

## Vedic Astronomy and House Division

By Dewavrata Buit

India, as can be expected from an ancient culture, has a long astronomical tradition. The oldest astronomical text in India is the Vedānga Jyotiṣa (astronomy as part of the Vedas), one part of which is attributed to Lagadha. It is dated about 1400 BC on the basis of the statement in the book that the winter solstice took place at the star group Śrāviṣṭha (Alpha Delphini). A later astronomer of the same school is Garga who is placed at about 450 BC on the basis of his observation that 'the sun is found turning [north] without reaching the Śrāviṣṭhas'. The earliest interest in astronomy was in observing equinoxes and solstices for ritualistic purposes, in making rather inexact soli-lunar calendars, and in observing stars (nakṣatras) as a guide to the motion of the moon and the sun.

## Siddhāntic astronomy

The development of mathematical, or siddhāntic, astronomy came about as a result of interaction with Greece in the Post-Alexandrian period. Siddhānta literally means the established end. The leading figure in the modernization was Aryabhata I, who was born in AD 476 and completed his influential work, *Aryabhatīya*, in AD 499. The main occupation of Indian astronomers for the next thousand years and more was the calculation of geocentric planetary orbits and developing algorithms for the solution of the mathematical equations that arose in the process. Illustrous names in Indian astronomy following Aryabhata are Latadeva (505) who was Aryabhata's direct pupil; Varahamihira (c.505) a compiler rather than a researcher, and an expert on omens; Bhaskara I (c.574); Aryabhata's bête noire Bharmagupta (b.598) whose works were later translated in Arabic; Lalla (c.638 or c.768); Manjula or Munjala (932); Shripati (1039); and Bhaskara II (b.1114), the last of the celebrated astronomers (Table I). There was also a host of commentators including such well-known names as Prithudaka (864) in Kannauj, Bhattotpala (966) in Kashmir, and Parameshvara (1380-1460) in Kerala, who were astronomers in their own right. There were also a number of astronomers whose own works are not extant, but they are cited by others. There is an Indian astronomer Kanaka who is unknown to Indian sources but appears in the Arabic bibliographic tradition as Kanak al-Hindi. He is said to have been a member of the embassy that was sent from Sind to Baghdad to prepare *Zij al-Sindhind* (translation of Brahmagupta's *Brahmasphuṭasiddhānta*). In the absence of any reliable information on him, a large number of legends have grown around him, making him a personification of the transmission of science from India to the Arabs. In addition to the Siddhānta there are in Sanskrit and allied languages books called Karaṇa. If Siddhānta are the text books, Karaṇa are the made-easy books. They give practical rules for carrying out computations. A noteworthy feature is the Karaṇa choose a contemporaneous epoch rather than follow the Siddhānta in starting from a Kalpa or a Yuga. As early as about AD 1000, Al Biruni (973-1048) noted the Siddhānta and Karaṇa. They are the Koshtakas or Saranis, which provided ready-made specialist astronomical tables for use by astrologers and almanac makers. Work on observational aspects has been rather limited. Parameshvara made eclipse observations from 1393 to 1432, and later Achyuta Pisharati (c.1550-1621), also in Kerala, (c.1730-1800) wrote a four-chapter treatise *Uparagakriyakrama* on Solar eclipses. In the 18<sup>th</sup> century Nandarama Mishra (c.1730-1800) prepared a Karaṇa work, *Grahaṇa-paddhati*, on eclipses. The Siddhānta School was mildly influenced by the British

presence in India. Indian assistants at British Indian observatories tried to update Siddhānta elements. Kero Lakshman Chhatre (1824-84) started his career at Colaba Observatory in 1851, became the professor of mathematics and natural science at Poona College in 1865, and was made a Rao Bahadur in 1877 two years before his retirement. In 1860 he brought out in Marathi a handbook *Graha-sadhanachi-koshtake*, based on the 1808 work of R.S.Vince. An assistant at Madras Observatory, Chintamani Ragoonatha Chhary (1828-80), completed his Tamil work *Jyotiṣa-cintāmaṇi*, and also an almanac, called *Dṛg-gaṇita pañcāṅga*, based on the Nautical Almanac. Many young men from families with tradition of Sanskrit studies took to modern astronomy. A school teacher Venkatesh Bapuji Ketkar (1854-1930) compiled a modern astronomical almanac *Jyotir-gaṇita* in Sanskrit, with the year 1875 as the epoch. Ketkar is however better known in India for his published prediction (1911) of the existence of a planet beyond Neptune. It is a matter of historical curiosity that the last of the classical Siddhānta astronomers lived right into the present century.

Sāmanta Chandrasekhara Simha (1835-1904) was born in a princely family in the small village of Khandapara in western Orissa. Introduced to the ancient Siddhānta literature in the family library, he soon noticed that the predictions did not match observations. Following instructions in the old texts, he made his own instruments. His main instrument was a tangent-staff, made out of two wooden rods joined together in a shape of a T. 'The shorter rod was notched and pierced with holes at distances equal to the tangents of angles formed at the free extremity of the other rod'. Calling it *Mana-yantra* (measuring instrument) he used it with a precision which was more due to his innate abilities rather than the instrument's. Using Bhaskara-II as his role model he then set out in 1894 to write on palm leaf his *Siddhānta-darpaṇa*, consisting of 2284 śloka of his own composition to which were added another 216 called from old Siddhānta, especially Bhaskara II's *Siddhānta-shiromani* and *Suryasiddhanta*. Throughout the Siddhānta period instruments and observations played second fiddle to computations. Observational results were not explicitly recorded; the description of astronomical instruments was condensed in a single chapter,

## House Division Systems

'Astrological house systems are often thought of as some form of incomprehensible entity—almost as an evil that lurks behind the chart. In reality, it is not the houses themselves that are recondite, but more correctly the mathematical description of the houses. Once an astrological practitioner realizes that the mathematics of how a house system is created can be ignored, then the application of the meanings of the houses and their usage in astrological practice are concentrated upon.' Houses are the divisions of space around an event. An event which we wish to consider astrologically occurs. It may be a birth, it may be a mundane event, it may be a horary question, or it may be something other than these. An event occurs and astrologers wish to examine a horoscope for that event. The next step is to determine the placement of that event in the hierarchy of space. To do this we need to introduce some order to the space we are going to diagram—and diagram is exactly what we will do with the space. So, an event occurs, and now we must create a frame for picturing the planets within our portion of space. Doing this poses certain important questions which must be answered. How do we divide this space? What is our starting point for this division? How do we translate how we see the planets from Earth with where they are in their orbits around the Sun? What about the parts of the sky we can not see—

like those parts that are on the other side of the earth? How do we represent those 'hidden' spaces? Since space is rather 'plastic', and if we can change our view of the event depending where in space we are viewing from, then what constant boundaries can we create for classifying the space around our event?

These questions have a serious philosophical leaning, and are essentially solved when the diagram of the horoscope is produced. That is, all questions such as stated above are solved when the horoscope is drawn except the one question of which house system to use. One horoscope produced usually implies that one house system was chosen for dividing space. Another horoscope of the same event may show a completely different house system. But the nagging side issue question always remains: which house system is best to use? There is no simple or direct answer to that question. However, I can give you two good thoughts on the subject: use that house system which divides space in such a way that the planets fall into houses which describe their function in the nature of the event; and, use that house system which gives cusps against which you can time events. That is, if the Moon function of this event is described well by a Moon in the eighth house, then the house system you choose should not place the Moon in the seventh or ninth, or some house other than the eighth house. Also, if subsequent events can not be timed to the house cusps derived mathematically and plotted on the horoscope, then choose some other house system. In general, I find that for natal events the Placidian system works well and fulfills these two guidelines. Why it works well I do not know. It may well be that the thought form created by a mass of astrologers using the Placidian system is all that lies behind its functioning. I can not explain why it works, but my practical side allows me to see that it does work well and consistently for natal events where it is used and applied. For events other than natal, other house systems seem to work better. Some house systems also work well with natal events, besides Placidian.

## Astronomical Considerations

In the astronomy defining an event, there are great circles which divide the sphere of space into logical parts. These great circles are called: meridian, horizon, prime vertical, celestial equator, polar axis circle, ecliptic, and horizon.

The Moon's nodes are a special case, where the plane of the Moon's motion defines these where it cuts the ecliptic. All of the houses and sensitive points used in astrology are a result of these circles or mathematical derivatives from these circles where these circles or their derivatives cut the ecliptic. You may wish to use the notes and definitions at the end of this article for a reference. House systems use the great circles of astronomy as starting points for their definitions and also for projection purposes. Having a good understanding of the astronomy of the horoscope does help in being able to visualize the construction of the individual house systems. As the earth sphere is divided into the Western & the Eastern hemispheres by the Prime Meridian (the Greenwich Meridian) so is the Celestial Sphere divided into Western and Eastern hemispheres by the Celestial Meridian. As the globe is divided into northern and southern hemispheres by the Equator, so is the Celestial Sphere divided into the northern and southern hemispheres by the Celestial Equator. The Four Major Mathematical Points of the Zodiac in Astronomy the Eastern Horizon is called the Ascendant. 180 degrees from it is the Western Horizon called as the Descendant. The intersecting point where the Ecliptic cuts the Celestial

Meridian is called the Meridian Cusp (M.C.) and 180 degrees from it is called the Imum Coeli (I.C.).

## The Computation of Houses

First the longitude of the Ascendant is calculated by using the following formula:

$$\text{Formula (1): } \tan L = \sin \varepsilon / (\cos \varepsilon \times \cos \omega - \sin \omega \times \tan \alpha)$$

L is the Ascendant,

E is the Right Ascension of East Point,

$\omega$  the Sun's maximum declination and

$\alpha$  - the latitude of the place

Once the Ascending degree is known, 180 degrees is subtracted to get the Descendant.

Or

$$\text{Formula (2): } \text{ASC} = \text{ArcCot} ( - ( \tan f \times \sin e ) + ( \sin \text{RAMC} \times \cos e ) ) ( \cos \text{RAMC} )$$

The MC is calculated by using the following formula:

$$\text{Formula (1): } \tan K = \tan R / \cos w$$

K is the longitude of the MC,

R the Right Ascension of the Meridian Cusp and

w the Sun's maximum declination.

Or

$$\text{Formula (2): } \text{MC} = \text{ArcTan} ( \tan (\text{RAMC}) \cos e )$$

180 degrees deducted from the MC is the longitude of the IC.

These 4 are the Four Houses of the Zodiac. Ascendant is the 1<sup>st</sup> House, IC the Fourth, Descendant the Seventh and MC, the tenth. We have said that each sign of the Zodiac is 30 degrees each. If the Ascending degree is Pisces, then the Ascendant is Pisces, the IC is Gemini, the Descendant is Virgo and the MC, Sagittarius.

## *Definitions of Terms and Abbreviations*

Body: A planet, a star, or some similar object which exists in space and time.

Celestial Equator: A great circle denoted by an extension of the Earth's equator infinitely projected into space. This is the circle along which the measurement of right ascension is made.

Celestial Sphere: That sphere which would be formed if one were to infinitely extend the 'sphere' of Earth outward into space.

Co-Equator: The mirror image of the Earth's equator. The equator mathematically associated with the co-latitude of a place on Earth.

Co-Latitude: The number obtained when the terrestrial latitude is subtracted from ninety degrees. For the city of Philadelphia, located at forty degrees north terrestrial latitude, the co-latitude, or angular distance of Philadelphia from the Earth's North Pole, is fifty degrees.

Co-Polar Axis Circle: The great circle formed when the mathematics used to derive the polar axis circle is mirrored from the Earth's poles, rather than from the Earth's equator.

Ecliptic: That great circle of the celestial sphere which the Sun traces, when seen from the Earth, in its yearly travels against the backdrop of the sky.

Ecliptic Plane or System: The mathematical plane which contains the Solar System, with the Sun as its center and its planets at the center of their motions. A sphere of space using the ecliptic as its equator. Equatorial plane: the mathematical plane represented by infinitely extending the Earth's equator into space.

Equatorial system: a sphere of space using the celestial equator as its main central circle or equator.

Great Circle: A circle contained within the celestial sphere which has as its center the center point of the celestial sphere.

Horizon: A great circle, for which there are actually four associated terms: Visible, Rational, Sensible, and Celestial. In the way that we use these terms, the Visible Horizon is our view of where the earth and the sky meet off in the distance from where we stand on or near the earth. The Celestial Horizon is the horizon we use mathematically as our starting point to calculate houses and sensitive points, and it is the visible horizon as if that horizon were starting at the center of the earth (as opposed to where we are located on or near the surface of the earth) and was extended infinitely into space.

Horizon Plane or System: The plane which contains the horizon. The same as the celestial horizon. A sphere of space, with the Celestial Horizon serving as its equator.

Hour Circle: A great circle which is perpendicular to the Celestial Equator and which passes through a particular body in space.

House Circle: A great circle which has as its poles the North and South points of the Horizon, and which is perpendicular to the Prime Vertical.

Local Sidereal Time: The time calculated for a horoscope when a time of event is added to the longitude correction, the time zone correction, the acceleration, the delta T correction, and the sidereal time from an ephemeris.

Meridian: A great circle of the Horizon system which passes through the Zenith, the nadir, and the North and South points of the horizon.

Nadir: the south pole of the horizon system. Opposed to the zenith.

Obliquity: ecliptic and the celestial equator. Presently it is about twenty-three and a half degrees and decreasing slowly with time.

Perpendicular: Ninety degrees. Circles which meet at ninety degree angles.

Polar Axis Circle: A great circle which passes through the North and South Poles of the Earth and the East and West points of the horizon.

Pole: When describing three or four dimensional space (using time as a fourth dimension) a pole is a mathematical point that is ninety degrees everywhere from a circle. For instance, the earth's North or South Poles are ninety degrees from all points on the earth's equator.

Prime Vertical: A great circle which passes through the Zenith, the Nadir, and the East and West points of the horizon. It is ninety degrees from the meridian, and vice-versa.

Vertical Circle: A great circle which is perpendicular to the horizon and passes through the Zenith and the Nadir.

Zenith: the north pole of the horizon system. The point in the horizon system which is over your head. Opposed to the nadir.

Zodiac: a small portion of the celestial sphere which is about eight degrees on either side of the ecliptic circle.

## ***Calculation Conventions***

The following standard abbreviations are used in the mathematics which follows:

e represents the obliquity of the ecliptic

f represents the terrestrial latitude

ASC is the ascendant

MC is the MC

RAMC is the Right Ascension of the MC

Sin, Cos, Tan, Cot, etc. represent the trigonometric functions Sine, Cosine, Tangent and Cotangent respectively

For calculator purposes: Cot = (1/Tan) and vice-versa,

ArcSin, ArcCos, ArcTan, etc. represent the trigonometric inverses

H11, etc. stands for the offset to compute the cusp of house eleven, etc.

C11, etc. stands for the value of the cusp of house eleven, etc.

Particularly, the process of adjusting house cusp calculations for the correct trigonometric quadrant can be somewhat tricky if not performed with care. House cusps which are over 360° or under 0° should be converted to lie between 0° and 360°. That is, if you compute a house cusp as being 372° then this should be changed to 12° Aries. Add 360° to any negative values or results. House cusps with values between 0° and 29.99° lie in Aries; between 30° and 59.99° in Taurus; between 60° and 89.99° degrees in Gemini, and so forth around the zodiac and through the signs.

$$MC = \text{ArcTan} ( \text{Tan} (\text{RAMC}) \text{COS } e )$$

$$ASC = \text{ArcCot} ( - ( \text{Tan } f \times \text{Sin } e ) + ( \text{Sin } \text{RAMC} \times \text{COS } e ) ) \text{ (Cos } \text{RAMC} )$$

The declination of any point on the ecliptic can be calculated from:

$$\text{declination} = \text{ArcSin} ( \text{Sin} (\text{zodiacal longitude of point}) \times \text{SIN } e )$$

The obliquity of the ecliptic, for any date in modern times, is calculated by:

$$e = 23^\circ 27' 08.26'' - (46.845'' \times T) - (.0059'' \times T^2) + (.00181'' \times T^3)$$

where T is in fractions of a century starting from Jan 1, 1900

## ***Various types house division systems***

Following are the various types of house division systems:

Alcibitius Declination

Alcibitius Semi-Arc

Arcturan

Campanus

Classical

Earth

Equal

Horizontal

Koch

Campanus

Meridian

Moon

Morinus

Natural

Graduation

Hours  
 Octopos  
 Placidian  
 Porphyry  
 Radiant  
 Regiomontanus  
 Solar  
 Sun  
 Topocentric  
 Zariel

Out of these systems let us in this issue we shall examine the natural hours house system.

### The Natural Hours House System

The times of sunrise and sunset are noted for the location and date of the horoscope. The degrees of the ascendant at Sunrise and Sunset give the degrees of the ascendant (ASC) and descendant (DSC) respectively. The hemispheres between the ASC and DSC are divided into six sectors, each representing two 'hours' of time. These sectors also give the house cusps. Note that the ascendant and descendant are no longer tied together as a pair in this system, and the MC may fall in any house.

Compute the RAMC, MC, and ASC in the normal manner.

Determine the times of sunrise and sunset for the location of the chart. Suppose you determine that there are twelve hours and thirty-six minutes of daylight, and, thus eleven hours and twenty-four minutes of night for the day of the event at your event location. Then convert these hours and minutes to arcs of a circle as follows:

$$12H\ 36M = 12.6\ Hrs\ ( ( 12.6/24 ) \times 360^\circ ) = 189^\circ\ of\ daylight\ arc$$

$$And,\ 360^\circ - 189^\circ = 171^\circ\ of\ night\ time\ arc$$

Compute the cuspal increments:

$$D = 189^\circ / 6 = 31^\circ 30' \text{ for the daylight increment and, } N = 171^\circ / 6 = 28^\circ 30' \text{ for the night time increment}$$

Compute the house cusps:

$$C12 = asc - d$$

$$c11 = c12 - d$$

$$C10 = C11 - D$$

$$C9 = C10 - D$$

$$C8 = C9 - D$$

$$C7 = C8 - D$$

$$C1 = ASC$$

$$C2 = ASC + N$$

$$C3 = C2 + N$$

$$C4 = C3 + N$$

$$C5 = C4 + N$$

$$C6 = C5 + N$$

Illustration

Queen Victoria, born on May 24, 1819 at 4:15' am LMT at 0 W 10' 00", 51 N 30' 00"

Sunrise: 4:01:11, Sunset: 19:54:40

	HMS	DMS
Sunrise	4:01':11"	
Sunset	19:54':40"	

Dina māna	15:53':29"	238°:22':15"
Ratri māna	8:06':31"	121°:37':45"
Dina bhāva	2:38':55"	39°:43':43"
Ratri bhāva	1:21':05"	20°:16':18"

Dina māna is the length of the daylight duration from sunrise to sunset and is mathematically 'sunset minus sunrise'. Ratri māna is simply calculated as 24 hours minus the Dina māna. These are converted into arcs by equating 24 hours to 360°.

$$\text{Dina māna arc} = (15:53':29" / 24) \times 360^\circ = 238^\circ:22':15"$$

The dina māna arc represents six houses from the cusp of the 7<sup>th</sup> house to the ascendant. So, divide the dina māna arc by '6' to get the dina bhāva or the visible house cuspal distance.

$$\text{Dina bhāva} = 238^\circ:22':15" / 6 = 39^\circ:43':43"$$

Now reduce this from the cusp of the ascendant to get the cusp of the 12<sup>th</sup> house. Lagna is Taurus 14°:37':44" = 44°:37':44"

$$\begin{aligned} 12^{\text{th}} \text{ house cusp} &= \text{Lagna cusp minus dina bhāva} \\ &= 44^\circ:37':44" - 39^\circ:43':43" = 4^\circ:54':01" \text{ Aries.} \end{aligned}$$

In this manner calculate the other house cusps. For the Ratri bhāva a similar procedure is followed. However instead of subtracting the bhāva arc from the lagna, we add it to the lagna cusp to get the second house and subsequent houses till the 7<sup>th</sup> house.

Note: The 7<sup>th</sup> house cusp is not the same as the lagna cusp and instead there are two cusps for the 7<sup>th</sup> house!

Bhava Madhya					
		Ratri Bhava		Dina Bhava	
1	44:37:44	2	64:54:02	12	4:54:01
		3	85:10:20	11	322:49:42
		4	105:26:38	10	283:05:59
		5	125:42:56	9	243:22:16
		6	145:59:14	8	203:38:33
		7	166:15:32	7	163:54:50

In the next part of the series we will discuss the Vedic perspective of the house division system.

Compiled by : DEWAVRAT BUIT

Course coordinator,

SJCERC

4A;Pranesh Appartments,

Laxmi Nagar, Nagpur 22.

