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ON THE ORIGIN OF SIDEREAL ZODIAC AND ASTRONOMY

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The distinctive practice of longitudinal measurement with reference to a point located west of the vernal equinox by 7° 15', noticeable in a Babylonian star catalogue of B.C. 300 suggests the exixtence of a sidereal fixed zodiac in ancient times. Present author has attempted to show that the initial point of the ancient Babylonian Zodiac was the same as that of Hindu's which had the star Mūla of sidereal longitude 240° as fiducial. With Mūla as fiducial the 'Meṣādi' was 7°.5 west of the equinox in BC 300 and this almost perfectly coincided with the mean difference of Babylonian sidereal longitudes and the tropical longitude of BC 300. The astronomical rationale of the tantric concept of 'Mūlādhāraṃ' as elucidated here in point towards the origin of sidereal Zodiac and astronomy during the Vedic period in ancient India.

Key Words: Babylonian initial point, Mūla (* - Scorpii), 'Meṣādi', Mūlādhāraṃ, Tantra, Kuṇḍalini, Microcosm, Macrocosm, Symbolic equivalence.

INTRODUCTION

A comparative study of the ancient and medieval star catalogues can be found in reference (1). These catalogues are of Babylonian, Greek, Indian and Arabic origin and are dated respectively to BC 300, AD 100, AD 500 and AD 1450. The given fragment of the ancient Babylonian catalogue is different from the three others as regards the origin of measurement of longitudes and it raises a number of questions relevant in the context of ancient astronomy and the zodiac.

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Babylonian Star Longitudes

The relevant data is extracted below from reference(1) :

Table - I

Star	Babylonian longitude ** (λ)	Modern longitudes Computed for BC 300 (λ_0)	Difference ($\lambda-\lambda_0$)
θ Leo	140°	131°.5	8°.5
β Virgo	151°	144° .5	6° .5
γ Virgo	166°	158°.5	7°.5
α Virgo	178°	172°	6°
α Libra	200°	193°	7°
β Libra	205°	197°	8°

** rounded to integer degrees.

Mean difference ($\lambda-\lambda_0$) is 7° 15' and the standard deviation is 51'.

The above Babylonian longitudes have the uniqueness that their zero reference is roughly 7° 15' west of their epochal (BC 300) vernal equinox as compared to the use of vernal equinox as the zero point in the Ptolemy's, Brahmagupta's and Ulugh Beg's longitudes. The distinctiveness of the Babylonian zero perhaps point towards the existence of a hitherto unknown ancient zodiac and the present paper is an investigation into the same.

Intricacy of the Babylonian Zero-Point

The above situation poses a very important question before the inquisitive minds:

How could a point lying 7° 15' west of the vernal equinox assume significance as the zero reference in Babylonian astronomy ?

In fact neither we have any observational reasons like the location of a fixed star nor any phenomenal reasons like the fall of cardinal points to explain the above choice of initial point by ancient astronomers. The possibility of any fiducial star opposite the aforementioned point on the ecliptic can also be ruled out as the catalogue containing longitudes from 140° to 205° is devoid of the longitude 180°. The Indian fixed zodiac as formulated by the calendar reform committee with the star Citra as fiducial also fail to account for the Babylonian zero as the star Citra or α - Virgo has a longitude of only 178° as per the catalogue. Mathematically, every point of a circle is on a par with the other to become the zero point and as such at any epoch an arbitrary choice would have been guided by observational convenience and naturally the zero would have coincided with either of the fixed bright stars or the cardinal points. Here the situation is perplexingly different—neither astronomical nor mathematical compulsions are available to justify a zero point located 7° 15' west of the vernal equinox!

Apart from the above the only possibility is that the Babylonian initial point arose out of some other fiducial star with reference to which probably an ancient school of astronomy and astrology existed. The ancient Indian astronomy or *Jyotiḥśāstra* provide credence to this likelihood in view of :

(a) *Vedānga Jyotiṣa* refers to the epoch at which the solsticial line coincided with the beginning of *Dhaniṣṭha* and the mid point of *Āśleṣa* . Obviously the reference point towards a mathematical zodiac in existence having *nakṣatra* divisions of 13° 20' each, beginning withy *Aśvini*. It is quite unlikely that a particular star marked the beginning of *Dhaniṣṭha* and the then winter solstice. In fact the probable *Yogatāra*-s of *Dhaniṣṭha*. and Delphini do have latitudes 33° N 02' and 35° N 02' respectively and are therefore much away from the ecliptic. As such the question arises as to how the *nakṣatra* zodiac was defined in ancient India?

(b) An ancient description of the zodiac can also be found in *Maitrāyaṇa* upaniṣad VI. 14 :

> "The half (year) commencing with the asterism *Maghā* and ending with the half of the *Śraviṣṭha* belongs to *Agni*, while the sun performs his southern journey[2] ....."

The description here is very similar to that of Vedānga Jyotiṣa, but the solsticial line is across 300° - 120° instead of 293° 20' - 113° 20'. In fact in both the cases the year is described with reference to a mathematical zodiac and the respective epochs had the solstices and equinoxes at the beginnings or mid-points of the stellar divisions. It is apparent that irrespective of the year-beginning or the calendar, the ancient Hindus had a zodiacal conception with the 27 *nakṣatra* divisions. Prof. P.C. Sengupta makes the following observation on the above description :

> "We next have a record that the sun turned south at the beginning of the *nakṣatra Maghā*. The date of this on the basis of the *Pañca Siddhāntika nakṣatra* division, the oldest at present known is about 1880 BC. We do not know of any details of the development of astronomical knowledge in India at this point[2]".

The above zodiacal descriptions belonging respectively to the epochs of 1432 BC and 1909 BC as such raise the same question as that of the Babylonian catalogue in respect of the origin of their underlying zodiacs which was different from the respective epochal equinoxes or solsticses.

Ancient Hindu Zodiac & Fiducial Star

A clue towards answering the above question follows from the astrological basis of the ancient astronomy.

The major source of inspiration behind the astronomical observation been the development of astrology, it is quite possible that the zodiac has been defined on the

basis of some astrological rationale. The choice of a particular point on a circle obviously point towards some rationale at work and in the context of Hindu Astronomy or *Jyotiṣa* it can be identified and decribed as - 'the principle of symbolic equivalence of the Man and the Cosmos' i.e. microcosm and the macrocosm. In the language of astrology *Kālapuruṣa* or the Time/Zodiac personified is an exact replica of the *Jīvapuruṣa* (human being). This demands an astronomically defined physical point or vice-versa to establish the correspondence. Eventhough Jyotiṣa today has no such information, another of the ancient Hindu disciplines *viz.*, *Tantra* has fortunately preserved this secret and the point of bio-cosmic symbolic coincidence can be identified as "*Mūlādhāraṃ*", the source of *Kuṇḍalini* at the bottom of the Cerebrspinal axis. In the conception of human body as the zodiac, *Mūlādhāraṃ* coincides with the end-point of 8th *rāśi*, Scorpio, having a sidereal longitude of 240°. The nomenclature "*Mūlādhāraṃ*" meaning—'*Mūla* the fiducial' obviously arose out of the fiducial status of *Mūla* in the mathematical conception of the Hindu zodiac. It is therefore apparent that the ancient Hindus defined the fixed sidereal zodiac based on a scientific rationale - '*Mūlādhāraṃ*' was the source of *Kuṇḍalini* (*Yoga-śaktil* Horoscope) in *Yoga* as well in the *Jyotiṣa* computations. The synonymous phraseology prevailing in *Jyotiṣa* and *Tantra* lend further credence to this argument. Among all *Yogatāra*-s *Mūla* has the distinction of being placed at the galactic centre and is specially suited to serve as the fiducial star as it has no proper motion. The present author has shown in an earlier paper[3] that the Hindu zodiac is a mathematical division of the ecliptic with reference to the beginning of *Kaliyuga* using the cardinal points and the fiducial star *Mūla* (Illustration given at Appendix-I).

It is quite likely that the Babylonian longitudes may be based on the ancient Hindu fiducial star *Mūla* (λ-Scorpii) defined to be at 240° of the fixed zodiac. We have no reason to doubt the transmission of Hindu ideas to Babylon in view of the Seidenberg's[4] discovery that the mathematics of ancient Egypt and Babylonia owe their origin to the Vedic mathematical texts called *Śulbasūtras*.

Evidences Substantiative of the Astronomical Rationale of Tāntric "*Mūladhāram*"

The symbolic equivalence of Man & Cosmos (zodiac) and the etymology of the term '*Mūlādhāraṃ*' alone may not be sufficient to convince the historians of science about the underlying astronomical rationale in view of the total absence of any perceptible evidence for a related astronomical tradition. No direct evidence is forthcoming from historical research or archaelogy. The only alternative is to seek indirect evidence out of the Vedic literature and Hindu mythology. In this context the following aspects are noteworthy:

1. Synonymous phraseology of Tantra and Jyotiṣa

In a rare çoincidence '*Kuṇḍalini*' (meaning horoscope) can also be found at the Tāntric *Mūlādhāraṃ* along with other common terms—*Nādi*, *Ida*, *Piṇgala*, *Cakra*, *Yoga*, *Bhukti*, Sun and Moon representing *Śiva* and *Śakti* etc.

2. Common Origin and Perceptor

Ancient texts of both *Jyotiṣa* and *Tantra* declare Rudra as the first Perceptor. Rudra obviously is a mythological charactor traceable into the pre-historic antiquity of the Vedas. Legends about the 18 astronomical *Siddhāntas* by the *Ṛṣis*, the highly sophisticated Sanskrit language and the associated *mantra-yoga* etc. all point towards the origin of *Jyotiṣa* and *Yoga* at the hands of the great *Ṛṣis* of the Vedic period. The explicit description of the zodiac having 108 *navāṃśas* available in *Maitrāyaṇa Upaniṣad* VI. 14 belongs to the epoch of BC 1909 i.e. well within the Vedic antiquity.

3. Identification of 'Rudra' by erstwhile scholars

A.J. Karandikar's work on Vedic Astronomy and Mythology (1970) identified 'Rudra' as the 'Mūla' *nakṣatra*. With the sidereal longitude of 240° Mūla will mark the beginning of Sagittarius and hence the Vedic symbolism as the wielder of bow or the Archer is quite appropriate.

This identification also explains the rationale behind the depiction of 'Rudra' as the first perceptor of *Jyotiṣa & Tantra*. Rudra infact is 'Mūla'—the fiducial star—defined to be of a fixed sidereal longitude of 240° and hence the crux of the zodiac or *Kālapuruṣa*. Vedic symbolism and mythology as such made him the great *Yogi* who enunciated the disciplines of *Tantra* and *Jyotiṣa*.

4. Worship of 'Rudra' as the Phallus

Another aspect that supports the above identification is the worship of 'Rudra' as the phallus especially by the Tantrics. On the human body 240° coincides with the phallus (Lingam)—the end point of the 8th sign *Vṛścika*—and hence over the Zodiac *Mūla* marks the Cosmic Phallus.

Further, *Mūla* (Lambda Scropii) is only 2°16' west of the galactic centre known as SgrA and is posited at the place where the ecliptic cuts the Milky Way or *Ākāśa Gangā* and is therefore known as *Gangādhara*. Rudra is also another synonym of Time i.e. *kālacakra*. In Temples where Rudra is worshipped as *Lingam pradakṣiṇa* is restricted to 2/3rd of the periphery (i.e. 240°) which is representative of the zodiacal belt.

5. Astrological Evidences

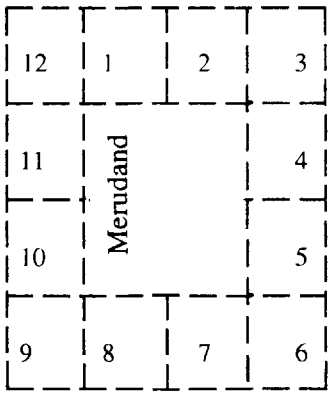
(a) In astrology the 8th rāsi represents *Mṛtyu* or death. Rudra thus became the synonym of death—*Yama* or *Kāla*—as well as *Mṛtyunjaya*. Beng the crux of the zodiac,

Rudra is time itself and hence the character credited with destruction of all and everything. Also Mūla is presided over by Nirṛti, the deity of Pitṛus.

(b) See the horoscopic picture (given below) prevalent in South India. The 0° - 240° vertical line that represents the cerebro-spinal axis (*Merudand*) is a pointer towards the location of *Mūla* at 240° as fiducial, to define the Zero point.

(c) The '*Apasavya Cakra*' employed in the *Kālacakra daśā* takes the end of Scorpio i.e. 240°, as the initial point.

(For Rohini first *pada* the *Kālacakra daśa* cycle runs as 8, 7, 6, 5, 4, 3, 2, 1, 12)



(d) The 18 *nakṣatras* (18x13° 20' = 240°) of *Jyotiṣa* in reverse order symboli-cally represent the 18 steps of *Yoga-Vidyā* and the ascent of *Kuṇḍalini śakti* that provides the transcendence of '*Māyā*'. It is apparent therefore that the importance attached to '18' in the Hindu way of life also is a contribution of Rudra. Similarly the *rāśis* from *Meṣa* to *Vṛścika* also influenced many of the Vedic customs and mythology in their numerical form-8.

6. Purāṇic Evidences

(a) *Māsānāṃ Mārgasīrṣoham*

B.G. Tilak has interpreted this verse of the *Bhagavad Gītā* as reflective of the fall of equinox over Orion and the year-beginning with the autumnal equinox. In the light of the above discussion it may also be possible that in distant antiquity a sidereal luni-solar calendar had its year beginning with the transit of Sun over *Mūla*(240°) i.e. *Dhanusaṃkramaṃ*. The solar month of *Dhanu* had the name *Mṛgasīrṣa* in much the same way as *Ārdra* became *Rudra*'s *nakṣatra* by virtue of Dhanu-purṇimā being considered as the birthday of Rudra.

(b) *Kārtikeya as the Deity of Jyotiṣa*

Kārtikeya-mythologically the son of Rudra and Ganga fostered by the six *Krittikas*—is the deity presiding over Jyotiṣa. In the south, He is also known as Kumāra swāmy—an eternal bachelor.

Kārtika, the foster mother can be identified as the solar month of *Vṛścika* and the son of Ganga is obviously *Mūla*. The six faces of Kārtikeya or the six petalled Lotus in which he was born is the year of six seasons.

An interesting meaning of the term 'Kumāra' in the Vedic context is available at reference.[9] To quote :

> "..... Now the word 'akumāra' in *RV* I.155.6 is very interesting. 'Kumāra' means bachelor which is interpreted as fixed relative to the Earth. The Sun is called 'Yuva' (young) but 'akumāra', i.e. not fixed .....".

It is therefore likely that the appellation 'Kumāra' for the son of Ganga probably originated out of its fiducial role i.e. fixed position serving as a reference. It must also be noted that the Vedic literature refers to Yama also as 'Kumāra'.

(c) Another piece of evidence is available in the epic character Bhīṣma who is also portrayed as 'bachelor' son of the Ganga. Please note that the Gangāputra is pledged to remain a bachelor to facilitate the inheritance of the Crown by the son of *Matsya-Kanyā* (an allegorical term indicative of the zodiacal signs pisces (*Mīna*) and Virgo).

The death of Bhīṣma by his own choice at the beginning of the Winter solstice is a description of the Calendar reform by adopting the Winter solstice as the year-beginning.

7. Evidence of the Āgamas and the philosophy ofTantra

The *Āgamas* that stipulate the procedures of temple construction and worship also renders evidence in support of the astronomical rationale of *Mūlādhāraṃ*. A temple (*kṣetra*) in fact must be an exact replica of the Tantric body as well as the *Rāśi-cakra* (zodiac) i.e. the *Jīvapuruṣa* & *Kālapuruṣa*. In the *sanctum sanctorum* the Idol is installed over a vertical column that represents the *Merudaṇda* stemming out of the bottom most point of *Mūlādhāraṃ*. Zodiacally this point coincides with the end-point of the 8th sign in the vertical direction. Horizontally the biggest oblation stone at the bottom of the flag staff marks *Mūlādhāraṃ* and 240° while the flag staff stands for the cerebro-spinal axis.

Philosophically the temple is designed to harbour the '*Kuṇḍalini*' *śakti* of the Tantric and the astronomical celebrations are meant to sustain the above *caitanyaṃ* by the cosmic potential of the luni-solar phenomena and the *Mahākuṇḍalini*. This latter, *Kuṇḍalini* obviously is the cosmic power supposedly generated in the zodiacal abstraction of the ecliptic having the *Mūla nakṣatra* at 240° by definition. It is the basis of all planetary forces vis-a-vis destiny and hence the name *Kuṇḍalini* for the horoscope. '*Jyotiṣa-Kuṇḍalini*' as such is reflective of the bondage of Karma in the state of dormant *Kuṇḍalini* and with the awakening of *Kuṇḍalini* the *Yogi* gets liberated from the bondage or transcends *Māyā*. The Temple and the Idol worship are meant to those

who are less competent to become a Yogi by observing the stringent practices of Tantra. According to *Tantra*, spatially each individual (*Sādhaka*) or the Deity is at the centre of the Universe and encompasses the universe in himself, and by appropriate choice of the temporal element with the aid of *Jyotiṣa* the cosmic power is tapped and utilized for the sustenance of the *Kuṇḍalini śakti*. Thus the philosophical basis of *Tantra* and the *Āgamas* also point towards its dependence over *Jyotiṣa* and the astronomical rationale of '*Mūlādhāraṃ*'.

To summarize, the Vedic system of knowledge conceive the human self as the culmination of an eternal process of evolution under the guidance of a cosmic intelligence or the will to evolve implicit in the '*asat*' (unmanifested). In modern parlance, the phenomena can be described as the continuous as well as directional changes that began with the great bang of '*Om*' to produce the multitude of galaxies, stars, planets .... etc., and at some point in the vast incom-prehensible expanse of the elapsed time, the animate or biological line sprouted out to generate the innumerable species of organisms with Man at its head. A bio-cosmic harmonious linkage is hypothesized to explain the further evolvement of human self. While the pre-human stages of consciousness were all subservient to nature, Man differed significantly and took over the reins of evolution in his own hands and this is reflecterd in the epithet of Rudra as '*Paśupati*'. In otherwords, Man ceased to be the slave of nature and discovered for himself the path of liberation from the chain of births and deaths (*saṃsāra cakra*). This intellectual development lies at the root of the Vedic civilization that produced the great *Ṛṣis* through the path of Yoga. The civilization that produced the *Vedas* and *Upaniṣads* could not have been primitive, as portrayed by the modern historians. *Mukti*, by the Yogic arousal of *Kuṇḍalini* is a natural and logical conclusion to the philosophy of the *Upaniṣads* as reflected in '*Mṛtyor mā amṛtaṃ gamayā*' and is the loftiest secret enshrined in the Vedas. We can see a reflection of this vedic concept of evolution in the mythological description of the ten incarnations of Viṣṇu through the forms of *Matsya*, *Kūrma*, *Varāha*, *Narasimha*, *Vāmana*, *Paraśurāma*, *SrīRāma*, *Bala Rāma*, and ultimately *Yogeśvara Kṛṣṇa*.

8. Earlier Studies on the astronomical aspects of Tantra Vidya

Oscar Marcel Hinze, in his work 'Tantra Vidya' has shown the Seven Lotus-Flowers and the number of their petals as an archaic representation of Gestalt astronomy according to the system of Ptolemy. In western mysticism the seven occult centres of the body are infact represented directly by the seven planets rather than abstracted symbols like wheels or Lotus flowers. The Tāntric occult practices are well established in the Indian tradition than the west and as such the basis of the formulations must be the sidereal zodiac about which we have very ancient references in the Vedic literature.

Not only Tantra but the traditions and customss of Vedic civilization also reflect the influence of zodiac in a perceptible way. A few noteworthy aspects are:

1. The numbers 3, 12 and 108 derived their sanctity in Vedic life by virtue of their significance in the mathematical division of the zodiac. 'Three' we can locate in the threads of the *Yajñopavītaṃ*, '108' in the number of beads of the *japa-mālā*, and the multiples of 12 played an important role even in the syllable structure and the practice of mantras.

2. Numbers 8 and 18, were contributed to the Vedic life by *Tantra* and *Jyotiṣa* by virtue of thye location of '*Mūlādhāraṃ*' at the end of the 8th *rāśi* and 18th nakṣatra.

3. Above all, the worship of an abstract concept like 'Time ' (numerous personified forms like *Brahmā*, *Viṣṇu*, *Rudra*, *Kāla* etc.,) cannot be noticed elsewhere and is a unique feature of the Hindu way of life that distinguishes it from the general class of religions.

The all pervasive influence of the zodiac and the *nakṣatra* '*Mūla*' upon the Vedic tradition and mythology as described above offer ample substantiation to the astronimical rationale of Tāntric "*Mūlādhāraṃ*".

Babylonian Longitudes Versus Sidereal Longitudes

Table-II provides a comparison between the Babylonian longitudes and the Hindu sidereal longitudes computed on the assumption that λ- Scorpii has a longitude of 240°.

Table - II

Star	Babylonian longitude	Sidereal with Mūla at 240°	Difference
θ Leo	140°	-	-
β Virgo	151°	152° 32'	1°.5
γ Virgo	166°	165° 21'	0°.5
α Virgo	178°	179° 16'	1°.0
α Libra	200°	200° 30'	0°.5
β Libra	205°	204° 46'	0°.25

Except for α-Virgo & β-Virgo which appear to be of low value by 1° in the Babylonian catalogue, other longitudes are almost the same. In Table-I also these stars, α & β Virgo stand apart with the differences of only 6 and 6.5 degrees from the tropical longitudes of BC 300 while the others differ by 7°; 7.5°, 8° and 8.5°. It is therefore evident that these longitudes have been measured wrongly by (-) 1°. If we account for this error it can be seen that the Babylonian longitudes match very well with the *Mūla* based Hindu longitudes.

Further, the *ayanāṃśa* of BC 300 with *Mūla* as fiducial turn out to be roughly 7°.5' i.e. the Hindu initial point '*Meṣādi*' was 7°.5' west of the vernal equinox of B.C. 300. This *ayanāṃśa* is very close to the mean difference of Table-I and point towards the coincidence of the Babylonian initial point with the Hindu '*Meṣādi*'.

Conclusions

Maitrāyaṇa Upaniṣad VI. 14 as well as *Vedāṇga Jyotiṣa* contain explicit description of a sidereal zodiac belonging respectively to the epochs of 1909 BC and 1432 BC. The fragmentary Babylonian star catalogue based on a zero point lying approximately 7°.15' west of the epochal vernal equinox, point towards the existence of a similar zodiac in Babylon as well. The astronomical rationale of the Tāntric concept of '*Mūlādhāraṃ*' and certain mythological charcters leads to the inference that the ancient zodiac had the '*Mūla*' *nakṣatra* (Lambda Scorpii) of sideral longitude 240° as fiducial. This identification of the fiducial star convincingly explains the physical rationale of the zero point of a fixed zodiac and the Vedic philosophy behind it. Various Vedic customs and traditions infact reflect the cardinal importance 'Mūla' (Rudra) and the zodiac had in Vedic times as the abstractions of Time—Which was the object of their worship.

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