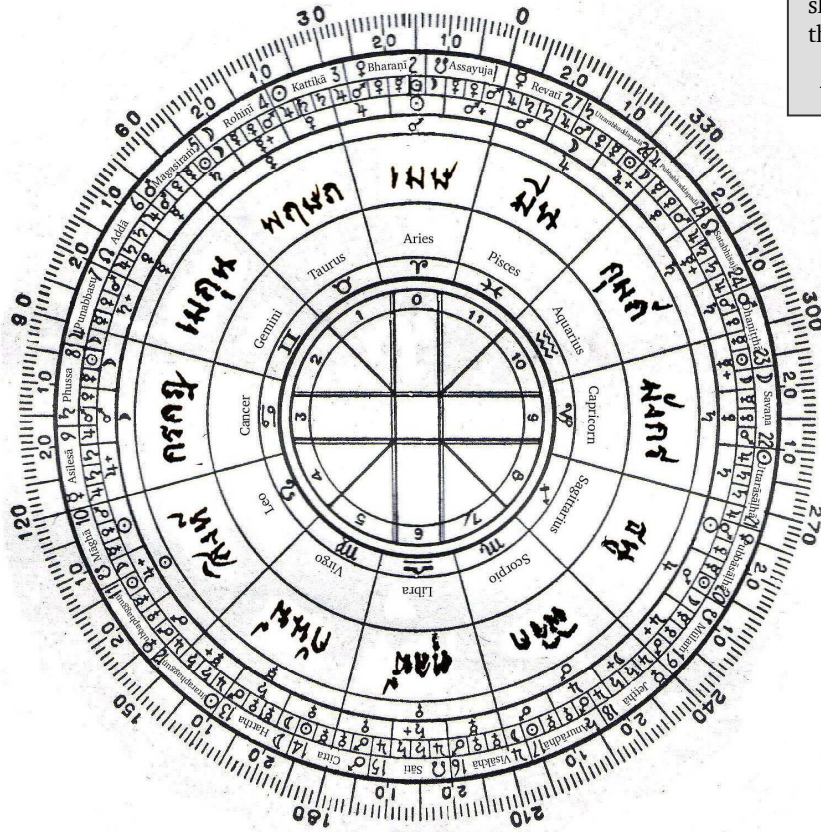


THE LUNAR AND SOLAR ZODIAC

“A bhikkhu should learn the zodiac in whole or in part, and should be skilled in knowing the directions.”

Araññika-vatta (Cv.VIII.6.3)



Symbols

- ☉ Sun
- ☾ Moon
- ♂ Mars
- ♊ Ascending
- ♋ Jupiter
- ♄ Saturn
- ☿ Mercury
- ♏ Descending
- ♀ Venus

This ancient zodiac diagram is essentially a template map of the cosmos – showing how astronomy and astrology were a ‘combined science’ in earlier times, giving rise to our calendar. The inner rings show the 12 signs of the solar zodiac (symbol, English, Thai-Sanskrit), while the outermost ring within the circle shows the 27 signs of the lunar zodiac (*sattādhika-viśa-nakkhattā* in Pāli). The zones in the diagram (*nakkhatta-yogā*) correspond very closely to the areas of the actual solar and lunar constellations (imagine the earth orbiting our sun in the centre of the diagram). Since the solar calendar corresponds to the solar zodiac (especially in Thai), and the reckoning of the lunar calendar is directly based on the lunar zodiac, this diagram also functions as a crude calendar – with the sun and the (full-) moon (cycle) nearly opposite each other.

Lunar Calendar

Magasira-māsa

*Phussa-māsa

Māgha-māsa

*Phagguṇa-māsa

Citta-māsa

*Visākha-māsa

Jeṭṭha-māsa

*Āsāḷha-māsa

Savaṇa-māsa

*Bhaddapāda-māsa

Assayuja-māsa

*Kattika-māsa

Solar Calendar

December/ธันวาคม

January/มกราคม

February/กุมภาพันธ์

March/มีนาคม

April/เมษายน

May/พฤษภาคม

June/มิถุนายน

July/กรกฎาคม

August/สิงหาคม

September/กันยายน

October/ตุลาคม

November/พฤศจิกายน

Solar Zodiac Association[/sanskrit]

Sagittarius/Dhanus

Capricorn/Makara

Aquarius/Kumbha

Pisces/Mīna

Aries/Meṣa

Taurus/Vṛṣabha

Gemini/Mithuna (Methuna)

Cancer/Karkāṭa

Leo/Simha

Virgo/Kanyā

Libra/Tulā (Tulyā)

Scorpio/Vṛścika

* months having
an *amāvāsī*
cātuddasī

Hemanta-utu

Gimha-utu

Vassāna-utu

CALCULATING THE UPOSATHA – THE LUNAR CALENDAR

The lunar calendar is derived from the lunar zodiac. There are three seasons – the cold season (*hemanta-utu*), the hot season (*gimha-utu*) and the rainy season (*vassāna-utu*), each comprised of four months. The names of the months come from the zodiac sign that the moon dwells in on the full-moon night (*puṇṇamī*) of each month.¹ At present we take the waning fortnight (*kāla-pakkha*) as the beginning of the month, making the full-moon night the last day of each month.²

The moon revolves around the earth in approximately 29½ days, making a lunar month. Each year of 12 months must therefore have 6 months of 30 days and 6 months of 29 days. Present tradition alternates these months, with the even-numbered months having 29 days (*magasira-māsa* beginning the year). Modern tradition makes the *sukka-pakkha* permanently 15 days, so the *puṇṇamī* is always *paṇṇarasī*. The 29-day (even-numbered) months therefore have a 14 day *kāla-pakkha*, so the new moon (*amāvasī*) is *cātuddasī*. Another way of putting it is that the 3rd and 7th uposathas of each season are *cātuddasī*.³ In summary, the full-moon is always a fifteenth day uposatha, the half-moon is always on the eighth day (*aṭṭhamī*), and the uposatha of the new moon alternates between 15 and 14 days.

The main deviation from this pattern of 14 day uposathas occurs when there is a lunar ‘leap year’ – and an additional month of 30 days is added to the calendar.⁴

ADHIKA-MĀSA

A lunar year of twelve 29½-day months amounts to a year of 354 days, roughly 11 days shorter than the solar year of 365.245 days, so an extra month (*adhika-māsa*) of 30 days must be added every two or three years.⁵ In the time of the Buddha this was added in any season, whenever the discrepant days added to a month. Modern Thai practice, which was also standardised in India very early, is to always have the *adhika-māsa* at the end of the hot season as the ‘second Āsāḷha’ – although it has 30 days rather than the 29 days of the ‘first Āsāḷha’. The *adhika-māsa* is added 7 times over a 19-year cycle, with the repeating pattern of 332 3332.

e.g.	1	2	<u>3</u>	4	5	<u>6</u>	7	<u>8</u>	9	10	<u>11</u>	12	13	<u>14</u>	15	16	<u>17</u>	18	<u>19</u>
year	1997...	1999...				2002...		2004...			2007...			2010...			2013...		2015...
		2018...				2021...		2023... etc.											

MISCELLANEOUS

The moon cycles through the whole zodiac on its ‘ecliptic’ (i.e. a ‘sidereal’ month) every 27 days, 7 hours and 45 minutes, roughly passing through each successive *nakkhatta* on each successive day (1.012 days). Since the actual lunar cycle (‘synodic’ month – waning and waxing of the moon) takes roughly 29 days and 12 hours, the next full moon will be two or three *nakkhattā* ahead of the previous one.⁶ The cycle of the full moons going through the complete zodiac takes a lunar year.

In order to reconcile the 12 signs of the solar zodiac with the 27 signs of the lunar zodiac, the full sweep of the heavens must be divided into 108 ($108 \div 12 = 9$, $108 \div 27 = 4$). 108 is therefore a ‘special number’ that synchronises the cosmos – the standard of 108 *mālā* beads may represent a symbolic effort to

¹ Luang Por Liem – reflecting that things have been deviating from their natural order in recent times – says that the moon’s orbit has changed since 1980. Cf. A.IV.70

² There is evidence from the canon that the waxing fortnight (*sukka-pakkha*) was considered the beginning of the month in the Buddha’s time. (Cf. NP 24, the account of Ven Mahā Moggallāna’s parinibbāna, Pc 57, and the account of the Buddha’s cremation) This could have been a result of later interpretation by canonical redactors, since this reckoning was used in Tamil India (and possibly Sri Lanka), while northern India, including the middle country, always had the full moon at the end of the month.

³ This standardisation of months and fortnights was not introduced until later: they were either more flexible during the Buddha’s time or followed exact astronomical reckoning. Cf. The discussion of pavāraṇā in the Mahā-vagga.

⁴ Thai tradition also includes an ‘*adhika-vāra*’ – an ‘extra day’ – added periodically, but whose standard regulation still eludes me. It appears to be added every few years in the 2nd *kāla-pakkha* (the 3rd uposatha) of the hot season – making it a fifteen-day uposatha instead of the expected fourteen-day. King Mongkut apparently devised a method to abandon this practise, but the issue remains a mystery...

⁵ The cycle of the full-moon through the *nakkhattā* loses approx. 10.696 degrees every year after each *adhika-māsa* because the Earth’s orbit is eleven days slower than the 12 orbits of the moon every year – one year after the *adhika-māsa*, each full-moon will be roughly one *nakkhatta* behind where it should nominally be; two years, nearly two *nakkhattā*...

⁶ This is because the Earth itself has processed 28.5 degrees of its orbit over that time.

pervade the cosmos with one's mantra... The second-most outer ring in the above diagram shows the heavens divided into 108, with the nine planetary symbols of astrology (นพเคราะห์)⁷ which have merely an astrological significance – being associated and dominant signs for each *nakkhatta*.

The solar calendar has mostly usurped the lunar calendar in modern times, but many vestiges of the older reckoning remain.⁸ The very reason for dividing the solar cycle into 12 must be derived from the lunar cycle. Months (named after the moon) are still generally about the length of one lunar cycle, although this time-frame has no natural significance for the solar calendar. The lengths of the months vary somewhat in order to amount to 365 days and to allow the solstices and equinoxes to always occur on the 21st. Also, a period of 7 days has no significance for the solar calendar – weeks representing a quarter-phase of the moon – and the days are named after the first seven of the nine heavenly bodies of astrology⁹ (in Thai, French, Pāli, and Sanskrit – but in English a few Norse gods have plundered four days of the week).

DAYS OF THE WEEK

<u>English</u>	<u>French</u>	<u>Pāli</u>	<u>Sanskrit</u>	<u>Thai</u>	<u>Planet</u>	<u>assoc. colour</u>
Sunday	Dimanche	ravi-vāra	āditya-vāra	วันอาทิตย์	Sun	red (yellow)
Monday	Lundi	canda-vāra (bhumma-vāra)	candra-vāra	วันจันทร์	Moon	yellow (white)
Tuesday	Mardi	maṅgala-vāra	maṅgala-vāra	วันอังคาร	Mars	pink (red)
Wednesday	Mercredi	budha-vāra	budha-vāra	วันพุธ	Mercury	green
Thursday	Jeudi	garu-vāra (vihappali-vāra)	brhaspati-vāra	วันพฤหัสบดี(บดี)	Jupiter	orange/brown
Friday	Vendredi	sukra-vāra (sukka-vāra)	śukra-vāra	วันศุกร์	Venus	blue
Saturday	Samdi	sora-vāra	śani-vāra (saora-vāra?)	วันเสาร์	Saturn	violet/black

THE CONSTELLATIONS (*sattādhika-vīsa-nakkhattā*)

Assayuja: α arietis (Sheratan), γ arietis (Mesarthim)

Bharaṇī: 35, 39 and 41 arietis

Kattika: pleiades (η tauri (Alcyone), M45 tauri)

Rohiṇī: α tauri (Aldebaran)

Magasira: λ orionis, φ¹ and φ² orionis

Adda: α orionis (Betelgeuse)

Punabbasu: α geminorum (Castor), β geminorum (Pollux)

Phussa: γ cancri (Asellus Borealis), δ cancri (Asellus Australis), θ cancri

Asilesā: δ, ε, η, ρ and σ hydrae

Māghā: α leonis (Regulus), γ leonis (Algieba). ε, ζ, η and μ leonis

Pubba-phagguṇī: δ leonis (Zosma), θ leonis

Uttara-phagguṇī : β leonis (Denebola), 93 leonis

Hattha: α corvi (Al Chiba), β, γ, δ and ε corvi

Cittā: α virginis (Spica)

Sāti: α boötis (Arcturus)

Visākhā: α librae (Zubenelgenubi), β librae (Zubeneschamali), γ librae (Zubenelakrab), ι librae

Anurādhā: β scorpii (Graffias), δ scorpii (Dschubba), π scorpii

Jetṭhā: α scorpii (Antares), σ scorpii, τ scorpii

⁷ The Pāli terms for the ascending and descending nodes (where the moon crosses the ecliptic) are Rahu (the lord of the Asuras) and Ketu, respectively.

⁸ Western astronomy with its solar zodiac was imported into India by at least 320 C.E. The Sanskrit versions of the solar zodiac were translated from the Greek.

⁹ After Greco-Roman practice.

Mūla: ε, ζ, η, θ, ι, κ scorpii, λ scorpii (Shaula), μ and ν scorpii

Pubb'āsālha: δ sagittarii (Kaus Meridionalis), ε sagittarii (Kaus Australis)

Uttar'āsālha: ζ sagittarii, σ sagittarii (Nunki)

Savaṇa: α aquilae (Altair), β aquilae (Alshain), γ aquilae (Tarazed)

Dhañiṭṭhā: α delphini (Sualocin), β delphini (Rotanev), γ and δ delphini

Satabhisaja: γ acquarii (Sadachbia)

Pubba-bhaddapadā: α pegasi (Markab), β pegasi (Scheat)

Uttara-bhaddapadā: γ pegasi (Algenib), α andromedae (Sirrah)

Revatī: ζ piscium

