

STUDY OF ASTRONOMY IN THE VEDIC AGE - A BRIEF EXPOSITION

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[The word '**astronomy**', that comes from the original Greek word '**astronomia**' formed in the combination of '**astron**' (star or constellation) and '**nomos**' (arranging) literally means pertaining to stars and celestial bodies; simply 'star arrangement'. Astronomy is that branch of science which deals with celestial objects, space and the physical universe as a whole. It is a scientific study of the universe and the objects in it, including stars, planets, nebulae and galaxies. It describes the nature, position and motion of the stars, planets and other objects in the skies and their relation to the Earth. Simply to say, Astronomy is the study of stars, planets and space.

The present paper is a humble endeavour to analyse critically some of the astronomical descriptions found in the Vedic texts, which can be held to be one positive attempt for a clear depiction of Vedic people's thought on Astronomy in that era.]

Vedas are the oldest literary monuments in this world preserving the glorious and variegated cultural heritage of Indian people. One indisputable fact is that Vedic literature is not merely the storehouse of Indian religion, philosophy and ethics; but also a scientific literature dealing with almost all branches of science such as cosmology, astronomy, mathematics, physics, chemistry, medicine, architecture, sculpture, metallurgy and so on. Through this paper a modest effort is intended to be done with a view to expose critically some of the astronomical descriptions found in the Vedic texts, which can be held to be one positive attempt that will depict clearly the scenery of Vedic people's thought on astronomy.

Astronomy is that part of science which deals with stars and planets. It is the scientific study of the subjects like creation of the planets, their shapes, their rotations and revolutions, concept of time, calculation of seasons, years etc. and so on. The science of

astronomy now is in a high position. Not only about the earth or the sun, people have reached now in accurate decisions about the whole space through minutest researches. All the wrong concepts those the people of early ages sustained about this creation, modern scientists have refuted and proved to be baseless them. Here question may arise that at the time of the Vedas was there prevalent the study of astronomy? Were the people of Vedic period conscious to the astronomical theories? Or, had they also sustained wrong ideas about this universe? The following discussion will expose the answers regarding this mater.

In the minds of some people there seems to have occurred a common view that Vedic people were not conscious about the theories of science. Sustenance of such like views is not unusual as, the study of Vedic literature has not gained still an extensive form in sufficient area; it is confined in a limited number of people. The study of Vedic literature makes the fact clear that Vedic people were very much aware about different scientific theories and that a mature, skilful application of science had been in use in that era. Descriptions regarding the sun, the moon, diurnal motion of the earth, its movement round the sun, the seasons, ebb and tide etc. are found to be observed clearly in the Vedic Saṁhitās. One may refer to one R̥gvedic *mantra* where it is stated that the light seen in the moon is not its own, it is the reflection of the sun.¹ That means, the fact that the moon does not have its own light, it becomes bright being reflected at the light of the sun only, was not an ignorant matter for the Vedic people.

In one hymn of the *R̥gveda Saṁhitās*, the first written text in this world, there is the clear quotation about the difference between solar-year and the lunar. One R̥gvedic verse bearing reference about that distinction runs thus :

*vedā māso dhṛtaurato doādaśa prajāvataḥ/
vedā ya upajāyate//²*

That means, 'who knows the twelve months and the thirteenth one additionally originated.' It is to be mentioned here that one solar-year completes in $365\frac{1}{4}$ days and one lunar-year in 356 days. Thus 10 days increase every year with regard to the sun in comparison of the moon. So after every three years one lunar-year stands with 30 days extra; i.e. all total 13 months arise instead of 12.

This extra month is termed in Indian astronomy as *malamāsa* or *malimluca* which is generally known to all.

In the year 1514 Nicolaus Copernicus, the great scientist of Poland discovered the theory that the earth is not a steady planet; it moves round the sun doing rotation in its own axis. But a minute observation of the Vedic texts makes the fact clear that thousands years before the time of Copernicus people discovered that planets like earth are not steady, those are moving objects. As for example, the following *mantra* of the *Śukla Yajurveda Samhitā* can be cited here where it is stated that the earth circumambulates the sun by rotating movement :

*ayam̐ gouḥ pṛśnirakramīdasadan mātara purah̐*³

Another *mantra* of the *Ṛgveda Samhitā* speaks thus :

*śam̐ no dhātā śamu dhartā no astu
śam̐ na urucī bhavatu svadhābhiḥ*⁴

That means 'may Dhātā be peaceful for us, may Varuṇa be peaceful, may the earth with its rotation be peaceful to us.' Apart from these, so many mantras there are in the Vedic Samhitās wherein references regarding the movements of planets are found to be stated, such as *ṚV*, III. 3.9; *ṚV*, V.32.9; *ṚV*, V.84.1 etc. Thus it is observed that the theories of the rotation and revolution of the planets definitely was known to the Vedic society which denotes the probability of the vast study on this chapter in that era.

Concept of the gravitational force of the earth and of the great cosmic attraction cannot be marked to be the modern theories. The fact that these theories were uncovered once during the time of the Vedas becomes clear through the study of the Vedic texts. In the *Ṛgveda Samhitā* it is stated that in the region 'Sūryaloka' (the region of the sun) the sun through its attractive force holds all the planets in a balancing mode. The concerned *mantra* is :

*te hi dyāvāpṛthivī viśvaśambhuva
ṛtāvārī rajaso dhārayatkavī/
sujanmanī dhiṣaṇe antariyate
devo-devī dharmanā sūryaḥ śuciḥ*⁵

It is worth mentionable that in the year 1922 solar scientist Hebel discovered the theory that this creation is going to be expanded slowly; whereas the very aspect already was seen to be

exposed during the time of the *Rgveda* that the expansion of this universe becomes to be apprehended :

*anvasya sthūraṁ dadṛṣe purastādanastha ūruravarambamāṇah//*⁶

These conclusions decisions regarding different aspects of the planets prove themselves the fact that a skilful study was practiced in the Vedic period on astronomy.

One of the great achievements of modern science is the application of solar energy. In different hymns of the Vedic *Samhitās* remarkable descriptions about the concept of solar energy is found to be observed. In one *mantra* of the *Rgveda Samhitā*⁷ there is the statement of solar energy which very citation can definitely be termed to be the genitor of power conservation theory. Energy never spoils, it changes into different forms only. In Vedas the sun is described identifying as an inexhaustible stream of power. In the rays of sun, along with light there is the energy of vitality. That means the Vedic texts are seen to have spoken about the indication of mystic power retained in the sun. Thus, it is to be stated that the idea of the solar energy upon which modern scientists have done the establishment of power-production centres was definitely familiar to the people at the time of the Vedas. There is no doubt that the idea of the 'power tower concept of solar energy' was introduced during the time of the *Rgveda* itself.

In the Vedic literature, regarding the names of seasons, reasons of their alterations etc., descriptive and scientific discussion is found to be observed. In the Vedic texts there is stated already that the circle of the seasons alters because of the revolution of the earth. Names of the six seasons are mentioned in the *Rgveda Samhitā*, viz., *Madhu*, *Mādhava*, *Śukra*, *Śuci*, *Nabha* and *Nabhasya*.⁸ According to the verse *RV*, I.95.3 the reason of these six seasons is the revolution of earth to the sun. Again in the *Atharvaveda Samhitā* there is the clear mention of six seasons thus :

*griṣmaste bhūme varṣāṇi saraddhemantaḥ śiśiro vasantaḥ*⁹

Likewise in another *mantra* of the *Rgveda Samhitā* it is said that one year contains 12 months (*dvādaśa pradhayaścakramekaṁ*) and 360 days (*triṁśatā saṣṭiḥ*)¹⁰. The study of Vedic texts makes the aspect clear that people of that time had attained detailed concept about the summer solstice, winter solstice and transition etc. The

following *mantra* of the *Rgveda Samhitā* gives reference in this regard :

*upa prāgācchasanan vāyyarvā devadrīcā manasā didhyānaḥ/
punah ajaḥ puro nīyate nābhīrasyaṅnu paścāt kavayo
yantirebhāḥ//*¹¹

With respect to the context it may be stated here that in the *Aitareya Brāhmaṇa*¹² of the *Rgveda Samhitā*, in the *Chāndogya Brāhmaṇa*¹³ of *Sāmaveda Samhitā* and in the *Gopatha Brāhmaṇa*¹⁴ of *Atharvaveda Samhitā* there is the statement that “the sun never sets, it is ever-lustrous, ever-shining. When we look that the sun goes down and night comes, then the sun appears on the other side of the earth; it never declines.”

From the above discussion it can be stated, without any hesitation that a flourishing study on astronomy had been in use during the time of the Vedas. The concepts those the Vedic people sustained about this creation are found the similar today to those which the modern scientists have discovered. Most of the theories which the scientists have discovered now, the Vedic people uncovered at that time – which seems to be impossible without minute studies. Of the vast granary of astronomical knowledge nurtured in the minds of the Vedic people these are mere examples only. Innumerable explanations of astronomical theories have been included in the Vedic texts which will furnish lots of informative equipments towards the field of astronomy of the present society– for that, there should be commenced the proper study and tentative application of Vedic texts.

Selected Abbreviations :

AB	:	<i>Aitareya Brāhmaṇa</i>
AV	:	<i>Atharvaveda</i>
ChB	:	<i>Chāndogya Brāhmaṇa</i>
GB	:	<i>Gopatha Brāhmaṇa</i>
ṚV	:	<i>Rgveda</i>
ŚYV	:	<i>Śukla Yajurveda</i>
VP	:	<i>Vedar Parichay</i>

Notes and References :

- ¹ cf., *atrāha goramanvata nāma tvasturapīcyam/ itthā candramaso grhe// -ṚV, I. 84.15*
- ² *ibid, I. 25.3*
- ³ *ŚYV, III. 6*
- ⁴ *op. cit, VII. 35.3*
- ⁵ *ibid, I.160.1*
- ⁶ *ibid, VIII.1.34*
- ⁷ cf., *abhūrvoukṣirvyu āyurānad darṣannu pūroo aparo nu darṣat/ ibid, X.27.7*
- ⁸ *VP, p. 218*
- ⁹ *AV, XII.1.36*
- ¹⁰ cf., *dvādaśa pradhayaścakramekaṁ triṇi nabhyāṇi ka u tacciketa/ tasmīnsākaṁ trīṁsatā na saṁkavorpitā śāsthīrṇa calācalāsah// - ṚV, I.164.48*
- ¹¹ *ibid, I.164.12*
- ¹² *AB, 3.14*
- ¹³ *ChB, 5.31.1.*
- ¹⁴ *GB, 2.4.10*