

Astronomical Myths in India¹

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The sky has fascinated humans for a long time. The steady majesty of the sky with its rhythmic periodicity have had a captivating affect on human lives from the earliest.

At the roots of India is a religion that we call Hinduism. The word Hinduism, in its roots means a religion of the people from the land of Indus. But the religion itself is as diverse and varied and indeed as evolving as the idea of India itself. It is therefore not surprising that the attitude of Indian towards the heavens and their cosmogony have also evolved and mythological stories have been rendered, reinterpreted and re-ordered. Here we briefly discuss some of the most common aspects of the relation of Hindus with the heavens.

1. Astronomical stories

1.1 Story of Eclipses

The Eclipses are explained in early mythologies of India as a story of a demon trying to eat up the Sun and the Moon. A mural depicting the story can be seen in Angkor Wat, Kampuchea (see picture²). As the story goes, the gods were cursed by the sage Durvasa because Durvasa took affront to the elephant of Lord Indra trampled on the sage's gift of a garland. The Gods therefore lost their immortality and kingdom. They



approached Lord Vishnu for help. Vishnu advised them that they could regain their original stature if they consumed the nectar of immortality from the bottom of the ocean of milk. Realising that they needed the help of the arch foes, the Asuras they called a truce with the Asuras. The Gods and the Asuras churned the ocean together using the serpent Vasuki as a churning rope and the mount Mandara as the churning staff.

However, once they when they began churning, the mount began sinking into the ocean. Vishnu then took the form of a turtle (Kurma), to bear the entire weight of

¹ Contributed to the book *Stars of Asia Stars of Asia*, ed. N Kaifu, Japan, Jan 2011

² taken from <http://picasaweb.google.com/lh/photo/ptlel0BYNXlPkZoTHQYNIQ>.

the mountain. The churning continued and various objects are thrown out including the deadly poison Halahala. The fumes of the poison threatened to destroy the Devas and the Asuras. Lord Shiva then came to their rescue. He gathered the entire poison in his palm and drank it. However, the poison was so potent that even Shiva dare not consume it. His consort, Parvathi clasps his throat and held the poison there and the throat became blue with the affect of the poison. However, even around his neck the poison was far too hot. The therefore wrapped a snake around his neck since the abdomen of a snake is cold. Hence he became known as "Neelakanta" (literally: "the blue-throated one).

Eventually, the nectar of immortality came out of the Ocean, carried out by Dhanvantar, the physician of the Gods. The Asuras immediately took charge of the pot. Vishnu again came to the rescue in the form of a beautiful damsel, Mohini and distracted the Asuras. She then retrieved the potion and distributed it to the Devas. By the time the Asuras realised Vishnu's tricks, it was too late, as the Devas regained their renowned prowess and defeat them.



When the nectar was being served to the gods, a demon, disguised as a god, sat between the Sun and the Moon in an attempt to procure the nectar. When he was detected by the Sun and the Moon, Lord Vishnu immediately severed his head from his body. Unfortunately, it was not fast enough, for the demon had already tasted a small quantity of the nectar and had become immortal. Ever since, this demon is said to wreak vengeance on the Sun and Moon whenever they come near. The head of this great demon is known as Rahu (see figure on the left³) and his tail is known as Ketu. However, since both have an opening on both ends, the swallowed Sun and Moon soon emerge from the demon's body.

In Hindu astrology Rahu and Ketu are known as two invisible planets. They are enemies of the Sun and the Moon, who at certain times of the year (during conjunction or opposition) swallow the Sun or the Moon causing either a solar or a lunar eclipse.

In later evolution of the myth, Rahu and Ketu are defined as the ascending and descending nodes of the ecliptic and equator. When the Sun and the Moon come together at these points, we get solar eclipse at ascending node and lunar eclipse at descending node. Their mathematical equations are set up by the time of Arybhata (about 500 AD) and eclipses are accurately calculated thereafter.

³ from British Museum, taken from Wikipedia

1.2 Orion Myths

1.2.1 Orion and the creation myth

One of the interesting aspects of Hindu mythology is that the internal ambiguity and internal ambiguity. On the one hand, the Universe is created by a Lord who produces the entire universe from his own thought. This Great One is later left ambiguous while the importance of various Gods keeps changing. In the earliest myths Indra is the most important God and a warrior God but his significance falls in later literature when the Great Trinity of Bramha (the Creator), Vishu (the Preserver) and Shiva (the Destroyer) take over. However, various other Gods and Goddesses continue to occupy their own important roles and in fact Bramha and Vishnu are not worshipped directly. Bramha is not a very important God as far as number of temples etc. are concerned and Vishnu is worshipped in the form of one of his incarnations of Rama or Krishna. Vishnu has ten incarnations out of which the tenth one is yet to come. These are: Matsya (fish form), Kurma (Tortoise form), Varaha (boar form), Narasimha (in the form of half lion, half man), Vamana (dwarf form), Parasurama (human form), Rama (human form), Krishna (human form), Buddha (human form) and Kalki (the destroyer feminine who is yet to come). Each has a mythological story associated with it but we shall not deal with them here since they are not related to astronomy. However, Shiva is the only member of the Trinity who is worshipped directly. Shiva himself is originally worshipped as Rudra (the angry one or the one who makes you cry). It is this Rudra form that has an interesting astronomical association.

In the original myth of creation, Prajapati developed a desire for his own daughter (often called Ushas or dawn). Interestingly the mother of Ushas is never defined. But because this relation of incestuous, the other Gods were appalled. They approached Rudra or Shiva to prevent this incest from occurring. On the other hand, Usha herself, embarrassed by this attention kept changing her form but each time Prajapati also took the equivalent male form out of his desire for her. It is one of these forms, when Prajapati is an antelope that is reflected in the sky in the form of Orion-Taurus. Prajapati is Taurus. The deer or the deer's head is the modern constellation, Capricorn. Sirius was the deer piercer who shot the arrow. Orion, the hunter with bow and arrow is Rudra trying to stop him from this sin. In variants of this, the seed of the father falls on the ground with other consequences and there are other elaborate stories about the anger of Rudra which we shall not discuss here.

In some variants of this story, The brightest star in Taurus, Aldeberan, (Rohini) and represents the female deer, Prajapati is represents Orion, and the three stars that form belt of Orion, are the arrow that pierced him. The arrow is Agni (fire), Soma (a celestial drink or Moon), and Vishnu (the supreme god) Agni was the fire god. Sirius and Aldeberan represent the deer piercer.

1.2.2 Skanda and the Mahabharata

In the Mahabharata, a later epic and the major Hindu epic, Orion was the warrior, Skanda. Skanda was the six headed son of Shiva. He was both the god of war and the General of the gods. Riding a red crested cock and blowing fearful sounds on a

conch-shell, he thrust his spear into the White Mountain. The top split off into the sky becoming the Milky Way. The hero also killed various demons and restored peace.

1.2.3 Orion and the dove

In another version of the story, Orion is a hunter who is waiting on top of a tree waiting for a hunt when he sees a beautiful deer. As he aims his arrow at the deer, the deer pleads with him that while she is a legitimate catch of the hunter, she has a small baby at home and the deer would be grateful if he gave the deer a chance to meet its baby one last time before its death. The hunter lets her go, not expecting her to return. However, while sitting on the tree, unwittingly he keeps taking leaves from the Bilva tree and dropping them on the ground where there is a small Shiva Linga. The bilva leaves are particularly precious to Shiva who is pleased with this worship. The deer however keeps its word and returns to die on the arrow of the hunter. Touched by this scene of valour, decency and commitment to honesty, Shiva transfers them to the heavens as Orion and Taurus.

1.3 Ursa Major and Pleiades

In Indian mythology, the seven central stars of Ursa Major that form the cup shape, is referred to as Saptarshi meaning seven (sapta) sages (rishis). These are Vasistha, Bharadvaja, Jamadagni, Gautama, Atri, Visvamitra and Agastya. These seven Rishis are often mentioned in the later works as typical representatives of the character and spirit of the pre-historic or mythical period. Their astronomical designations are given in the table below.

Indian Name	Bayer Designation	Western Name
Kratu	α UMa	Dubhe
Pulaha	β UMa	Merak
Pulastya	γ UMa	Phecda
Atri	δ UMa	Megrez
Angiras	ϵ UMa	Alioth
Vasishtha	ζ UMa	Mizar
Bhrigu	η UMa	Alkaid

However, Agni developed a desire for the wives and wanted to seduce them. On the other hand a minor goddess or a nymph (depending on who you ask) wanted to marry Agni. She therefore took the form of six of the seven wives of the Saptarshi's and mated with Agni. However, the Saptarshi's themselves uncertain about the chastity of their wives, divorced them and they went on to become the Kritika or Pleiades. Only one wife Arundhati of Vasistha remained loyal to her husband that is the binary in Ursa Major.

In other variations, Kritika or Pleiades are seven in number and not related to Saptarshi at all. They are the mothers of Kartikeya who is sometimes mentioned as one of the two sons of Shiva but there are other suggestions including Kartikeya being the son born of Agni and Swaha who brought up the five daughters and hence together they were called Kritikas.

1.4. Pole Star

The pole star is called Dhruva in Hindu mythology. Dhruva was born a son of the King Uttānapāda and his wife Suniti (or Sunrita). The king also had another son Uttama, born to his second queen Suruchi, who was the King's favourite wife. Once, when Dhruva was five years of age, the two princes playfully raced towards their father's lap. But, the Suruchi chided Dhruva and insulted him for trying to woo the attention of his father since he was not her son. She further asked him to redeem himself by seeking Vishnu's blessings.

Suniti consoled the distraught child, by asking him to ignore Suruchi's and meditate on the Lord. Dhruva started his penance, and went without food and water for six months, his mind fixed on the Lord. Pleased with his austerity, the Lord Vishnu appeared before him. Seeing the Lord before him, he prostrated himself before the Lord.

When Vishnu was pleased with Dhruva's austerity and asked him to ask for a boon. Dhruva said that that he did not know how to sing the praise of Lord Vishnu, and therefore asked the boon of knowledge. Pleased with this, the Lord Vishnu told him that he would be Great and wise King on Earth and on his death he will be immortalised with the most revered seat of Pole Star to this six year old child. The Saptarshis also point remain close to and associated with the location of Dhruva.

2. Cosmogony

In its earliest format, the Vedic Hinduism is a tripartite relation between Humans, Gods and Ancestors. The most prominent deities of the Vedic Hinduism are Indra (Heroic God of bravery and valour) Agni (fire), Soma (ritual drink), Vishvadevas (Gods of all the worlds), Asvins (Gods' horsemen, Varuna (sky, water and celestial ocean), Maruts (Storm God), Mitra (patron divinity of honesty, friendship, contracts and meetings), Ushas (Dawn). These are essentially abstract gods and are resident of the earth or connected to it directly in terms of their manifestation. They do not refer directly to heavens. In that sense, the earliest form of Vedic Hinduism is more focused on the earthly reality.

One of the most conspicuous aspects of Hindu Cosmogony is the concept of Time. While the original concept begins with 12 months and luni solar calendar, soon it expands. In the oldest Indian document Rig Veda dated between 2000 and 1500 BC, the concept is of a year of 360 days of 12 months with two intercalary months every 5 years to synchronise Solar and Lunar calendars. However, in later literature, the concept of Yuga is expanded significantly and it takes the form of 4 distinct Yugas that make 1 day of Brahma in a cycle that is repeated for several Mahayugas. In this the 4 yugas are, Krita Yuga of the duration of 1,728,000 years, Treta Yuga of 1,296,000 years duration, Dvapara Yuga of 864,000 duration and the current Kali Yuga of 432,000 year duration.

We site one example in the leap of their imagination. It called Nasadiya Sukta and it can be translated as follows:

1. *At first was neither Being nor Non-being.*

- There was not air nor yet sky beyond.
What was its wrapping? Where? In whose protection?
Was water there, unfathomable and deep?*
2. *There was no death then, nor yet deathlessness;
of night or day there was not any sign.
The One breathed without breath, by its own impulse.
Other than that was nothing else at all.*
- 3 *Darkness was there, all wrapped around in darkness,
And all was water indiscriminate: Then
That which was hidden by the Void, that One, emerging,
Stirring, through power of Ardor, came to be.*
4. *In the beginning Love arose,
Which was the primal germ cell of the mind.
The Seers, searching in their hearts with wisdom,
Discovered the connection of Beings with Nonbeing.*
5. *A crosswire line cut Being from Nonbeing.
What was described above it, what below?
Bearer of seed there were and mighty forces,
Thrust from below and forward move above.*
6. *Who really knows? Who can presume to tell it?
Whence was it born? Whence issued this creation?
Even the Gods came after its emergence.
Then who can tell from whence it came to be?*
7. *That out of which creation has arisen,
Whether it held it firm or it did not,
He who surveys it in the highest heaven,
He surely knows – or maybe He does not!*
- Rig Veda X, 129*

In this poem, the poet goes well beyond what natural boundaries of religious exploration of the world go. In the first one, the poet goes on to suggest that the origin of the universe is unknowable except may be to the ultimate creator who also created later gods, but then the poet, suspecting that the origin was in pure thought, is not sure if even the Original One knows! The second poem refers to Time. In the first verse, he is a common earthly time of seven wheels on which this immortal moves.

From these earliest speculations, as the time progresses, various seers have added clarifications and explored additional ideas about the cosmogony. In Brihadaranyaka Upanishad (6th Brahmana dated to 8th and 7th Century BC), Yagnavalkya describes Universe to Gargi in the following terms:

- Everything on earth is wrapped in water
- Water is wrapped in air
- Air is wrapped in sky
- Sky is wrapped in the world of Gandharvas (planets?)
- Worlds of Gandarvas is wrapped in Aditya (Sun)
- The world of Sun is wrapped in the world of Chandra (Moon)
- The world of Moon is wrapped in the world of Nakshatra
- The world of Nakshatra is wrapped in the world of Deva's

- The world of Deva's is enclosed in the world of Indra
- The world of Indra is wrapped in the world of Prajapati
- The world of Prajapati is wrapped in the world of Bramhana

This multilayered universe and infinity of numbers are a common theme to cosmogony of not only the Hinduism but also to Jainism and Buddhism which arose from the same intellectual pool of 5th century BC.

3. Formal education in astronomy

Subsequently, as the astronomical knowledge became more complex and observation based the emphasis changed significantly and by 3rd or 4th century BC it became an observational science. At this stage interaction with the Arabic and European Science in the west the emphasis changed to mathematical astronomy and Aryabhatta (5th Century AD) developed computational astronomy in great detail and forever changed the emphasis in Indian astronomy. In a book written in 505 AD, Varahamihira codified the syllabus for astronomy students. According to him, a student of astronomy must able to achieve the following:

1. Know time division of Yuga, year, solstice, seasons, month, fortnight, day, night, yama (90 min), mahurta (48 min), nadi (24 min), prana, truti and calculate their starting and ending times,
2. Saura (planetary calendar including the retrograde motion of planets and their different speeds in the sky), Savana (terrestrial calendar),
3. Understand and calculate solstices,
4. Calculate times of eclipses,
5. Earth's rotation and revolution including concepts of difference in the length of day and night,
6. Calculate latitude and longitude of a place (from Ujjain),
7. Understand Nakshatras and Zodiacs and show them in the sky,
8. Teach this to a learned person.

Today of course a student of astronomy treats astronomy more as a branch of physics with little emphasis on accurate observations are greater reliance on multi wavelength astronomy and astrophysics to understand the cosmos.