Some Astronomical Aspects in Vedic Period

Dr. Brijesh Kumar Shukla
Reader in Sanskrit Department
Lucknow University
78-A, Badshah Bagh University Campus
(Gokaran Nath Road)
Lucknow-226007

There are several indications & Mantras in Rig-Ved, which expose the astronomical knowledge of Vedic people. They were very minute observers of the incidents. Followers of the Vedas had good knowledge about movement of the Sun, orbit of the Moon & its location, illuminated moving planets & celestial objects occurrence of eclipses etc. They had great intuition about the clarity of the celestial happenings.

In order to establish the concept of months, movement of the Moon has been chosen as the key index, which has resemblance with the English name Amant & Purnimat1. In Jyotish, it is general convention that name of the lunar month is adopted from the nakshatra, through which Moon passes at the time of Purnima (i.e. full-moon night or when the gap between Moon & Sun becomes 180 degrees). The English word Lunar Mansions is absolutely relevant to Nakshatra network. Anybody who is aware of the Vedic Literature can not agree with the thought that Indian astronomers have adopted the concept of Zodiac division from the Babylon. Maxmuller also agreed that Babylonian Zodiac sign division is a solar phenomenon and it has no concern with the divisions of Nakshatras & Lunar phenomenon. On the contrary, carvings on stones is Kilakshar script many other information also3.

It is important to note here that there is significant resemblance between 28 Hsius of Chinese astrology and our nakshatras. Similarly, Arabian’s 28 Mananzils have also equivalent resemblance with out 28 nakshatras, out of which 19 have very close similarity. Lunar Zodiac of Chinese astrology was observed in 2nd century B.C. and it was observed in Arabian astrology after a long period. While in Indian astrology, the details of 28 nakshatras were explained in Atharva-ved1. In every nakshatra, the Yog-Tara remains highly illuminated and can be seen in the vicinity of the Moon. The Yog-Tara affects the concerned person’s life, according to its own nature and the person may seek for suitable astrological remedies, to avoid its negative effects3.

Existence & prestige of the followers of the Vedic society was based on doing Deeds & Yajanas in suitable muhurt (time). Hence, the developed Panchang, which was based on Sun’s movement also, through various nakshatras. But, they did not describe the rising & setting of some stars, like Babyloneans & Egyptians. On the contrary, they were competent to assess the movements of the Sun & Moon, from astronomical point of view. Gradually, the concept of Extra Month of 30 days, 25 or 26 days’ duration was introduced to accommodate the Sun-Moon differences, in every five years’ period of 1826 days, instead of 5 X 360=1800 days.

One Lunar day (which is also known as Tithi) is very significant for Indian Astronomy. Each lunar month is divided in two fortnights-Shukla Paksha & Krishna Paksha and each Paksh consists of 15 days or Tithis. The actual lunar month is over from 30 days’ period and its duration remains only for 27-28 days. Probably, this adjustment might have been made to accommodate the Sun-Moon combination in definite nakshatra, i.e. due to appearance of Purnima in a definite nakshatra, after every 27-28 days. But, due to difference in the actual speed of the Moon & length of the lunar day, these Tithi concept becomes imaginary3.

Authenticity of Tithi calculations
At the time of Vedang-Jyotish, the tithi, month & seasons were established1, based on the calculations of the movement of the Sun, Moon & the Earth and even after the lapse of thousands years time, no difference has been observed in these calculations. On the country Arabic months use to change their position in calendar months. For example - festival of Moharrum or 1st sometimes falls in winter, sometimes in summer & sometimes in rainy season by rotation. In western calculations also, some adjustments are always needed. But our Panchangas are based on the definite calculations of the movement of Sun, moon & Earth. Entire zodiac circle is divided into 360 imaginary parts, in which all planets move in an angular motion. Gap of 12 degrees, between Sun & the moon is known as one tithi or one day of the earth. On Amavasya or No-moon night, Sun and moon remain at same degrees of the zodiac. Gap of every 12 degrees between Sun & moon corresponds to the tithi. Meaning thereby that it reamins Pratipada tithi, if gap between Sun & moon remains up 12 degrees. Similarly, this gap remains between 12 to 24 degrees on Dwitiya, 24 to 36 degrees on Tritiya etc. Consequently, this gap covers 360 degrees in 30 tithis and again sun & moon come on equal degrees in the zodiac circle. Path of moon’s motion sometimes remains nearer to earth & sometimes remains farther to the Earth, which causes unequal duration of tithis. When moon’s path remains closer to earth, it covers 12 degrees, gap faster, on the contrary it takes more time in covering 12 degrees, when it becomes farther from the Earth. Hence, we can calculate the tithi by simple observations of angular gap between Sun & Moon in the sky. But, for modern popular calendars, there exists no such simple method.

Calculations & Identification of Stars & Galaxies
The stars (Nakshatras) were identified in the sky for the first time, in the period of Atharva-Veda3. Calculations related with them were also made in the same time and area of Sun or Moon’s motion i.e. Zodiac, was divided into 28 equal parts, indicating the directions of the nakshatras (i.e. stars appearing fixed from the earth). There 28 nakshatras were named, according to their appearing shapes, as follows:-(1) Ashwini (2) Bharani (3) Kritika (4) Rohini (5) Mrigshira (6) Aandra (7) Punarvasu (8) Pushya (9) Aashesha (10) Magha (11) Purva Phalguni (12) Uttara Phalguni (13) Hasta (14) Chitra (15) Swati (16) Vishakha (17) Anuradha (18) Jyeshtha (19) Mool (20) Purva Aashad (21) Uttara Aashad (22) Abhijit (23) Shrawan (24) Dhanishtha (25) Shatbhisha (26) Purva Bhadrapad (27) Uttara
Bhadrapada (28) Revti.
Besides Atharva-Veda, Maitrayani Samhita also gives 28 nakshatra while, Taittiriya Samhita and Taittiriya Brahmin consider only 27 nakshatras. Abhijit nakshatra has been exclude by them, probably due to it’s small size & simplicity of calculations.

Moon takes 27 days 8 hours 21 minutes to complete its movement through all these 27 nakshatras, ie to complete it’s one round about the Earth. Hence the moon travels in one nakshatra for roughly one day.

Vedic Astronomy has another very significant aspect, i.e. the Zodice Circle, which is related with the Antarkixha (Gagan-one of the Panch-Tattva). According to Shatpath Brahmin, one year of Prajapati (Lord Brahma) includes 10800 Kchhan (moments). This number is obtained from the concept the each month contains 30 Mthcheneron & every mycheneron consists of 30 Kchhan, (ie. One year = 12 X 30 X 30 = 10800 Kchhan). In Rig-Ved, all the 40 letters of alphabets are precisely divided into 10,800 parts, which gives the number 40 X 10,800 = 432,000. Later, this number formed an important period in Astrology, which is known as the length of Kaliyug (other three yugs - Dwapar, Treta & Satyug are multiples of this number). Total period of all the four yugs is called Mahayug and it is equivalent to the 12,000 Divya Years (1 Divya year = 360 solar years). Hence, one Mahayug corresponds to 12,000 X 360 = 4320,000 solar years. It is important to note that 5th century A.D. Heraclitus had defined the period of 10,800 years as Great Year. Similarly, Babylon’s astrologer Berossose also explained 4320,000 years’ time cycle. But, they explained these numbers much after writing the Indian Vedic book Shatpath Brahmin, though Greek & Babylonian astronomers did not accept this fact and disagreed with the Indian astronomers on this topic.

Apprehension about the Sun
In the time of Atraiya Brahmin, the Indian established the opinion that the Sun is one and it never sets down. It gives light only to that part of the Earth, which faces it and the other parts of the Earth which do not face the Sun, remain dark. Part of the Earth which receives sunlight is said to has day, while the dark part is said to has night. Due to the spinning of the Earth, one part of the Earth which has day at any moment, will go to the dark side later on and the dark part will come in light side. Hence, at every part of the Earth day & night occur alternately and this process continues.

In those days, various theories / concepts were existing in different countries. Although many western intellectuals treat Greece, as the origin of the evolution of knowledge & science, yet the Greeks believed till 600 B.C. that everyday a new Sun is born in the morning and it is dies in the evening.

Speed of light
Speed of light is very fast, hence the light travels very large distances in very short time. The modern scientists have established this fact, after making a lot of researches and finally calculated the speed of light as three lakh K.M. per second. But, out Vedas had already provided this information long back. In Rig-Ved it is told that sunrays expand very fast, in the entire world and Sayanacharya written in his commentary that sunrays or light travels the distance of 2202 yojanas in half Nimesh.

Sir Monier Williams assumed 1 yojan=9 miles and according to Govt. of India 1 yojan=9.0625 miles. Hence, speed of light should be 1,86,413.22 miles per second, while it’s latest standard value is 1,86,200 miles per second, which is very close to the value which was calculated by Sayanacharya in 15th century A.D.

Weber, the learned western professor of Indian literature, had the opinion that Indian were having significant knowledge of astrology and astronomy at least since 2780 B.C. Casino, Belly, Jendle & Plakdee were of the opinion that Indian astronomers had made celestial observations at least 3000 B.C.

Belly had confirmed the age of Indian astronomy by quoting following supporting event. In 1687, in the time of Louis 14th, large number ancient astrological & solar eclipse tables were collected from various part of India and were sent to Europe for their study. Although calculations of the tables were about 4383 years old, yet they did not differ from the calculations made by Belly. Consequently, it can be confidently said that Indian astrology had been developed thousands years ago.

It is also evident from the Rig-Ved that people of that time had good knowledge of 720 Ahoratris.

Modern higher sciences also confirm the concept “Time & movement are calculated with the help of each other and they are mutually dependant on each other”. It is mentioned in the Rig-Ved Jyotish that Ved is essential for Yoga and Yajna should be done at appropriate time. Hence, anybody can understand Vedas, only if he knows Vedas. This scientific principle was known even in Vedic period.

M.M. Shri Madhusudan Ojha, internationally recognized learned personality, had the opinion that any person who did not possesses the knowledge of astronomy is not eligible for learning of Vedas. This Shasthira is witness of the past, present & future on the earth, inside the earth & beyond earth.

This science is very practical. It’s principles can be easily verified with the practical observations. The Moon can never be seen in a declared Amavasya of the Panchang. Similarly, it is never invisible in a declared Full-Moon night of the Panchang. It is also never observed that a solar eclipse took place in a full moon night or on any other day than Amavasya. Hence, it’s authenticity does not require any proof. So, I can say that the Astronomical aspects had been seen more practically in period of Vedas.