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ASTRONOMICAL DETAILS AS GLEANED FROM EPIGRAPHS

WITH A SPECIAL REFERENCE TO TAMIL NADU

M.Bavani,

Assistant Professor,
Department of Epigraphy and Archaeology,
Tamil University,
Thanjavur - 613 010.

Abstract

Even in the absence of scientific development, our forefathers scientifically accurately predicted astronomy. This article explores the field of astronomical knowledge and the calendar system which prevailed in the ancient period through the inscriptions.

IndexTerms Calendar, Astronomy, Epigraphy, Tamil Calendar, Jupiter circle, Almanac, Panchangam, Lunar system, Solar system.

Introduction

The calendar that was used in Epigraphy at the turn of the 6 century of the Christian era was a simple one throughout India. There were four eras in use then namely, the **Krita-Malava-Vikrama era of 58 B.C.E**; the **Saka era of C.E.78**, the **Kalachuri era C.E 248-49**; the **Gupta era of C.E 319**. To reckon the astronomical details the Panchanga elements were followed in Indian tradition. Panchanga means five parts of timings that are vaaram(Weak, solar days), Nakshatra (star), Tithi (lunar days), Yogas (confluence of the Sun and moon - half of tithi (12hours), and Karnas half of Yogas (6 hours) Among them only the tithi had come into use. The first occurrence of vaara is found in Eran inscription of Budhagupta of Gupta year 165 (C.E, 484) where the day of Suraguru, i.e. Thus day is mentioned. (D.C. Sircar, 1965, p.345) However, it was not used in inscriptions for another century and a half. In most cases, the year [either that of the reign of the ruling king or that one of the four eras] and the lunar month, paksha, and tithi were cited. An effort has been taken to study the astronomical details and scientific calculation of time by our predecessors found in inscriptions, Particular Tamil inscriptions.

The Almanac Details in Inscriptions

Now we are following the Gregorian calendar. it was introduced only in 1582 (https://en.wikipedia.org/wiki/Gregorian_calendar#cite). But India has a good tradition in Astronomical Science and horoscope. The years commonly followed by all of us at present are not mentioned in the inscriptions. Mention the almanac features. In Sanskrit, it is called Panchangam. Pancha = five, elements = features, reckoning the time with the five elements of titi (days mentioned in the lunar system as titi that means day), nakshatram (Star) Week, Karna, and Yoga. Apart from this, there are a few other notes. The moon is growing for 14 days and waning for 14 days. the growing period is called Sukla paksha or puurva paksha valar pirai in Tamil. The waning period is called krishna paksham or aparapaksham teey pirai in Tamil. 60 Years have been followed in Tamil Culture. They are 1.Prabhava, 2. Vibhava 3. Sukla 4. Pramodoota. 5. Prachorpaththi 6. Aangirasa 7. Srimukha 8.Bhava 9. Yuva 10.Dhaatu 11.Eesvara 12.Vehudhanya 13.Pramathi 14.Vikrama 15.Vishu 16.Chitrabaanu 17.Subhaanu 18.Dhaarana 19.Parthiba 20.Viya 21.Sarvajith 22.Sarvadhaari 23.Virodhi 24.Vikruthi 25.Kara 26.Nandhana 27Vijaya 28 Jaya 29 Manmatha 30Dhunmuki 31.Hevilambi 32 Vilambi 33 Vikari 34.Sarvari 35.Plava 36 Subakrith 37 Sobakrith 38 Krodhi 39.Visuvaasuva 40.Parabhaava 41.Plavanga 42.Keelaka 43.Saumya 44.Sadharana 45.Virodhikrithu 46.Paridhaabi 47.Pramaadheesa 48.Aanandha 49.Rakshasa 50.Nala 51.Pingala 52.Kalayukthi 53.Siddharthi 54.Raudhri 55.Dunmathi 56.Dhundubhi 57.Rudhrodhgaari 58.Raktaakshi 59.Krodhana 60.Akshaya. Though it is called Tamil years these names are derived from Sanskrit.

Reckoning of time in Lunar and Solar system

Times are predicted by focusing on the sun and moon on meteorologically orbiting planets. Time is predicted by focusing on the sun in some places and the moon in others. The month is calculated by the time it takes for the sun to cross a zodiac sign. The solar month is followed in parts of Tamil Nadu, Bengal, Punjab and Kerala. The moon is the day to cross a zodiac sign According to the " lunar month " Is calculated to be 30 days. Tidhis are calculated for the lunar month itself.

Reckoning by the orbit of the Moon

The lunar month is calculated based on the 30 days that the moon takes to cross a zodiac sign. Tithis are important in predicting lunar eclipses. The lunar month is divided into 2 periods, divided into 15 days for each period and calculated at the end of each 15 days as the full moon, respectively. Every 15 days is calculated on the basis of waning and waxing for 15 days. The waxing period after the new moon Also known as " Sukkilapaksham ", the tea ceremony that follows the full moon " Krishna Patsam ", " Aparapaksham ", " Pahula paksham " is called in many ways. In Tamil, ' Naal ' means ' Tithi ' in Sanskrit. That is, it can be referred to as a possible or beneficial day.

In northern India the lunar month is called Purnimanta. The month is calculated from the full moon with the first full moon in North India. At the same time, the lunar-based month south of the Narmada River is called Amanta. Lunar months 12. They are Siddhi Rai , Vaikasi , Ani , Audi , Avani , Purattasi , Ippasi , Karthika , Markazhi , Thai , Masi , Panguni . For 12 months, 354 days is calculated as the formal 360 days must come.

Reckoning by the orbit of the Sun

The period of time during which the Sun travels across a zodiac sign is called the solar months. It is widely used in West Bengal, Punjab, and adjoining states. This month's accounting system is common in Kerala and Tamil Nadu in South India. The month is calculated based on the zodiac sign of the Sun.

zodiac is divided into 12 houses. They are 1. Aries 2. Taurus 3. Gemini 4. Cancer 5. Leo 6. Virgo 7. Libra 8. Scorpio 9. Sagittarius 10. Capricorn 11. Aquarius 12. Pisces. It takes 12 months for the sun to move from Aries to Pisces. It is calculated as 365 days. This estimate is calculated for each sample in each region. In Tamil Nadu, Chithirai is the beginning of the solar year and Vaikasi is the beginning of the year in West Bengal and Punjab. It also counts from 29 to 32 days per solar month. (D.C. Sircar, 1965, p.225)

Reckoning of Seasons

The old method of using one of three seasons [hemantha (autumn), varsha (rainy) and grishma (winter)] was also resorted to in some cases. The elements of the calendar given in epigraphical records were only a few in the earlier period, they increased with the passing of century after century. The increase of calendrical details of more than five-element (panchanga) was not uniform throughout India. Therefore it is better to treat them zone by zone. This paper concentrates only on the Tamil zone of present Tamil Nadu and Kerala (Ancient Tamil country).

From the beginning of the 6th century, a set pattern of clearly demarcated zone as to the different modes of reckoning began to appear. Since this pattern was shaped and it continued till the present day, with some minor alterations and adjustments. Thus the Vikrama era attained great popularity in the region comprising Rajasthan and the western portion of Madhya Pradesh. The Bombay-Karnataka area south of the Narmada patronized the Saka Era, as centuries passed by, these two eras gradually spread over the adjacent tracts in the 7th century of the Christian era. The Saka Era became popular in the Andhra country, by then the Bombay-Karnataka-Andhra area continued to be the stronghold of that era. It is from this area, particularly from the west coast, that the Saka era spread to the countries of Southeast Asia avail 7th century C.E. The Kali era of 3101 B.C.E., came to be used sparingly in South India. New eras appeared among which the important ones were those of Ganga and Harsha. The 60-year Bruhaspati cycle and of 12-year Bruhaspati cycle also came into use in this period.

Tamilnadu

In Tamilnadu the earliest record discovered so far with astronomical details is found at Anaimalai near Madurai. This is dated in the Kali year 3871 (C.E. 770), on the day of the Sun [i.e. Sunday] in the month of Kartik. (EI.VIII,p.320)

**Kaleh sahasra-tritayebda-gochare gateshta – satyam -apisaikasaptatau
Krita pratishtho bhagavan - ahut – kritam - adihaisa paushanehani
masi-karttike**

There is another record at Tirupparangunram dated after three years i.e. in the kali year 3874 (C.E. 773) in the month of Taisha [i.e.pausha]. Most probably these are lunar months.

**Taishe-mase-sahasra-tritaya vasu-satair – vatsarair -veda
s[n]khyai - ssa/ptat/yatavaty..... kalau (ARE, 1951-52,no.143)**

Except for these two records, we do not have any other records with astronomical details until the fourth quarter of the 9th century. But there is one exception at Salem, but it belongs to the Ganga king Sripurusha and naturally, the Karnataka influence can be attributed to this date. That record on copper plates is dated in the Saka year 693(C.E771+1) [completed] on the tithi on the bright half of Bhadrpada, when the nakshatra was Uttara-Phalguni of Friday, at the time of the appearance of the [planet] Sukra [i.e.venus].

Usage of Eras

The first record in the interior Tamil country having Saka date comes from Ayyampalayam in Madurai District (SII, XIV,no.22) This is dated in the 8th regnal year of the Pandya king Varaguna II contains the Saka year 792(expired) (C.E 870). No other detail is found. About the same time we get three records of the same Pandya ruler at Tiuvellarai, Lalgudi, and Javantinathapuram all in the Lalgudi taluk of Tiruchirappalli district mentioning the solar months like Vrischika and Dhanu, the week-day and the asterism of the day. (SII, XIV.no12; EI. XX.pp.466, EI. XXVIII.p.39)

From the beginning of the 10th century C.E., there more and more Chola and Pandya records occur throughout the Tamil country mentioning the solar months, the weekdays and the nakshatras. The tradition of citing solar days began only from the reign of Rajaraja I. But after that, they did not find it in regular use. After this period comes into practice the custom of using the lunar paksha (15days circle of time) and tithi along with the solar months, the weekdays, and the nakshatras. Sometimes the solar day is also found mentioned. In manycases the solar months bear the names of the lunar months. The yogas were mentioned rarely. The sankrantis, eclipses, equinoxes, and solstices are also mentioned.

i. Lalgudi record of Varaguna II, the pandya king -c.C.E.875 (EI. XX.pp.466)

Yandu 4-vatin edir 9-amandu Dhjanu nayirru chevvyakkilamai-perra sataiyattu-nal

ii. Kumbakonam record of Uttamachola - c.983 (SII.III,no.137)

Yandu 13-avadu ivvandanitingal padinen[pj] =pakkam-pinal mulam velli

iii. Tiruvannamalai record of Rajaraja I, c.C.E. 1003 (*SI.VIII,no.84*)

Yandu 18-avadu karttigai -madam-piranda [du] padinellan-diyatiyana

nayarruk-kilamaiyum revatium perra inru

iv. Tiruvallam record of RajarajaI-c.992 (*EL.I,no.7(1)*)

Yandu 7-avadu.u ivvattai aypasit-tingal paunnamasiyum irevatium perra

vishuvil somagrahanattinanru

The use of the eras Kali and Saka, both together in the same record was very rare. There are many records in the North Arcot District dated in the Saka Era in the 9th and 10th centuries C.E. This must have happened obviously due to the influence of the Andhra-Karnataka chieftaincies like the Banas and the Western Gangas. From the middle of the 14th century, there occur a fairly large number of records of the Vijayanagar kings and of their subordinates dated in the Saka and Kali Eras.

Jupiter Cycle (Viyalavattam)

Just as time is calculated based on the rotation of the sun and the earth. Similarly, the name Jupiter circle is a method of predicting time by keeping the motions of the planet Jupiter. References are found on Inscriptions to Jupiter circle. References to this method of reckoning time are abundant in parts of Kerala.

The period is calculated on the basis that the planet Jupiter will stay in a zodiac for a year. It is calculated in two ways. One is by the lunar month name as Chittirai, Vaikasi, Ani, Adi, Avani, Puratasi, Aipasi, Karthikai, Margali, Tai, Maci, Panguni... in which month the planet Jupiter placed. for example , if Jupiter placed in the month of Chitra it call as Chitra viyazan that means Chitra Jupiter. The other method is based on the Zodiac Zones, or, House The zodiac is divided into 12 houses. They are 1. Aries 2. Taurus 3. Gemini 4. Cancer 5. Leo 6. Virgo 7. Libra 8. Scorpio 9. Sagittarius 10. Capricorn 11. Aquarius 12. Pisces. It takes 1 year for the Jupiter to move from Aries to Taurus, one house to other. It will be considered as Tamil years, in 60 years. Every year, the presence of Jupiter is mentioned in this way.

The first occurrence of Jupiter's Cyclic year is found in a record of Dharmapuri in the extreme north of Tamil Nadu and it belongs to the Nulamba king Mahendradhiraja, is dated in the saka year 815. (*EL.X,no.14*)

This is certainly due to the Mysore, influence, for we get the next occurrence only in a Srirangam record of the Kakatiya king Prataparudra in Saka 1239 (C.E.1317). (*EL.XXVII,no.48*) The regular use of the cyclic years came into practice only from the advent of the Vijayanagar empire, beginning from the reign of Kampana, brother of Bukka, in the middle of the 14th century C.E.

In Kerala, astronomically dated records are available from the 10th century C.E. From the beginning, the year quoted is that of the 12-year Bruhaspati cycle (on viyala-vattam). But here the names of the twelve years were not mentioned at all. Only the position of Jupiter in the zodiacal signs for the concerned year was indicated. The solar months and days are mentioned regularly. From the end of the 11th century C.E. the weekday and day's nakshatra were quoted in almost all dates. The mention of lunar paksha and tithi appears only from the 15th century C.E. From the beginning, the solar days cited in records are expressly mentioned as expired "cenhRa" (passed). The feature is peculiar to kerala. The Kollam era of C.E. 824-25 was used regularly only from the beginning of the 12th century C.E., though the earliest known kollam year is 149 found in the Mamballi grant of Srivallavangodai. (*EL.IX,p.234f*)

i Mamballi grant of Srivallavangodai- koll. 149[C.E.974]

Kollam=donri nurru-narpattonbadam-andu Tulattul Viyala=ninra Mirichchika nayirru Nayiranda Achchuvadi in-nalal

ii Tirukkakkarai record of Bhaskara Ravivarman -c.C.E. 1012

Chellaninra -yandu irandamandaikkedir irupattonpatam-andu Danuvil viyalan ninra Vrichchika Nayiru irupatu chenra-nal.

iii Killiyur record of Vira Udaiyamarttandarman [TAS,vii,25]

Kollam 354-Iavatu viruchchika-nayirru 8 chenra viyalam Mulamum in-nalal

Astrologer:

Epigraphy throws light on the patronage given to the astrologers in the medieval period. A record of Uttamachol (*SI.IIIp.315*) mentions an astrologer [tirukkaL] who recited the Changes (in the movements of the stars and planets) every day and carried (with him) the calendar (naaLoolai) [mayakkamum-cholli naalLoolai tuukkum tirukkal]. A Thanjavur record of Rajaraja I speaks of two astrologers called Adittan Chembiyan Perun-Ghani and Rajaraja-ganitadhirajan and their assistants. Numerous records are mentioning the kani-murruttu, i.e. the tax-free grants made to the ganis or astrologers. During the Vijayanagar times, there was an important office for Jyotisha (astrology) and the incumbents of which were provided with the free-hold grant (*EC.VII,no.62*). There is a copper-plate grant of Sri-Ranga dated C.E. 1631 which tells that one Arubala Narasimha Bhatta was granted the hereditary right of reading the Panchanga in a few villages and was allowed to enjoy the fees attached to the office. (T.V. Mahalingam, 1940,pp.218-219.)

Conclusion

Although the world today follows the calendar systems that originated in the 16th century, the world's first astronomers were the ones who scientifically predicted the time of Indians, particularly the Tamilians. the Tamil speakers living not only in Tamil Nadu but also in Sri Lanka, Malaysia, Singapore, and Mauritius follow the solar system of the Tamils. In India, Assam, Orissa, West Bengal , Punjabs also Used this Solar based calendar system. Although the Gregorian calendar is used at the office level, the Indian people use these calendars for cultural and religious ceremonies.

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