



International Conference on Purāṇic and Siddhāntic Cosmology Within an Experiential Mathematical Framework

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Concept note

For people trained in the modern sciences, Vedic knowledge offers many concepts that may at times appear incomprehensible, or even contradictory. Partly in response, this conference aims to examine cosmological descriptions offered in time-honored Purāṇic and Jyotiṣā texts (Siddhāntas) identified with the Vedic tradition, as more than a collection of seemingly esoteric metaphysical perspectives. In fact, traditional texts such as these encompass a rational system of thought also grounded in observational data that can offer significant contributions to contemporary scientific discussions. For example, the legacy of Vedic mathematics offers overlap between traditional systems of Vedic thought and contemporary analyses of the natural world. The organizers thus propose that the tentative conclusions facilitated by modern science can be augmented by age-old perspectives drawn from both the Purāṇas and Siddhāntas.

This conference also aims to be the first in a series of seminars fostering a continuous dialogue that proactively engages Vedic considerations of natural philosophy while avoiding indulgence in either excessive religious dogma or scientific rationalism. Such discourse aims to encourage an appreciation of how the cosmological descriptions found in the Purāṇic and Jyotiṣā traditions can help enhance a grander sense of reality underlying ordinary conditional experience.

Vedic Adhidaivata Roots of Purāṇic and Hindu Astronomy

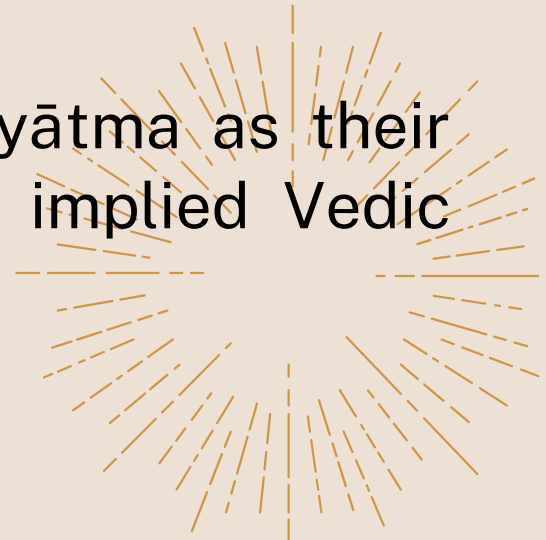
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The Vedas, the most ancient known literature of India carry a variety of natural and physical information of great importance, appreciation of which facilitates understanding the common threads passing through the cultural history of the people of India. However, study of Vedic texts is far from being a straightforward exercise of literal dictionary based translation from Sanskrit into another language to look for the original Indian approaches to astronomy, mathematics, cosmology, music, medicine and other subjects of current interest. Nirukta of Yāska is the earliest available text that explains some RV hymns, providing possible multiple meanings for a few RV verses. Yāska was recording the Vedic tradition as it existed in his time, adding his own explanations to be passed on further. One of the definitive clarifications offered by Yāska is about Soma as a nameable entity and about Somapāna or drinking of Soma by Indra. Soma is a creeper of the same name, from which the soma juice is extracted ritualistically and consumed by the officiating priests as consecrated offering in the somayāga. This is the adhiyajña explanation. But when Soma is said to be the food for gods (deva) approaching him on Pūrṇimā (full moon), the visible moon in the sky is meant by the word Soma. In the Upaniṣads Soma means mind in the adhyātma (spiritual) sense. From the time of Yāska onwards, we can infer that generations of followers of Veda inherited and practiced a blend of adhiyajña, adhidaivata, adhyātma as their dharma or way of life. This ethos of non-determinism and acceptance of balanced diversity as the implied Vedic perception is seen in several Purāṇa texts also.



The concept of devatā (deity) from which the adhidaivata-pakṣa originates, has number count as its basis, and the action of the deities are of cosmic nature, most likely in the visible sky, in some cases reflecting axial precession of earth. In this talk I like to briefly discuss the astral/cosmological background behind

i) Indra consuming 30 lakes of Soma (Ṛgveda 8.77.4)

ii) Viśvedeva deities counted as 3339 drinking Soma (RV 10.52-53; Brahmāṇḍa Purāṇa)

iii) Chandas (Meters) helping Indra to cross over the night (Aitareya Brāhmaṇa 4.5)

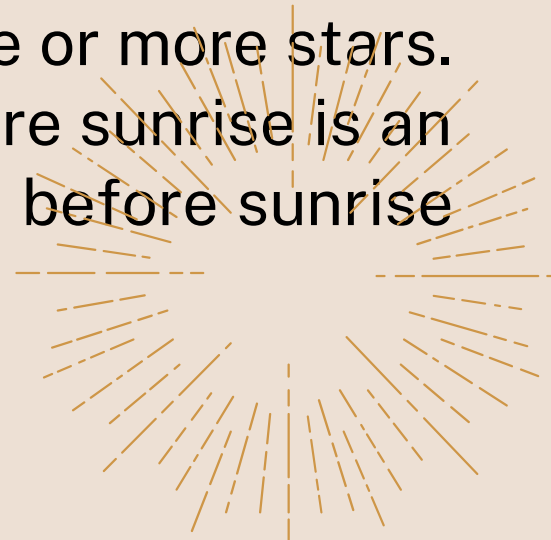
iv) Meru-Dhruva centric astronomy & Śiśumāra constellation (Taittirīya Āraṇyaka II.19)

Precession of Equinoxes and Sun's Transit in the Vṛddha-Gārgīya Jyotiṣa

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VGJ is a text of about 5000 verses, and some prose spread over 64 aṅga (sections). The text contains astral and other information, including the observed motion of the sun, moon, grahas, nakṣatras, and seasonal changes. Given the observations of the Sun's seasonal transit through nakṣatras in VGJ in Ādityacāra (11 th aṅga) and Ṛtusvabhāva (59 th aṅga), we present a method to statistically estimate the date of the observations in the text commensurate with the precession of the equinoxes. The same Ādityacāra information is also found in Parāśaratantra, which is in prose. An observer, modern or ancient, would notice that the sun rises more in the southeast during winter and in the northeast during summer. There is daily progress between the two extremes, with the sun swinging from south to north and back. This swing is called a seasonal (tropical) year. The sun crosses the mid-point between the two extremes twice in one year. These four solar events in a year are the uttarāyaṇa (winter solstice), spring equinox, dakṣiṇāyaṇa (summer solstice), and autumn equinox, respectively. The night sky is adorned with stars - as if in a celestial sphere. Stars seem to rotate east to west around a pivot position in the northern sky of this sphere as the night progresses. Stars closer to the pivot are always above the horizon even as they rotate around the pivot, while the further ones rise in the east and set in the west. The belt of stars on the celestial sphere, on the circle perpendicular to the pivot, is called nakṣatra maṇḍala - almost the same as the ecliptic. This maṇḍala is divided into 27 nakṣatras - each nakṣatra is a defined region with one or more stars. The motion of the celestials is constrained to this maṇḍala. The nakṣatras last seen rising in the east before sunrise is an indicator of the season, apart from the felt experience. When the sun is at its southernmost, the nakṣatra before sunrise heralds the beginning of śiśira(winter) - considered the beginning of the year in ancient India.



As the sun journeys north and then back to the south, covering the 27 nakṣatras, the start, and end of the six ṛtus (seasons), namely śíśira, vasanta, grīṣma, varṣā, śarat, and hemanta, are marked by different nakṣatra. Each season spans 4 ½ nakṣatras. In Ādityacāra aṅga, winter is observed to start from the beginning of śraviṣṭhā while in the Ṛtusvabhāva aṅga the start is past śraviṣṭhā. It can be seen the seasonal nakṣatra markers between the two chapters have moved by around ½ nakṣatra. This movement indicates the observations in the two chapters are from different epochs - attributable to precession. Each nakṣatra is a defined region with one or more stars around the ecliptic for a total of 83 stars. In our approach, we first gather the positions of nakṣatras for many past epochs using planetarium software.

Then we compute an error metric that indicates how far these projected nakṣatra positions are from the expected season described in the text, for each epoch. The epoch with the least error is an estimate for the date of the observations in the text. We determine that the two chapters have observations of two different epochs - Ādityacāra is placed around 1300 BCE and Ṛtusvabhāva 800 years later. This shows that the text is layered, assimilating later observations and insights as the text advances. Ṛtusvabhāva not only discusses the 12 months in addition to the six seasons of Ādityacāra. It also develops the notion of 12 solar months obviating the need for intercalary months needed in the earlier lunar reckoning.

References

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Celestial interpretation of the Aśva Sūkta in the Ṛgveda

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From Yāska's Nirukta, we notice the ancient tradition of understanding some hymns of the Ṛgveda in three ways. These are the adhyātma, where the locus is the Self, the adhiyajña where the locus is the yajña ritual and the adhidaivata where the locus is the dyouḥ or the visible sky. While commentators like Sāyaṇa interpret RV mainly from the adhiyajña point of view, Aurobindo and his followers have highlighted the adhyātma dimension of RV forcefully. It follows that RV hymns that contain description of the sky are amenable for adhidaivata meaning, wherein celestial objects are lauded. Iyengar (2010) has explored such a possibility with the Ṛgvedic word dhūmaketu to demonstrate that some RV hymns may describe comets and meteors. There are several other cases where both Yāska and Sāyaṇa indicate possible adhidaivata meanings. Typical is the case of Soma which is taken to be a herb of that name in the yājñika meaning, but Yāska points out that depending on the context this is the visible moon as per the adhidaivata meaning.

The famous Aśva Sūkta of the Ṛgveda (I.162 & 1.163) by Aucathya are traditionally taken to refer to the Aśvamedha yajña (horse sacrifice) ritual. The prime object and the event described is adhidaivata approach here. The medhyāśva (sacrificial horse) is said to have born out of Tvaṣṭṛ (the divine carpenter), seen among the gods and was killed by them, just as the terrestrial horse will be sacrificed by humans on earth. Sāyaṇa, in his commentary, describing the celestial horse's flight, proposes two meanings – the yājñika meaning of the horse climbing up to the heaven, as well as the direct textual meaning of a divine horse flying down from heaven to earth. The divine horse is said to be near a location in the sky called cow's foot (ā pade goḥ), which can be understood as the starry region later known as proṣṭapada with the same meaning (Pegasi). Sāyaṇa on the other hand takes the location as referring to the terrestrial location where the sacrifice takes place. The further picturesque description of a group of celestial horses flying like a line of swans perhaps points to bright meteorites traversing the sky.

The hymns as per the adhidaivata interpretation are relatable with one or more bright horse-like objects in the sky as observed from the earth. Such observations, it may be argued have lead to regular sky watching by the Vedic people, with associated ritualistic connotations.

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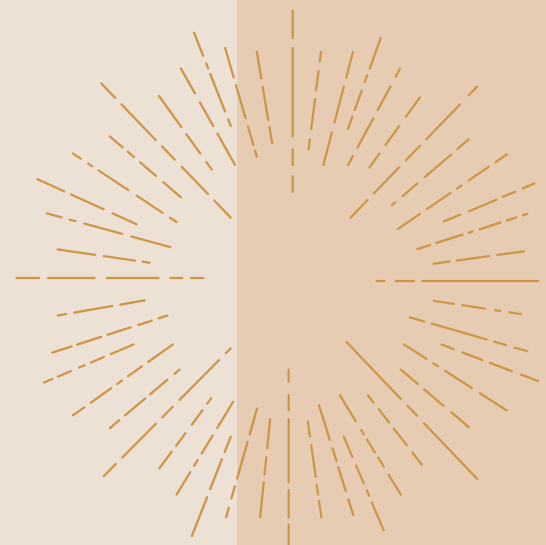
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