

Ancient Astronomy, Myths and Architecture in Indian Context

Mayank N Vahia

Tata Institute of Fundamental Research, Mumbai, India; vahia@tifr.res.in

Abstract

Human intellectual growth is marked by four different, if parallel developments. These include development of myths, megaliths, sciences particularly astronomy and religion. While these four paths have their own parallel and distinct history worthy of individual study, we discuss that they come together very elegantly in the form of temple architecture in India.

1. Introduction

At the core of all human development is the intellectual growth of the civilisation. Once one understands how its intellectual growth occurred, other developments can then be analysed as an offshoot of the original growth in ideas and thoughts. This development sets the pace of the growth of a civilisation over millennia after the original ideas arrive on the scene. Here we discuss the four parallel developments in human intellectual growth and then discuss how they merge to give unified concept of temples and temple architecture (Vahia et al. 2015).

2. Stages of growth

Humans arose in a hunter-gatherer environment and against the background of development in animal kingdom marked by specialised animals with exceptionally strong skills which human body could never hope to surpass. The only advantage the humans had over other animals was their *intellect* which gave them unsurpassed adaptability and versatility. A brain far superior in comprehending and manipulating the environment ensured that they would survive and flourish in all types of difficult environment (see e.g. Harari, 2011).

However, the additional intellect gave humans a vision which far exceeded their needs for survival and it was not long before humans had a large number of artificially made comforts such as controlled fire, covers made of animal skins, ability to find safe environment and group activities etc. that left them with enough leisure to look beyond the life. These developments in mental activity beyond the survival can be seen primarily in 4 different ways (Vahia et al, 2015). These are:

- 1) Development of myths.
- 2) Developments in astronomy and other sciences.
- 3) Developments in architecture particularly large stone architecture that goes under the name of megaliths
- 4) Development in formal religious ideas.

These were then followed up with developments in organisations of large human groups for maximised efficiency, for warfare to guard one's interest and other ideas that have led us to where we are today. We discuss the developments in each of these fields below.

2.1 Developments of myths

Myths are used by humans in a variety of ways (Armstrong, 2005). These include creation of legendary stories concerning some beings, heroes or events. They have

also been used for personification of natural forces. Myths are static and are in fact not a construct only of the past. We live amongst a lot of modern legends that are also mythical and imaginative, glorifying or condemning some people or events beyond what available evidence would suggest. Myths are therefore very dynamic. In turn, they provide a boost to a lot of other faculties such as development of imagination, growth in linguistics with addition of new ideas, phrases and words, and also provide group identity through local myths. They can also persist and be carried over long periods of time (Graça and Tehrani, 2015).

At a deeper level however, these myths do more. Myths are very complex entities designed to give a meaning to irrational experiences such as death by speculating on rebirth or higher existence. For example, in reaction to the mutilation of the dead in nature, they also give a sense of purpose why the dead should be tended. They also try to reduce the sense of loss of the dead by defining a higher plane to which the dead move on. In Hinduism as defined in the Vedic period, for example, the whole universe is a triangular relation between humans, ancestors and gods. Each of who much appease the other to get their comforts and this delicate balance is maintained through a complex collection of rituals that are fascinating in the manner in which they even interact in interplay amongst the humans.

At another level, they give a sense of purpose to life by defining heroes and the ideal behaviour which all virtuous people must follow. They define what the ideal quality of life is, and how one should try to achieve it.

By discussing the inter god relations, they permit us to see our own weaknesses and strength and provide a third party imagery that allow discussions of human frailties, virtues and vices without bringing in the humans implicitly addressed. By defining their character in detail, they also give promise of manipulating gods who control the cosmos.

They also permit us to create an ideal world in our imagination where the virtuous are not tested for being virtuous and where supreme, if unseen justice prevails. This ideal world far removed from the real-politic of daily grind provide a hope for the deprived of someday, someplace, receiving their honest dues.

However, one of the most fascinating aspects of human jump of imagination is the speculations about the universe beyond immediate existence and imagine their own relation to the cosmos. The ideas of universe being a creation of the creator and speculations on the powers and good of the great one arise in mythologies.

Myths also change, grow and evolve with time and are put to different uses by different purposes. Some myths also tend to be created for specific purpose either to smoothen out the wrinkles or inconsistencies created by earlier myths or conflict of myths and often to integrate new ideas into old stories to provide a consistency and continuity that humans are so fond of.

2.2 Development of astronomy and other sciences.

Astronomy is the earliest sciences in the sense that it has been a source of fascination from the earliest periods (Vahia et al; 2015). In addition, however, it is also exacting and predictable and in that sense of exactness about it. While the exact cause of this periodicity would not become clear for a lot of time, a lot of *ad hoc* formulations were suggested and evaluated from the earliest period. This includes the speculation of the

Sun riding on a chariot of horses and so on. However, the most important aspect of astronomy was probably the association of the sky with life giving forces such as rains and seasons. Since these arise from the sky, the idea that father sky seeds mother earth has been around from the earliest periods. Adding to that is the fact that the rains and the blessings of the heavens do not come at arbitrary times but come only when there is a specific conjunction of the location of sunrise, the stars in the night sky, and the conditions in the sky, make the time of this seeding very predictable and give rise to a whole host of observational techniques, record keeping and predictions. Several time units arise from astronomy. These are:

- Hours from Sun and Moon
- Days from Sun
- Week from Moon
- Fortnight from Moon
- Month from Sun and Moon
- Year from Sun
- Five year from synchronisation of solar and lunar years
- to nineteen year eclipse cycle
- Sixty years from Jupiter and Saturn
- Hundreds of years from the precession of the earth's rotational axis.

Astronomy also relates to other features of the effect of the skies on human life. These are in the relation to rains and other seasonal effects. The periodicity and stability of night sky and its stability is also very impressive. The interplay of the relation of Sun – Moon and their relative locations in relation to seasons and phases of the sun are also significant. Similarly, the wandering planets, comets and other transients only added to this fascination. The atmospheric phenomena which are often associated with heavens, together control life-giving forces. Hence, astronomy is life-giving and predictable. This realisation importance of the heavens gave rise to the attempts to try and understand the parameters that affect other sciences. Hence, science, at its core, also arise out of human desire to study the objective aspects of life.

On the other hand, farming and other sciences while remaining empirical give interesting insights into human existence. The relation between the cycle of botanical life forms and their relation to zoological life forms is also crucial to human evolutions. A lot of insights have been gained from predictions based on astronomy. In turn, the successes of these fields encouraged improved storage and transportation techniques and gave impetus to whole host of other technologies.

This interrelation between astronomy and life precipitated the standardisation of measurement techniques and other exacting sciences. In particular, from early times, there are myths about constellations and they are given names which project their ideas and images into the sky. Myths about planets generally refer to their colour, speed of movement, intrinsic brightness etc. Myths about stars refer to specific stories about individual *Rishis*, their wives, their children and of course, the gods.

Astronomy is utilitarian at several levels and has been enriched by several parallel growths such as needs for calendars for ritual purposes, for navigational purposes, for astrological purpose and of course as an object of great beauty and rhythm.

The best way to keep track of astronomy is to create pointers of high precision. In the earliest period, these were done with large stones and are called megalithic structures.

2.3 Megalithic structures

Megaliths are large stone structures organised in a specific manner (Brown, 1976). They seem to have originated in the need to protect the dead from the vagaries of environment and particularly mutilation from other animals. However, this original forms of megaliths that probably began with burial (or cremation) and marking and isolating the burial site from other habitations with stone circles and large stone monuments such as dolmans soon evolved.

Probably parallel to this, the stones structures used as markers also came into being and massive stone observatories were built. These stone structures must have been designed to mark out the sunrise and sunset locations over the period of one year. Their main purpose would have been to understand the relation between the sunrise location and the seasons. However, they would immediately acquire multiple roles. They would be predictors of seasons, a fascinating structure that would be an interesting place to meet as well as a caldendrical device (see e.g., Menon and Vahia, 2012). Together therefore it would be a place of prestige or a status symbol to the habitation. Equally importantly, the person who controlled this or understood this, controlled the fate of the town.

There are several examples of such structures the world over. The most interesting of these, the Stonehenge is in UK. Some recent work by Srikumar Menon at Byse suggests that at least some of the megalithic structures in India have astronomical connection (see e.g. Menon and Vahia, 2011). The site has several large stones several meters in size that, at first site, seem to be randomly arranged. However, a closer study of the stones shows that they have been carefully organised so that the shadows of one stone fall on another stone at summer and winter solstices. The stone structures are also vertical and if they are sepulchral, they only mark the location of burial if at all. The site has several cairns suggesting that the megalithic structures were not meant to mark burials. The most likely conclusion from this are that the site was used as an astronomical observatory to keep track of the movement of the sun over the period of one year.

However, megaliths also come in a variety of forms and stones carved in the shape of anthropomorphic figures and hero stones with stones carved with human and other forms are known. These are believed to be markers of the memory of a hero or an important person. Another variant commonly seen is a mix of a typical dolman structure with a hero stone as one of the walls. Such stones seen in south India are known as Virakkals or Vera Kallu. Many of these stones are worshipped.

An obvious extension of this representation is the large anthropomorphic structures that we call statues and the representation of gods and goddesses in statues are worshipped routinely. Some of these figures can be truly spectacular in size.

While the observatory of the kind seen at Byse does not have a strategic point from which observations need to be made, structures such as the Stonehenge have a specific point, usually in the geometrical centre from which the observations need to be made. This point therefore has its own strategic importance and as such mark a place

of reverence since a person of learning, sitting at that position would be a source of immense amount of predictive knowledge.

2.4 Developments in formal religious ideas.

Religion is defined as a set of beliefs concerning the cause, nature, and purpose of the universe, especially when considered as the creation of a superhuman agency or agencies, usually involving devotional and ritual observances, and often containing a moral code governing the conduct of human affairs.

Hence, it is natural that religious practices would encompass all aspects of human relation to the environment. These ideas begin with the first beliefs in natural forces, mother earth and father sky. They become more complex with time, involving natural forces, their abstractions and inclusion of moral values and other beliefs. In most places, these early religions have been replaced by later ones where specific manifestations of gods are identified and their works are considered the word of god and worshipped in all its complexities. However, in Hinduism, we have continuity from early beliefs to more modern manifestations, where all aspects of the evolution of religious thoughts can be seen and their interrelation explored.

From the early worship of Varun, Agni and the trinity of Bramha Vishnu and Mahesh imply polytheism while the ideas of advaita and monotheism also form a part of the discourse of Hinduism Hence a complete range of ideas and beliefs can be seen in important books.

One of the most outstanding features of modern Hinduism which was completely absent from the earlier phases is the worship in temples.

3.3 Amalgamation of ideas.

Temples come to Hinduism more or less with the revivalist movements after the arrival of Jainism and Buddhism (Allchin, 1995). Buddhist stupas in particular, are the worship of a sepulchral structure, originally marking the placement of the relics of Buddha but later transformed to holding symbolic remains.

Temples therefore are a merger of a large number of ideas (cf. <http://www.indian-heritage.org/temple/temple.htm>). They include worship and hence, by extension they would include other forms of worship of the hero stones. They are at their core, if not outright sepulchral, they are certainly worshipers of the revered. At the level of representation, they are worship of the all mighty who controls the cosmos and in that sense, these sites are a micro-cosmos that image the macro-cosmos. Since gods and sky are intimately related, it is natural that the temples would be oriented in specific direction to receive the rays of the sun on specific auspicious occasions. Many temples are in fact far more explicit in expressing this relation by representing lunar mansions on their pillars (Shylaja, 2007).

Temples certainly have a lot myths and philosophical or mythical ideas connected to it that provide it with authenticity or a sense of respectability. Temples therefore are the true mergers of mythology, astronomy, megaliths and religion. Yet temples and architecture have an interesting merger.

Temple architecture has two different styles, the Nagara Style and the Dravidian style. The former style consists of a temple whose main structure has a dome at the base of which the idol is placed. This is the most conspicuous part of the temple and it has one or more outer chambers where the devotees may sit, and in many cases, it also doubles up as a meeting place for community events. In contrast, the Dravida style temples are marked by conspicuous entrances which are exquisitely decorated. In contrast, the idol is placed in a less exquisite chamber.

The process of creating a temple is also similarly replete with astronomical context and the directions are defined with geological and astronomical references to north, cardinal directions as well as pre-calculated date on which the idol would be lighted up. In more elaborate temples, the pillars are also placed in a manner to keep track of the movement of the Sun over the year.

4. Conclusions

We suggest that human intellectual growth has 4 pillars, mythology, astronomy and other sciences, megaliths and religion. Amongst these, astronomy has played a profound role in human intellectual growth affecting mythology, season and calendrical astronomy, as well as megalithic architecture. However, temple architecture is a synthesis of a large number of ideas and human explorations in different fields and provides an excellent synthesis on evolution of human thoughts and skills (and economic strength) at the time of the construction of any temple.

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