astronomy learning provided that local knowledge is examined seriously and scientific claims remain open to evidential testing.

Retré et al. (2019) widen astronomy literacy beyond factual knowledge by including astronomy's place in culture, history, civilisation and art alongside its scientific concepts. This formulation is particularly relevant to the *Bundahishn*. A learner who can identify Sirius yet lacks the means to discuss why stars entered calendars, architecture, poetry or ritual has acquired a restricted form of literacy. The cosmological

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compilation therefore allows astronomical classification to be studied together with the practices that gave celestial knowledge public meaning and historical durability.

Jaleh Amuzgar gives this cultural argument a specifically Iranian grounding by explaining that people form myths over long periods from their social conditions, beliefs, needs, and surrounding environment, and that these narratives preserve the ways communities understood themselves and their world (Amuzgar, 2014). Reading Iranian myths can therefore become a way of reading the land because mountains, drought, water, seasonal uncertainty, and concepts of order enter the narratives as lived pressures instead of neutral scenery. In astronomy education, a mythic sky should be interpreted in relation to the environment from which its patterns gained urgency.

The aspect of Figueiró et al. (2019) that most closely connects with the present article is reciprocal cultural exchange. The GalileoMobile team worked in November 2016 in the Sete de Setembro Indigenous Land near Cacoal in Rondônia. Activities at Linha 12, Linha 14, and Linha 9 combined storytelling, drawing, shadow puppetry, and sky observation with dialogue about Paiter Suruí knowledge. Interviews and records were returned to the community for educational and cultural use. The Iranian setting differs; yet, the methodological lesson remains relevant. Cultural astronomy materials should be developed with attention to their holders, language, and local purpose instead of being extracted as a colorful introduction to standard content.

5. Storytelling-Based Teaching and Iranian Narrative Forms

Storytelling-based teaching organises a lesson around a narrative problem and then uses guided questions, observation, or other evidence to revise the learner's first interpretation. This approach is relevant to astronomy since many concepts involve scales, movements, and intervals of time that are difficult to experience directly. Narrative supplies a sequence through which those relations can first be imagined and later examined. Salimpour & Fitzgerald's (2022) idea of the "cosmic interaction" is useful here, as learners often encounter questions of origin and time through scientific and cultural resources at the same moment.

Iran also has performative traditions accessible to children and adolescents. Naqqāli uses voice, gesture, and at times painted scrolls to carry epic and religious narratives into public performance. UNESCO identifies it as Iran's oldest dramatic storytelling tradition (UNESCO, 2011). Modern children's theater developed through educators and institutions, including Jabbar Baghcheban, who wrote *Khānom Khazuk* in 1928 as an early Persian play for children, and Kanoon's Theater Center, which later used puppet theater, touring productions, and adolescent acting groups in artistic education (Encyclopaedia Iranica Foundationr, 1991, 2011). These forms allow an episode from the *Bundahishn* to be voiced, staged, and questioned instead of being reduced to a textbook paraphrase.

Persian publishing includes a large body of translated and originally authored books on children's literature, storytelling and narrative writing. Many approach astronomy or space through modern settings and fictional characters. Illustrated retellings from classical Persian literature are also well established, yet narratives comparable to the *Bundahishn* remain largely unadapted as educational stories for children and adolescents. The contest of Tishtrya and Apaosha and the account of Yima's Vara are two recognised ancient examples. Any adaptation should distinguish the source passage from later interpretation and present-day astronomy. Figueiró et al. (2019) offers a practical precedent through activities that join elder-told myths with drawings, shadow puppets, and direct observation. A *Bundahishn*-based lesson could similarly lead into a star chart, seasonal visibility exercise, or short performance whose script is revised after its celestial claims are checked against observation, simulation, or a reliable astronomical source.

6. Toward an Integrated Pedagogical Model

A workable classroom model can proceed through three stages, beginning with narrative entry. A short, source-based version of the Tishtrya episode introduces Sirius, drought, and calendrical expectation in a form that learners can recall. The teacher then identifies the source and explains that the episode belongs to an older cosmology. This framing prevents the account from appearing either as an anonymous folktale or as a disguised scientific explanation.

The second stage involves observational comparison. Learners examine when Sirius is visible at a selected latitude, how heliacal rising is defined, and how differences among calendar systems affect any proposed seasonal connection. A planetarium program or historical sky simulation may support this work, although

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a printed horizon diagram can also be sufficient. Agreements and discrepancies both deserve attention as they reveal which observational relations narrative compression preserves and which details it modifies.

The third stage is critical interpretation. Learners consider what the episode organised for its community and what a modern visibility model is designed to explain. They may compare a ritual calendar with an astronomical table or rewrite one scene after checking the sky data, so the difference between a Yasht and a scientific paper becomes visible through their distinct questions and rules of evidence. This stage gives the arts a precise educational role, allowing drawing, theatre and illustrated narrative to externalise a learner's model and make it available for correction, discussion and comparison within an interdisciplinary approach linking science with history and the humanities.

7. Discussion

The *Bundahishn* presents observation and interpretation within a single cosmological compilation, a feature that gives the work educational value and also requires careful handling. If it is presented only as imaginative heritage, its technical distinctions may disappear. If it is treated as a concealed modern textbook, its religious and historical character becomes distorted. A more defensible approach examines what the astronomical chapter classifies, how those classifications are placed within the cosmological scheme, and where modern evidence alters or qualifies them.

Storytelling can change the learner's relation to abstract content by making visible the human reasons for watching the sky. Yet the present article proposes a pedagogical framework and reports no classroom intervention involving Iranian pupils. References to possible learner responses are included as instructional cautions since the argument draws on astronomy education research and comparable cultural programmes rather than student data produced for this review. Particular attention is given to the risk of treating a symbolic account as an empirical model or merging astronomy with astrology through their historical overlap.

Historical accuracy is more than a scholarly preference because simplified or romantic versions of Zoroastrian cosmology can imply that ancient observers were either irrational or secretly modern, and both interpretations misrepresent the sources. Provenance, translation choices, and the limits of astronomical reconstruction should remain visible in teaching materials even when the language is adapted for younger groups. Future development should concentrate on source-based Persian materials prepared with input from historians of religion and astronomy educators. Any pilot use would require clearly documented age groups, teaching settings, and learning aims. Until such work is undertaken, the model proposed here remains a reasoned pedagogical framework rather than an evaluated intervention.

8. Conclusion

The *Bundahishn* can contribute to astronomy education when its celestial classifications are examined together with the cultural work performed by its narratives. The central implication is methodological: begin with a historically sourced episode, test its astronomical relations, and then interpret why those relations mattered within their own society. This sequence avoids romantic equivalence and sterile separation. It also identifies a specific gap in Persian educational publishing, where modern space stories are common, but illustrated and critically framed adaptations of Zoroastrian cosmology remain limited. Developing such material requires philological care, age-appropriate design, and explicit rules of evidence. Henning's analysis makes another requirement clear. The astronomical chapter contains material from different intellectual periods, so educational adaptations must preserve that internal layering instead of presenting the compilation as a single undifferentiated voice.

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