

CHAPTER – 13

SYSTEM OF ASTRONOMICAL CONCEPTS OF ANCIENT TAMILS

Dr. P. DURAISAMY

Assistant Professor,

Dept. of Physics, Thiruvalluvar Govt. Arts College

Rasipuram - 637401

ABSTRACT

In ancient days, man has observed the regular motion of the planets, sun, moon and stars. The positions and physical descriptions of the planets and star groups were identified within the Tamil literature. Among them some descriptions have astronomical significances. A system of 27 asterisms (naalmeen) and 12 constellations (oorai or Rasi) plays an important role in Indian astronomy, These names were embedded in ancient Tamil literature. This system of astronomical concepts was the basic for all other countries in ancient period.

Keywords: Asterisms(Naalmeen),constellation(Oorai),Planet, (Kolmeen), Eclipse(kolnerthal), Meteors(urkai), Meteorites, Nodal points (Rahu, Kethu).

PLANETS

Ancient Sangam classical called, “Sirubaanattruppadaai” which reveals the astounding astronomical knowledge of the heliocentric theory. This same theory is propounded by the modern astronomer, Copernicus during the seventeenth century. The Sirubanattruppadaai describes as,

“Vaanira visumbin kolmeen suulintha

Ilankathir Naairu ellum thotrathu” (Sirubanattruppadaai 242–243).

Here the ‘kolmeen’ and ‘naairu’ represent the planets and the Sun respectively.

The Moon’s path was divided into 27 equal parts because it takes about 27 1/3 days in traversing it. These parts as well as the stars lying in their neighbourhood were called ‘Vinmeen’.

These are mentioned in the Paripaadal (10:1015). This poem represents the complete picture of the Zodiac and constellation system in a particular time.

SATURN AND ITS RINGS

Saturn is unique in the fact, that, it possesses a well developed set of rings and they make it one of the most impressive celestial objects, viewed with the telescope. These rings were discovered by Galileo in 1610. It revolves round the Sun in about 29 years.

The planet Saturn's nature was mentioned in the literature as,

“Maimeen pukaienum Thuumam Thontrinum

Thenthisai marunkin velli ootinum” (Puranaanuuru 117:1-2)

“Kariyavan pukaienum pukaikoti thontrinum

Virikadir velli thenpulam padarinum” (Silappathikaaram 10:102)

According to Tamil sangam literature, the planet Saturn was originally called Maimeen, Kariyavan, Manthan and Mudavan, but later the name Saturn was given to it. Here the words ‘Manthan’ and ‘Mudavan’ reveals that the Saturn's longest period of revolution 29 years. ‘Maimeen pukaienum’ signifies a particular position of the Saturn rings which appears once in 14years. Now the modern astronomers have predicted the appearance of ringless Saturn viewed once in 14 years.

VENUS

It is the evening and morning star and is the brightest planet. It outshines all other celestial bodies except the Sun and the Moon. Venus is similar to the earth in size. Its maximum angular separation from the Sun is 40 and it shows changing phase like the moon.

As said Pattinappaalai lines also refer to the general aspects of Venus and its position as,

“Vasaiel Pugazh Vayanku Venmeen

Thesaithirinthu Therkkku Ekinum” (Patinappaalai 1-2)

The word monsoon is used to connote a seasonal wind which flows with consistency and regularity for one part of the year and blows from the other direction for the other part of the year. There are several physical factors that are believed to influence earth's climate and monsoon. The variation in the inclination of the earth's axis relative to the

place of Venus orbit. Based on the position of the Venus in its orbit, the ancient Tamils had predicted the monsoon rainfall. The Puranaanuuru represents the same concept,

“Alankukathir Kanali Naalvair Thontrinum
Elankukathir Velli Thenpulam Patarinum” (Puranaanuuru, 35:6-7)

ECLIPSE

Observation of the eclipse is recorded in several places in Tamil literature. Ancient Tamil astronomers added Rahu and Kethu, to formulate their Rahu-Kethu theories of eclipse.

Ascending node – Rahu

Descending node - Kethu

A lunar eclipse occurs both the earth's shadow and the moon in its orbit will be near the same node. The point of intersection between the ecliptic and the moon's orbit called nodal point.

“Thinkal Kool Neernthanku” (Perumpaanaatrupidai 384)

“Mathiseer Aravin Maana Thoontrum” (Sirupaanaatrupidai 185)

The interesting feature of the above passage is the detailed observation of the changes occurs in the moon during the progress of the Lunar eclipse. The Thirukkural says as,

“Kandathu Manum Orunaal Alarmanum

Thinkalai Paambu Kondatru” (Kural. 1148)

All to whom the full moon is visible, will see lunar eclipse. But the solar eclipse is not as such. The people who lived in a particular region of the earth only could see it.

METEORS AND METEORITES

Meteors are stony and metallic particles revolving around the Sun, which will be visible only when they plunge into the earth's atmosphere.

Meteorites are masses of stony or metallic material, or both, which could reached over earth through the atmospheric air.

The same fact are referred by Puranaanuru and Suudamani .

Nikandu as,

“Thisai eru naankum urkai urkavum” (Puranaanuru 41:4)

“Vin veelum kolli Urkai entru aakume” (Suudamani Nikandu 51:3)

Here the word “Urkai” represents the meteor.

Puranaanuru mentioned as,

“Kanaiyeri Parappa Kaaletirpu Ponki

Oru Meen Vilunthatraal Visumpinaane” (Puranaanuru 229)

Here ‘Oru Meen Vilunthatraal’ represents the meteorites. This poem also expressed the position of the planets and stars situated in the sky and the specific times during which the meteorite fall down to the earth.

ASTERISMS AND CONSTELLATION

A system of 27 asterisms (Naalmeen) and 12 constellation (Oorai or Rasi) plays an important role in Indian astronomy. The origin of this asterism and constellation system is very old. This system was the basic for all other countries in ancient period . The names and the proper positional calculations of these stars and constellations embedded in ancient Tamil literature.

The ‘Karthikai’ are described as consisting of six Stars, so which was called as ‘Arumeen’ in Tamil literature and which have been identified with Pleiades. In fact this Asterism have many stars but only six stars are visible.

In tamil sangam literature,

“Arumeen payantha aram ceyithin gal” (Akurinanuuru. 202:9) “Arumeen keleeya aram ceyithin gal” (Natrinal. 202).

Paripaadal 11:3 described “Moondronpathu Erukkaiyal”. This means that the total number of asterisms are (3 x 9= 27) twenty seven. The particular poem of Paripaadal (11) and Puranaanuru (229) describes the total system of asterisms and constellations.

The Names of the 27 Asterisms.

Tamil Name	Sanskrit Name	Astronomical Name
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1. Puravi	Ashvini	♈- Arietis
2. Aduppu	Parani	41-Arielis
3. Arumeen	Karthikai	Pleaides
4. Sakadu	Rokini	Aldebaran
5. Maanthalai	Mirukasiridam	♈-Orionis
6. Moothirai	Thiruvaathirai	♈ - Orionis
7. Kalai	Punarpoosam	Pollux
8. Kaarkulam	Poosam	Castor
9. Katsevi	Aayilam	♋- Cancer
10. Kodun	Makam	Regulus
11. Kanai	Puuram	♋-Leonis
12. Utthiram	Utthiram	Denebola
13. Iviral	Astham	♋ - Corvi
14. Aruvai	Chithirai	Spica
15. Vilakku	Jothi	Arcturus
16. Muram	Visaakam	♋ - Libra
17. Mudappanai	Anudam	♋ - Scorpio
18. Thulankoli	Keetai	♋ - Scorpio
19. Kuruku	Muulam	♋- Scorprii
20. Udaikkulam	Pooradam	♋ - Sagittarii
21. Kadaikkulam	Uthiradam	♋ - Sagittarii
22. Mukkool	Thiruvoonam	Altair
23. Kaakkai	Avittam	♋ - Delphini
24. Sekku	Sathayam	♋- Aquarii
25. Naali	Poorattathi	♋ - Pegasi
26. Murasu	Uthirattathi	y-Pegasi
27. Thooni	Revathi	♋- Piscium

Tamil literature gives the names of the twelve constellations.

“Thinilai Maruppin Aduthalaiyaaka

Vinuurbu Thiritharu Veenkuselal Mantelathu” (Nedunalvadai 160-161).

Tamil name	Sanskrit name	Astronomical name
1. Meelam	Meesam	Aries
2. Aeeru	risipam	Taurus
3. Erattai	Mithunam	Gemini
4. Kadakam	Kadaka	Cancer
5. Madankal	Simmam	Leo
6. Kanni	Kanni	Virgo
7. Thulai	Thulaa	Libra
8. Nali	Viruchakam	Scorpius
9. Silai	Thanusu	Sagittarius
10. Suravam	Makara	Capricorn
11. Kumbam	Kumba	Aquarius
12. Meenam	Meena	Pisces

Ancient Tamil Grammar Tholkaapiam quoted as,

“Maraintha Olukkathu Ooraium Naalum” (Tholkaapiam, Porul. 133) The word “Oorai” - represents the constellation.

The concept of Oorai are existing in all the languages of the world.

In ancient Tamil,

1 Oorai = 21 ½ Naaligai, 1 Day = 60 Naaligai.

In metric system,

1 hour = 2 1/2 Naaligai

1 Day = 24 hours=24x24=60 Naaligai

We conclude that one “hour” is equal to one “Oorai”.

Poem (11) of Paripaadal describes a particular day in which the spantaneous rainfall and the river Vaigai was flowing in full spate.

Virikathir mathiyamodu viyal visumbu punarppa,

Eri, Sadai, Elil Veelam Thalaiyenakkeel Erunthu,

Theru Edai Padutha Moondru onepathitru Erukkaiyul
 Uru kelu Velli vanthu Yetriyal ceera
 Varudaiai Patimakan Vaaipa Porul Theri
 Punthi Mitunam poruntha, Pularviyal
 Anki uyar nirpa, Anthanan Pankuvin
 Illathathunaikku Uppaal eaitha, Eraiyaman
 Villin Kadaimakaram meeve Paambu Ollai
 Mathiyam Maraiya, Varunaalil Vaaintha
 Pothiyil Munivan Puraivarai keeri
 Mithunam adaya, Virikathir Veenil
 Eathir varuvu maari eiyaika ena evaatraal
 Purai kelu saiyum poli malaithala
 Neru tharum vaiyai punal”

The poem describes three veethees (paths) in the sky.

They are Rispa veethi (Comprising the constellations Virgio, Libra, Pisces, Aries), Mithuna Veethi (Scorpio, Sagittarius, Capricorn, Aquarius) and Mesha Veethi (Taurus, Gemini, Cancer, Leo).

It mentions the moon remain in each of these three paths for nine days. In which it spends 2.25 days in very close to the sidereal period of the moon.

‘Urukulu Velli Yetrial seera ‘ Here ‘ Yeru’ denoted Taurus. The Planet venus Moves in the constellation Taurus.

“Varudaiai Padimagan vaipa” here Varudai represents Aries and “Padimagan’ represents Mars. Which means that the planet Mars in the constellation Aries.

“Anthanan Pankuvin Illathunaiku uppal eitha” means that the planet Jupiter in the Pisces.

“Punthi Mithunam poruntha” denotes the planet Mercury in Gemini. “Iraiyaman Villin Kaimakaram Meeve” - Saturu in Capricorn.

“Pothiyil Munivan” represents the star Agathian (a - Carinae, Brightest Star in Argo Navis). ‘Paambu Ollai Mathiam Maraiya’ represents at that time, there was a Lunar eclipse.

Some asterisms and constellations other than 27 and 12 were also known to his Existing knowledge Agathian star (a - Carinae) is one of the brightest star in the Argo Navis. This Star arise near the solar ecliptic will indicate the starting of autumn season. Natrini says as,

“Maiara vilankiya maanira visumbil

Kaitholu marabin Elumeen poola” (Natrinal. 231:1–2)

The word “ Elumeen” (represents the “Ursa” (Major’ in the north sky. “Yeel Urai Munivar” ((Paripaadal 5:37) is also denotes the star cluster Ursa major. Arunthathi (alcor) have been mentioned in various Tamil literature.

“Vadameen Vilanku Aalurai Elu Makaliru” (Paripaadal. 43)

“Arunthathi anaiya karpin” (Inkurunuuru 442:4)

“Vadameen pol tholuthu” (Kalithokai 2:21)

“Vadameen puraiyum karpin” (Puranaanuuru 122:8)

Tamil literature mentions alcor (star in the North sky) as Vadameen or Saali.

CONCLUSION

The Tamil astronomy and heritage are among the most ancient in the world. Ancient Tamil astronomers (Arivans and Kanians) were having varied talents in the field of positional astronomy.

Several comparisons of astronomical objects can be found in ancient Tamil literature. The Tamil poets used mainly for the aesthetic beauty of the songs. However, their celestial observations are remarkable and accurate.

The astronomical parameters and rules stated by Tamil astronomers are sufficient to solve all problems of positional astronomy. Though the ancient Tamil astronomers did not possess the telescope, but they have made their continuous observations with the naked eye only.

The Heliocentric theory is mentioned in Sirubanattrupadai. The ancient Tamil astronomers had predicted the appearance of the ringless Saturn, which commence once in 14 years. They had also predicted the monsoon rainfall of Tamil Nadu by measuring the position of the Venus. They added nodal Points to predict the proper occurrence of eclipse. They also observed that the moon’s motion relative to the star groups. They properly named the various star groups.

The fundamental concepts of planetary positions were identified in ancient Tamil literature. A few astronomical concepts expressed by the ancient Tamil literature have very close resemblance with the modern astronomy.