Mythology, Cosmogonies, and Indian Science Fiction

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Abstract. This paper examines the cultural significance of the intersection between Indian mythology, cosmogonies, and science fiction. India has a rich history of diverse religious traditions and corresponding world views, many of which have influenced each other. The Hindu pantheon has included the Sun from early times. With the planets also gaining in importance after the rise of astrology, the need to predict their paths saw the development of astronomical observations and spherical trigonometry. These serve as examples of how scientific and religious ideas have interacted throughout Indian history. Despite a strong tradition of fiction in India, there is a lack of science fiction that combines elements of mythology and astronomy except in superficial ways. This paper explores the potential reasons for this gap and argues that an examination of this genre can offer insight into the ways in which science and religion are perceived and valued in contemporary Indian society. The paper also offers a commentary on the current state of Indian science fiction that blends mythology and astronomy.

1. Introduction
We start with some definitions as they pertain to this paper.

Cosmogony: Cosmogony concerns itself with the origin of astrophysical bodies and systems (e.g., the Solar System, the Galaxy, or the cosmos). We will adopt the broader definition where it incorporates the creation of beings, too. And that of gods.

Mythology: We will use this term for stories and traditions that have not been proven (along the lines of scientific methodology), but are widely believed. Whether they need to be proven that way is an area we do not go into. Thus, we do not imply that myths are untrue (or true).

Science Fiction: Here we take a more stringent definition that excludes fantasy, restricting ourselves to hard science fiction (sci-fi), i.e., fiction that has believable science as far as today's knowledge and/or projected knowledge about how things function,
or enough of a theory is provided. Thus, fiction based purely on mythology is not considered sci-fi here.

The thesis here is simply that despite a universe of germs in cosmogony and mythology, modern Indian literature has a paucity of hard science fiction connecting them and astronomy – and that it is an opportunity worth grabbing. The mythology and cosmogony parts presented in this paper are far from exhaustive, and do not even scratch the surface, but that does not affect the thesis.

2. Cosmogonies, Polytheism, and Pluralities

The region that is now recognized as India, as well as its neighbouring countries, has a long and rich history dating back thousands of years. This history has been passed down through generations through complex oral and textual traditions, which have served as a means of preserving the cultural heritage of the region. Throughout this time, starting from naturalistic traditions, the region has seen the rise and fusion of various religious and cultural beliefs.

One of the most prominent aspects of this rich spiritual heritage is the proliferation of polytheistic beliefs and the creation of numerous gods/goddesses and deities. These merging streams often introduced their own cosmogonies or adapted existing ones, leading to a rich tapestry of local and universal deities, many of which have connections with astronomy and astrology. On one hand, many villages in the state of Orissa have guardian shrines at the center of their lakes, serving as local deities. On the other hand, there are also deities that are revered on a universal scale, some of whom do not reside on Earth, and may or may not have direct connection with known heavenly bodies. For instance, Vishnu, one of the major deities in Hinduism, is believed to reside in the world of Vaikuntha. Shiva, on the other hand, is said to reside on Mount Kailasha. An example of merger of deities, possibly through treaties between the followers, is the formation of Dattatraya, born of the union of Brahma,
Vishnu, and Mahesha, the Hindu trinity representing the creator, the sustainer, and the destroyer, respectively. 4

One interesting story is that of Satyavrata, also known as Trishanku. According to the tale, Trishanku was cursed by one sage, Vishishtha, and aided by another, Vishwamitra, in his quest to ascend to heaven. However, the king of heaven, Indra, pushed him away. Undeterred, Vishwamitra used his divine powers to halt Trishanku's descent and created an alternate world between Earth and heaven, complete with its own gods and a king of the gods. Not wanting this 'competition', he was let into the real heaven. 5

In Hinduism, the belief in the Vedas, considered to be of divine origin and not written by humans, was a crucial factor in determining one's stance on atheism. As a result, the Charvakas, who were known for their rationalistic beliefs, and the Ajivikas, the Buddhists, and the Jains were all characterized as atheist. The Charvakas, for example, believed that there is no afterlife, and therefore, one should live life to the fullest, including borrowing money if necessary. On this count their pragmatism was often mislabelled as immorality. 6

It is interesting to note that despite being labelled as atheist, Jainism shares many similarities with Hinduism in terms of cosmogony, including the depiction of Jambudvipa. A comparison between the two Jambudvipas can be seen in Figures 1 and 2.

Known humans lived near the center, there was an ocean around it, then an island, then an ocean again and so on for eight layers. The oceans were made of wonderful liquids like honey, ghee etc. and the view extended almost to infinity. Mount Meru formed the axis mundi and stretched vertically upward with the heaven on top. It was the axis around which everything rotated. 7

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Fig. 1. Jain version of Jambudvipa (Figure courtesy of Wikipedia. By Anishshah19 - Own work, Public Domain.).

Image from page 35 of "A comprehensive history of India, civil, military, and social, from the first landing of the English to the suppression of the Sepoy revolt; including an outline of the early history of Hindoostan" (1900).


Culture and Cosmos
That brings me to a plurality that manifests itself in many ways across Hinduism. For instance, in some cases, Mount Kailasha is considered the axis mundi with Shiva's abode becoming the main heaven (sometimes identified with Mount Meru). There is also Banaras (Kashi), the Indian city of light, which has a different such axis in the form of the naag-kunda.

Fig. 2. Hindu version of Jambudvipa (Figure courtesy of Wikipedia).\(^9\)

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9 By Internet Archive Book Images - Image from page 35 of 'A comprehensive history of India, civil, military, and social, from the first landing of the English to the suppression of the Sepoy revolt; including an outline of the early history of Hindoostan' (1900), No restrictions. https://commons.wikimedia.org/w/index.php?curid=39395226.

there that is supposed to connect Earth with heaven above and the
tetherworld or naag-lok below.\textsuperscript{11}
There is a persistent belief that unless you go through a large number of
birth-death cycles, you do not get moksha (liberation). Banaras, the holiest
of cities, will rid you of the birth-death cycles if you die there.\textsuperscript{12} So there
are other cycles in play – there exist deities in Banaras that will drive you
away if you are not worthy of dying there. Widows are often left in Banaras
to die, or travel there to get out of that cycle. But since not everyone can
travel there to die, there are alternate arrangements, e.g., Tirupati in the
south. Also, for other purposes there are geographic alternatives, e.g.,
Mandi in Himachal Pradesh is the choti (small) Kashi, or Kashi of the
hills,\textsuperscript{13}
Similarly, for travel there are dhams – places of pilgrimage – in the four-
corners of diamond-shaped India that are auspicious to visit. But since not
everyone can travel across the country, a similar quadrangle was formed in
the North called the chota (small) dhams. However, to the locals, these are
just known as the four dhams, and to them they provide the same other-
worldly value as visiting the four main dhams.
A connected concept is that of tirtha, a ford.\textsuperscript{14} It comes from the Sanskrit
root t\textit{RR}, meaning to crossover. These are paths that help you cross a river
to go to a temple. There are also movable tirthas, e.g., saints, who help you
cross over to the other world, and manas-tirtha – the mind that allows you
to go from not-good to good. Each type of tirtha helps you
crossover/transition from the mundane to the sacred.
There do exist very interesting multiplicative factors in connection with
penance. There are myths about certain Rshis having done penance without
food and water for a thousand years. One possible resolution to that is
through these multiplicative factors. For instance, fasting for one day in
Kashi could be equivalent to fasting for a month in choti Kashi, and fasting
for a day in choti Kashi can be worth fasting for a month in some other
place.\textsuperscript{15} And through one-up-man-ships, this scheme could include cycles
where things just keep getting multiplied. This could easily be connected
to the sci-fi concept of non-linear time.

\textsuperscript{11}Diana L. Eck, \textit{Banaras, City of Light} (Columbia University Press, 1999),
p.264.
\textsuperscript{12}Eck, \textit{Banaras, City of Light}, p.32.
\textsuperscript{13}Anne Feldhaus, \textit{Connected Places : Region, Pilgrimage, and Geographical
\textsuperscript{14}Eck, \textit{India: a sacred geography}, pp.7–12.
The spatial and the temporal are not mutually exclusive. Auspicious time augments the sacredness of a place. To start any of the journeys or undertakings mentioned above, you had to start on an auspicious moment. The Indic calendar has been lunar-Solar for a long time, and it defines these auspicious moments based on planetary positions.\(^\text{16}\) As a ready reference, most Indian households still have an almanac, made by standard astronomical methods, to inform them of, for instance, when the moon would rise on a specific day.

There are also interesting complexities that got introduced into the cosmogonies, possibly due to the amalgamation of deities. For instance, in Figure 3 you see Vishnu, the sustainer resting atop Shesha. Shesha is a naag (snake) and one way to look at it is the axis of time, and another is to see how Vishnu rests on the rest, since a meaning of the word shesha is also 'remainder'. Note the lotus coming out of Vishnu's navel. On it rests Brahma, the creator of the Universe. Thus, the creator himself is balanced or dependent on the sustainer.

3. **On constellations, moon, and eclipses etc.**

Of more practical use and day-to-day consideration are various planetary bodies (including the Sun and the Moon), and their progression through the constellations and Zodiacal signs. The almanacs mentioned earlier were not only used to determine auspicious moments, but also to make decisions in connection with agricultural procedures like sowing and harvesting. We will not go into those details but will look at one origin story of the Moon including the connection/origin of eclipses.

The suras (Gods or celestial beings), and a-suras (broadly equivalent to the evil ones) were both looking for the amrita, the elixir of immortality, that lay hidden in the milky ocean. They decided to churn the ocean to get it to rise. For this they used Mount Mandara – a fragment of the very Mount Meru, the axis mundi – as the churning rod, and the great Vasuki Naga as a rope to do the churning.17

First to come out of this was the moon. Then a dozen other ratnas, or gems, came forth, and the last was amrita. As the amrita was being distributed, one of the asuras, Svarbhanu, sneaked in to have it with the suras. He was noticed by Sun and Moon, and Vishnu promptly cut off his head. His head is called Rahu, and his body, Ketu. These are the North and South nodal points respectively, and their coincidence with the positions of the sun and moon respectively cause their eclipses. The myth extends further, saying that, enraged at the Sun for revealing his identity, Rahu follows him in the sky and eats him – that is the eclipse of the sun. Since Rahu is body-less, the Sun drops out of his neck and the eclipse is over. The orbital period of Rahu is approximately equal to a Saros period (just under 19 years) after which similar set of eclipses repeat, though visible from different areas of Earth.

The epic Mahabharata has a story that suggests that eclipse forecasting was an established practice. The war rules required fighting to stop at sunset. It would then resume with sunrise. The Pandavas were finding it especially difficult to kill the Kaurava warrior Jayadratha. One of the days fierce fighting was going on and then there was darkness. Both sides stopped fighting, getting ready to retreat to their camps for the night. Krishna, the charioteer of the Pandava archer Arjuna, drove his chariot close to Jayadrath. Just then the Sun shone again and Krishna pointed it to Arjuna, saying dramatically, ‘There is the Sun, and there is Jayadratha. Kill him’. This incident is taken to mean that Krishna knew of the ensuing eclipse of the sun and he was ready to take advantage of it.

There have been attempts to use dating of eclipses to suggest that Mahabharata happened far earlier than suggested by the archaeological evidence based on geography and descriptions (~1000 BCE).\footnote{Brishti Guha, 'Dating the Mahabharata war – A tale of eclipses, archaeology, and genealogies', https://www.hindustantimes.com/books/dating-the-mahabharata-war-a-tale-of-eclipses-archaeology-and-genealogies-101666958664189.html, Hindustan Times (2022) [accessed 25 Mar 2024].}

It is at the start of the Mahabharata war that Arjuna, facing his cousins and teachers on the other side, refuses to be part of the war, and Krishna lectures him about karma and dharma, or his duties, and about performing them without worrying about the outcomes, and shows him the presence of the entire Universe by opening his mouth, suggesting he is everything. Such imagery transcends times and places. Oppenheimer, the father of the atomic bomb, is famously said to have invoked that on seeing the first nuclear tests and said, 'I am become death, the destroyer of worlds'.\footnote{Sen, \textit{The Argumentative Indian}, p.5.}

4. \textbf{Mathematicians and Astronomers as Astrologers}

Since many things apparently depended on the position of planets, knowing their positions to better accuracy and being able to predict future positions was critical for astrologers. Many who were interested in studying and understanding these positions scientifically would earn their living through astrological predictions. A great deal of astronomy got done in the process.

Aryabhata (fifth century) came up with his table of jyas (half-chords) – trigonometric tables for computing positions.\footnote{Aryabhata, \textit{Aryabhatiya} (Sanskrit), ~510CE.} In Ganitapada, Golapada, Aryabhatiya and others, he talks extensively about eclipses and planets, and even how planets and the moon are externally illuminated by reflected sunlight. He had a two-epicycle model of the Solar System, and there are also suggestions that his planetary periods computed in Solar references suggested heliocentric thought, a good thousand years before the west.

In the sixth century, Varahamihira developed these concepts further to include a table of sines.\footnote{Varahmihir, \textit{Pancha-siddhantika}, 6th century CE.} His panchsiddhant (five theorems, or, here, works) clearly show an influence of the Greeks in two of them, establishing the give and take that happened then.

There are a large number of themes in this sphere that are ripe for hard science fiction.
Evolving Thinking?
Let us briefly investigate how religious and political thinking is evolving, perhaps hand in hand. It is said that the dominant Indian religion viz. Hinduism is very tolerant, and that was perhaps the case for a long time. There was also ample scepticism that was present and tolerated, as we saw based on the atheistic schools of thought. It even existed until a time in the mainstream.

Hymn of Creation
Rgveda is the first of the four vedas. The vedas are chock full of philosophic thought. The complexities involving the origin of Gods and the Universe is likely best summarized in the naasadiya sukta (Hymn of Creation) of the Rgveda (10.129). Here is an English translation from A. L Basham.22

Then even nothingness was not, nor existence,
There was no air then, nor the heavens beyond it.
What covered it? Where was it? In whose keeping?
Was there then cosmic fluid, in depths unfathomed?

Then there was neither death nor immortality
nor was there then the torch of night and day.
The One breathed windlessly and self-sustaining.
There was that One then, and there was no other.

At first there was only darkness wrapped in darkness.
All this was only unillumined cosmic water.
That One which came to be, enclosed in nothing,
arose at last, born of the power of heat.

In the beginning desire descended on it -
that was the primal seed, born of the mind.
The sages who have searched their hearts with wisdom
know that which is is kin to that which is not.

And they have stretched their cord across the void,
and know what was above, and what below.
Seminal powers made fertile mighty forces.
Below was strength, and over it was impulse.

But, after all, who knows, and who can say

Whence it all came, and how creation happened?
The gods themselves are later than creation,
so who knows truly whence it has arisen?

Whence all creation had its origin,
he, whether he fashioned it or whether he did not,
he, who surveys it all from highest heaven,
he knows — or maybe even he does not know.

The Rgveda is arguably the oldest Indic text that has survived. Carl Sagan has quoted it for its wonderful sceptical outlook.\textsuperscript{23} If Gods themselves came after creation, how do they know how the creation came about? It is not a Hymn of Creation in the usual sense.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{image.png}
\caption{An image generated by the author with Stable Diffusion using the keywords cosmogony, mythology, Indian, and science fiction in the prompt. https://stablediffusionweb.com/.
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\end{figure}

The darshanas
The vedas were followed by the darshanas, puranas, mahatmyas and so on. The darshanas had variations of different philosophies and encouraged debates and exchanges. Many like the nyaya, which is about logic, begin by invoking the required theist magic words, and then for the rest are hard logic. In that sense they are, too, as atheistic as one can get.

Recent Times

Good sci-fi often needs world building. If alternatives are discouraged or fraught upon, the society is automatically discouraging science fiction, too. Incidents like reactions to James Laine’s work on Shivaji may provide pause to others.  

6. The Science Fiction Scene

When it comes to fiction, it can be the visual medium of movies and Over-The-Top (OTT), or the textual medium of books (and their online and audio versions). Let us look at visual media first, and then the textual. Again, we will be looking only at astronomy/cosmogony related works.

Movies and OTT

There have been a few movies that purportedly use some astronomy-related themes. For example, Chand Pe Chadhai (Trip to Moon, 1967, Hindi) and Koi Mil Gaya (2003, Hindi) and its sequel. Many times, these are cheap copies of some Hollywood movies, or have ideas that are not fully fleshed out, and in that sense do not pass the hard science fiction requirements. Other examples are: Ra.One (2011, Hindi), Antariksham 9000 kmph (2018, Telugu), Cargo (2019, Hindi), and Bramhastra Part One: Shiva (2022, Hindi). There may be a few others as this is not an exhaustive list. Clearly, given the copious production of Bollywood and Tollywood, there is not enough that has been pumped into this field.

On OTT there have been some with time-travel theme like the Maharaj Ki Jay Ho! (2020, Hindi) that was produced during the pandemic. That is an area which will welcome crisp writing and productions. There have been some recent non-astronomy sci-fi that were pleasing attempts, e.g., OK Computer (2021) and Bahu Hamari Rajni Kant (2016).

Print and Online

Diwali magazines

The state of Maharashtra has a tradition of printing annual special issues of magazines during Diwali, the festival of light. It is the most important festival and, at least for a few days, workplaces, schools, and colleges are closed. People eat a variety of special foods, meet other people, and in general do what is done during festivals. One additional thing that is still practiced in many households is to buy the annual issues of magazines.

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Until a few years back many of these magazines used to be monthlies, but most now bring out just the one annual issue. There were a couple hundred distinct magazines published during 2022 Diwali.

Many of these magazines are explicitly devoted to suspense, mystery, and adventure, and naturally include the genre of science fiction and fantasy. Navala, Dhananjaya and Hansa are a few examples. Many other magazines admit a few sci-fi stories even if their staple genre may be something else. There are also some non-fiction magazines, e.g., *Marathi Vidnyana Parishada Patrika*, and *Aisi Akshare*, that print a few sci-fi stories during Diwali. Just their presence has encouraged many to write sci-fi. Here, too, a majority are fantasy or have many loop-holes, and barely any have astronomy or cosmogony themes. It is in these magazines that I started publishing first (after some online forums like maayboli – https://www.maayboli.com).

**Fig. 5. A collage of a few Diwali issues in which the author has published short stories in Marathi.**

**Books**

It was only after independence that one starts seeing sci-fi stories and novels in Marathi. Even until about 1990 there were not many. After that there has been an increase, including a few anthologies, with stories on various other topics like robots, climate fiction, and genetics etc.

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Narlikar's sci-fi
As far as sci-fi involving cosmogonies and astronomy is considered, Prof. Jayant Narlikar was a singular force in Marathi sci-fi for a long time. He is an astronomer and the founder director of the Inter-University Center for Astronomy and Astrophysics in Pune. His supervisor, Fred Hoyle, has written such gems as 'The Black Cloud,' also with an astronomical theme. Narlikar started a bit dry, with critics complaining that he was trying to teach rather than tell. He learnt rapidly and his later novels were more stories and proper hard sci-fi, generally involving astronomy and/or mythology. *Preshit* (1983), *Waman parat na aala* (*The Return of Vaman*, 1990), and *Virus* are a few of his books.

Other Marathi authors
There are very few other authors in Marathi who have used some themes related to astronomy. A notable example is Niranjan Ghate. He has written a book called *Spacejack*. But these stories are of travel to moon and Mars rather than unknown space, and there is no mythology or cosmogony.

Moon, Mars, and nearby planets have started featuring somewhat more frequently now. Aliens have been common, but often not in fully thought out ways. A new generation of writers is starting to appear that is now taking on newer astro-topics. This is partly because of an online group called sci-fi katta (a private group the author is part of) where authors receive critiques and constructive feedback.

Other languages and regions
Bangla and Marathi have the most copious sci-fi. Hindi, too, has a long tradition, but more involving fantasy. English is the other language in which a lot of sci-fi is produced in India. For example, Ashwin Sanghi includes elements of mythology if not cosmogony.

Satyajit Ray has written many sci-fi stories (Bangla). One that he wrote in the 1960s was to be made into a movie called *The Alien*. Very similar elements appeared in Spielberg's ET. A version of the original story was released relatively recently ('Bankubabur Bandhu', Bangla, 2018). The Hindi movie *Koi Mil Gaya* mentioned earlier has closer parallels to Ray's

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26 Personal opinion based on Indian Association of Science Fiction studies website [https://iasfs.in](https://iasfs.in) and their WhatsApp group [accessed through 2022–23].

Culture and Cosmos
Alien. In Bangla too there is a growing trend in recent times of sci-fi in general, but not so much involving astronomy and related mythology.

**Trying to fill a niche: Astronomy + Mythology**

I have been writing short stories for several years and publishing them in Marathi magazines. I do try to fill this rather large niche of hard sci-fi involving astronomy (A) and mythology (M). Some such stories include: ‘kupamanduk’ (Parochia, A/M), ‘bimbacha pratishodh’ (Bimba’s revenge, A/M), ‘kRishnaleela’ (The Freak Black Hole, A), ‘now you see me’ (Now You See Me, A), ‘punaragamanayach’ (And Yet Again, A), ‘ye re mazhya maglya’ (Memoirs of a Status Quo, A), and ‘rakta tabakadya’ (A Prison Raid, A).

Samakaaleen Prakashan has now published 18 of these Marathi short stories as an anthology. Many have been translated to English. The English version of 'Memoirs of a Status Quo' has recently been published in a Caltech/JPL anthology called 'Inner Space and Outer Thoughts' brought out by TechLit (https://techlit.clubs.caltech.edu/), a group at Caltech that meets monthly for writing and critiquing speculative stories and novels.
7. Summary
The Indic mythology space is vast and multi-dimensional and multi-faceted, with a large number of elements relating to astronomy. There have been very few forays in this space. Given that outlets, especially the online ones, are more receptive, there has been increasing activity of late. The online forums are often plagued by no remuneration and even a lack of critical feedback. Until print outlets mature even further, that may be the main recourse many will have. The society was less receptive of sci-fi until a decade or two back, but things are looking up now. Time for more astro-folks to jump in.

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