

*Theme 3.1*  
*Pre-siddhantic Astronomy of*  
*Mahāsalila,*  
*Parāśara Tantra, Vrddhaqārāīya Jyotiṣa,*  
*Lagadha's Jyotiṣa*

*Mahāsalilam* was at one time an independent oral text of the Vrddhagarga school. At present it appears embedded in the VGS manuscripts but the text has all credentials to be treated as an independent work on astral sciences still retaining the Vedic ideation of self-similar cosmogony and esoteric views about the nakṣatras. The *karmaguṇa* and other chapters of the *Vrddhagārgīya Jyotiṣa* (VGJ) about planets, eclipses and comets are further developments over the already existing observational concepts of the *Mahāsalilam*.

Varāhamihira in his *Bṛhatsamhitā* quotes both Garga and Vrddhagarga but does not specifically cite any work of Garga by name. But in the chapter on *Budhacāra* he cites *Parāśara Tantra* (PT) by name to state the visibility numbers in the seven nakṣatra paths of Mercury.

प्राकृतविमिश्रसङ्क्षिप्ततीक्ष्णयोगान्तघोरपापाख्याः । सप्त पराशरतन्त्रे नक्षत्रैः कीर्तिता गतयः ॥7.8॥  
चत्वारिंशत् त्रिंशद् द्विसमेता विंशतिर्द्विनवकं च । नवमासार्द्धं दश चैकसंयुताः प्राकृताद्यानाम् ॥7.13॥

The corresponding **PT text in prose** is quoted by Utpala with the same seven paths and the same visibility numbers except he says as per *gaṇitavāsanā* (computations) this is not correct.

We saw in *Mahāsalilam* *Budha* (Mercury) was known after the other four. Hence the PT observation is something special.

Again Varāhamihira quotes *Parāśara*, Vrddhagarga in the chapter *Ketucāra* on Comets extensively, but omits the inter arrival time between successive comets, as stated by the ancient astronomers. *Mahāsalila* explains the ancient count of *Grahas* as 108 in number. Of these 101 were *Ketu* or comets. The five planets were the *pañcatārāgraha* of *siddhantic astronomy*. The hundred one comets, twenty-six of which were observed are systematically dealt with in the *Parāśara Tantra* in prose and later redacted in verse in VGJ (*aṅga-7; Ketumālā*) with some additions.

Hence one would be curious to know the date or epoch of astronomer *Parāśara*.

William Jones, the famed discoverer of Sanskrit and its grammar for the Europeans and founder of the Asiatic Society in 18th century, published an essay on Indian chronology (*Asiatick Researches*, 1790; v. 2b, pp. 391-403). He wrote referring to the commentary on the *Bṛhatsaṁhitā* (BS) by Utpala:

“We come now to the commentary, which *contains information of the greatest importance*. By former *śāstras* are meant, says *Bhaṭṭotpala*, the books of *Parāśara* and of other Munis; and he then cites from the *Parāśara Samhitā*, the following passage, which is in modulated prose and in a style much resembling that of the Vedas.”

There are no reasons to disbelieve this statement. It seems Jones had access to a manuscript of Utpala's commentary on BS containing some sentences attributed to Parāśara marked with Vedic modulation marks. This implies Parāśara's text is perhaps more ancient than the unaccented ancillary Nirukta and Sūtra texts, not to speak of Lagadha's calendar Jyotiṣa.

So far no manuscript of Parāśara Tantra (PT), has come to our notice, notwithstanding a diligent search. We have to be satisfied with the quotations by Utpala (10<sup>th</sup> cent), Ballālasena (12<sup>th</sup> cent.) and Bhāskarayogi (13<sup>th</sup> cent.), which easily fills a book about the astronomy of Paraśara's school. The specific passage which Jones cites indeed *contains information of the greatest importance*, namely the existence of a six season solar zodiac with the twenty-seven nakṣatras as background markers.

Ballālasena (12<sup>th</sup> cent.) in his *Adbhuta Sāgara* writes:

तथाच स्वकालिकमृतुक्रममाह पराशरः ॥  
तस्य श्रविष्ठाद्यात् पौष्णार्धं चरतः शिशिरः। वसंतः पौष्णार्धात् रोहिण्यन्तम्। सौम्याद्यात् सार्पार्धं  
ग्रीष्मः। प्रावृट् सार्पार्धात् हस्तान्तं। चित्राद्यात् इन्द्रार्धम् शरत्। हेमन्तो जेष्ठाद्यात् वैष्णवान्तं इति ॥

This is the *śraviṣṭhādi* scheme of following sun's movement among the stars, starting from the winter solstice day, when *śīsira ṛtu* started at the first point of the *śraviṣṭhā nakṣatra* sector. This system of tracking sun can be shown to belong to *circa* 1300 BCE [**Theme 3.2**], supporting the possibility of PT being an accented Vedic ancillary. In any case, the dispersed statements preserved as important by the three astronomers cited above, needs careful study. For this purpose, the reconstructed Parāśara Tantra with translation and notes was brought out in 2013.

VGJ also follows the *śraviṣṭhādi* scheme except it is stated in verse. There are some similarities between PT and VGJ, but there are also strong differences. Both the traditions have branched out of the *Mahāsalilam*. PT retains the prose style, although the followers might have in some places redacted the ancient tradition in verses. The contents of PT are:

- |   |  |
|---|--|
| 1. ॥ उपनयनाध्यायः॥<br><i>Prologue</i>             | 11. ॥ केतुचारः॥<br><i>On Comets</i>                                      |
| 2. ॥ सांवत्सरसूत्राध्यायः॥<br><i>Fundamentals</i> | 12. ॥ अगस्त्यचारः ॥<br><i>On Canopus</i>                                 |
| 3. ॥ आदित्यचारः॥<br><i>Sun's Movement</i>         | 13. ॥ नक्षत्रकूर्माध्यायः ॥<br><i>Astral-geography</i>                   |
| 4. ॥ चन्द्रचारः॥<br><i>Moon's Movement</i>        | 14. ॥ नक्षत्रोपसर्गाध्यायः॥<br><i>Nakṣatra Afflictions</i>               |
| 5. ॥ राहुचारः॥<br><i>Rāhu's Movement</i>          | 15. ॥ ग्रहयुद्धाध्यायः॥<br><i>Planet Conjunctions</i>                    |
| 6. ॥ भौमचारः॥<br><i>Movement of Mars</i>          | 16. ॥ तिथिकरणमुहूर्ताः॥<br><i>Tithi, Karṇa and Muhūrta</i>               |
| 7. ॥ बुधचारः ॥<br><i>Movement of Mercury</i>      | 17. ॥ प्रवर्षणम् ॥<br><i>Rainfall</i>                                    |
| 8. ॥ बृहस्पतिचारः ॥<br><i>Movement of Jupiter</i> | 18. ॥ भूकम्पनम्॥<br><i>Earthquake</i>                                    |
| 9. ॥ शुक्रचारः ॥<br><i>Movement of Venus</i>      | 19. ॥ उल्कापात-प्रतिसूर्य-परिवेषादि॥<br><i>Meteors, Mock Sun, Haloes</i> |
| 10. ॥ शनैश्चरचारः ॥                               | 20. ॥ मानुषम्॥<br><i>Dreams and Divination</i>                           |
|   | 21. ॥ संकीर्णाध्यायः॥  |

These are similar to what we find in VGJ, though VGJ is more detailed. There is not much in PT about observational details of moon. But VGJ has a long section on moon, including its *ayana* (lateral motion), length of the synodic and sidereal months. VGJ recommends mathematics in addition to observation.

विशेषाणां चक्षुर्विशिष्यते ॥ नक्षत्रसर्ववर्णितं नक्षत्रसर्ववर्णितं ॥ दर्शनं  
 नक्षत्रसर्ववर्णितं नक्षत्रसर्ववर्णितं ॥ लषामकराक्षरक्षानामत्यन्तसो ॥ लषामकर

५.२७ षण्मास्या चन्द्रमसस्ततोऽर्धषष्ठे च आदित्यस्याभिपूजितमाहुराचार्याः।  
सप्तदशत्रयोदशपञ्चत्रिंशन्मासिकानि चेन्दोस्त्रीणि विसन्धिग्रहणानि क्षुद्-  
व्याधिमरकदुर्भिक्षोपद्रवाय वेदितव्यानि ॥

५.५ तद्यथा दशोपप्लवाः ॥

ग्रसनारोहणोपघातोन्मर्दननिरोधपरिलेहनापसव्यसव्यान्तर्मध्यतम उपप्लवाश्च।  
तत्रार्धत्रिभागग्रहणं ग्रसनं प्रख्यातनृपतिविप्रच्युताय । मण्डलमध्ये  
ग्रहावर्त्तनमारोहणं नरपतिक्षोभकरं प्रजानाशनम् । ईषद्ग्रहणमुपघातं  
जगद्धिताय । उन्मर्दनं चिरमर्केन्दुसकलमण्डलाक्रमणं प्रजाविद्रवकरम्।  
सर्वमण्डलधूमावरणं निरोधस्तदरोगक्षेमसुभिक्षलक्षणम् । समन्ताद्  
जिह्वयेवाभिलेहनं परिलेहनं समानफलम् । पूर्वेण दक्षिणमपसव्यं प्रजाभयाय ।  
अप्रदक्षिणं सव्यमभयाय । मण्डलान्तर्मध्ययोर्ग्रहणमन्तर्मध्यं नृपतिक्षोभकरम्।  
महातमसाऽऽवरणं तम उपप्लवः परस्परं म्लेच्छसङ्गरकृदिति ॥

VGJ is more detailed. *Rāhuchara* is the third anga with four chapters. The six monthly lunar eclipse cycle and many others are described in VGJ. This section comes after Chandramarga which has eight chapters. Both these sections are yet to be edited. The interesting feature is a growth in observation can be recognized from PT towards VGJ. This indicates closeness in time, perhaps Parasharatantra being before Garga's astronomy. The six monthly eclipse sequence must have been observational. This has been verified to be so by modern methods.

Table 5.1 Two sequences of seven eclipses visible at Jaipur at six monthly interval in 15th Century

BCE Phases in Red were not visible due to altitude.

LT: Local Time, P:Partial, T:Total, N:Penumbral

Calendar Date	Ecl. Type	Partial Eclipse Begins LT	Alt	Total Eclipse Begins LT	Alt	Mid. Eclipse LT	Alt	Total Eclipse Ends LT	Alt	Partial Eclipse Ends LT	Alt
-1496-Nov-10	P	02:53	+50	-	-	03:08	+47	-	-	03:23	+44
-1495-May-05	P	21:34	+34	-	-	22:56	+46	-	-	00:18	+51
-1495-Oct-30	T	15:17	-34	16:27	-20	16:58	-14	17:30	-07	18:40	+08
-1494-Apr-25	T	04:02	+25	05:03	+13	05:53	+02	06:44	-09	07:44	-22
-1494-Oct-19	T	23:01	+62	00:15	+68	00:48	+67	01:21	+64	02:35	+52
-1493-Apr-14	P	18:36	-01	-	-	19:39	+13	-	-	20:41	+25
-1493-Oct-08	N	(Near Total) Penumbral Eclipse. Magnitude 0.973, Mid-point 1.45 AM; Altitude +57									
-1492-Mar-05	P	04:33	+34	-	-	04:54	+29	-	-	05:16	+25
-1442-Dec-13	P	05:54	+15	-	-	06:03	+13	-	-	06:12	+11
-1441-Jun-07	P	18:15	-10	-	-	18:48	-03	-	-	19:22	+03
-1441-Dec-02	T	17:31	-02	18:42	+13	19:13	+19	19:45	+26	20:56	+41
-1440-May-27	T	01:25	+41	02:25	+34	03:14	+27	04:02	+18	05:03	+07
-1440-Nov-20	T	00:01	+80	01:15	+73	01:49	+67	02:22	+60	03:37	+43
-1439-May-16	P	16:40	-29	-	-	18:06	-11	-	-	19:31	+07
-1439-Nov-09		(Total) Penumbral Eclipse. Magnitude 1.019, Mid-point 1. 52 AM; Altitude +64									
-1438-Apr-07		(Partial) Penumbral Eclipse. Magnitude 0.667, Mid-point 4.07 AM; Altitude +31									

<http://Eclipse.gsfc.nasa.gov> After F.Espenak

Bṛhatsaṁhita (5.16) mentions *parveśa* of lunar eclipse as seven (Brahma, Śaśi, Indra, Kubera, Varuṇa, Agni, Yama) at six monthly steps though he says eclipses should be found by computations. There was a count (like the five year *yuga* cycle) of full moons in six-month units probably for keeping track of lunar eclipses.

Parāśaratantra provides visibility numbers for planets with the exception of Mars. For Jupiter the movement is stated as two-and-quarter *nakṣatra* in a year. For Saturn, the stated period is twenty-eight years for covering twenty-seven stars. About Mars, no numbers are available except verbal classifications of its spatial forms pictured over several months (analemma) in the sky.

तस्य पञ्चवक्त्राणि क्रमेणोपदिशन्ति । उष्णमश्रुमुखं व्यालं लोहिताख्यं  
निस्त्रिंशमुशलं चेति ॥

Angaraka

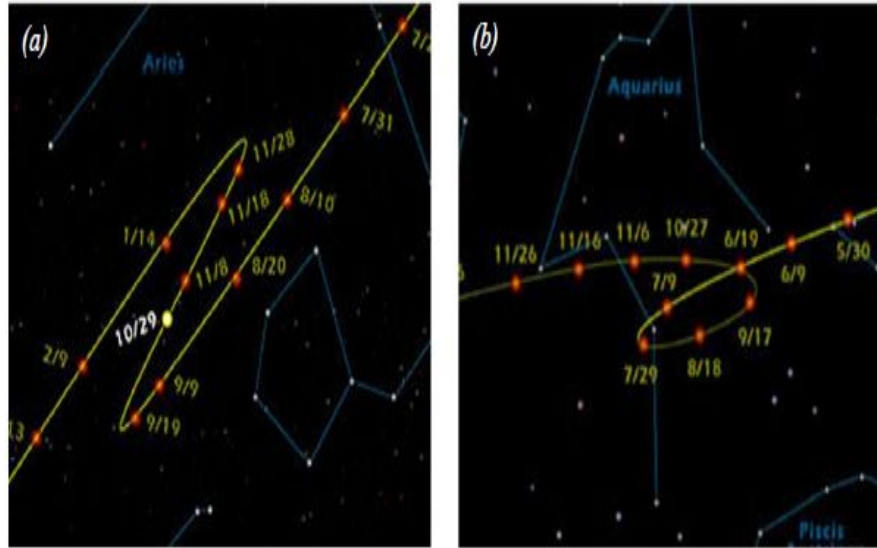


Fig. 6.1 Retrograde motion of Mars (a) Vyālamukha (b) Nistrimśamuśala  
(Courtesy: <http://mars.nasa.gov/allaboutmars/nightsky/nightsky04/>)

Brhaspati

८.३ सपादमृक्षद्वयम् अब्देन प्रविचरन् सस्यसम्पत् करोति । विपर्ययाद्विपरीतः ॥

8.3 Jupiter moving two-and-quarter *nakṣatra* in a year produces good crops. If this is altered the effects are opposite.

Shanaischara

१०.८ तस्याष्टाविंशतिवार्षिकः सप्तविंशतिनक्षत्रचारः । त्रिमार्गस्तत्र ।

As per VGJ Saturn stays in each *nakshatra* for 400 days; Cycle=29.56 years.



The inner planets are treated in terms of five *nakṣatra* paths for Venus and seven for Mercury. Both PT (prose) and VGJ (verse) are similar in their contents, the latter having some interpolations.

प्राक्प्रतीच्योः उदयास्तमयात् उदङ्मध्यदक्षिणाः त्रयो  
मार्गाः तेषां

दक्षिणोत्तरमध्यमोत्तरमध्यममध्यमदक्षिणा  
गत्यन्तरालदेशं पञ्चधा विभज्य पञ्चमार्गाः

कल्पनीयाः ॥ प्रागस्तमित

उत्तरोत्तरमध्यममध्यमानुत्तरदक्षिणेषु मार्गेषु

पञ्चपञ्चाशत्

षष्टिपञ्चसप्तत्येकाशीतिनवतिभिर्दिवसैः

पश्चाद्दर्शनमुपैति । प्रतीच्यां अस्तमितः

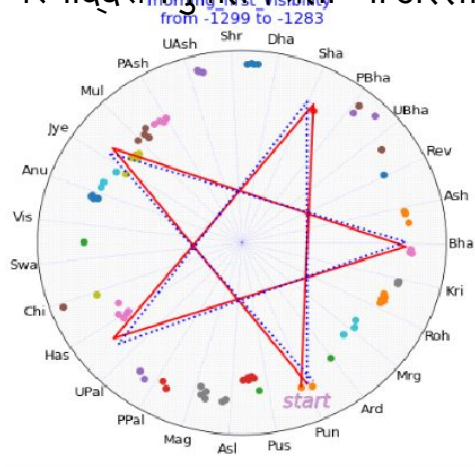
षडष्टद्वादशपञ्चदशचतुर्विंशतिभिरहोभिः

प्रागुदयते । प्रागुदितो नवभिर्मासैः एकविंशति

नक्षत्राणि चरति प्रतीच्यां अष्टाभिरैकोनविंशति

नक्षत्राण्याप्तः शुभाशुभफलः ॥

As per PT and VGJ the visibility of Venus in the east is for 270 days followed by an average invisibility of 68 days. Similarly, in the west visibility of Venus is for 240 days followed by 13 days of invisibility on an average. Thus the Venus cycle, on average, is 580- 590 days.



In the east and in the west from the rise and setting three paths namely north, central and south exist for Venus. The in between space of these three has to be divided as north-central and south-central to get five paths for Venus. Venus having set in the east along the above five paths becomes visible after 55, 65, 70, 81 and 90 days respectively. Venus having set in the west (along the five paths) rises in the east after 6, 8, 12, 15 and 24 days (respectively). Venus rising in the east covers 21 nakṣatra segments in nine months. In the west 19 stars are covered in eight months.

It could not be a chance coincidence that this pentagon shape matches with the five cornered *maṇḍala* seat for Śukra in the *navagraha homa* rites as described in the Vedic *gr̥hyasūtra* manuals.

भगवन्तं शुक्रं प्राङ्मुखं.....सूर्यग्रहस्य पूर्वदिग्भागे पञ्चकोणाकारमण्डले रजतप्रतिमायां अधिदेवतेन्द्राणी प्रत्यधिदेवतेन्द्रसहितं भूः शुक्रं आवाहयामि ॥ (Āśvalāyana Gr̥hyapariśiṣṭa)

Here again we see a close relation between the *adhidaivata* observations and the *adhiyajña* practices.

# Budha-Mercury

प्राकृताविमिश्रसङ्क्षिप्ततीक्ष्णयोगान्तपापाख्याः ।  
सप्त पराशरतन्त्रे नक्षत्रैः कीर्तिता गतयः ॥ (बृ.सं.७.८)]

७.२ अथ चत्वारिंशत्त्रिंशद् द्वाविंशत्यष्टादशपञ्चदशैकादशनव-  
रात्राणि गतिक्रमात् उदितोऽभिदृश्यते तान्येव अस्तमितो भवति ।  
उष्णशीतवाय्वभ्रसूर्येन्दुग्रहणायोदयति सस्यविघाताय चेति ॥

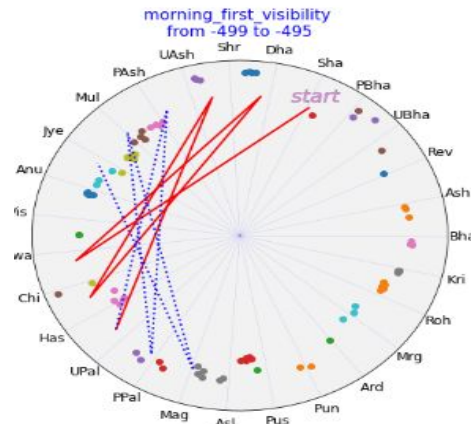
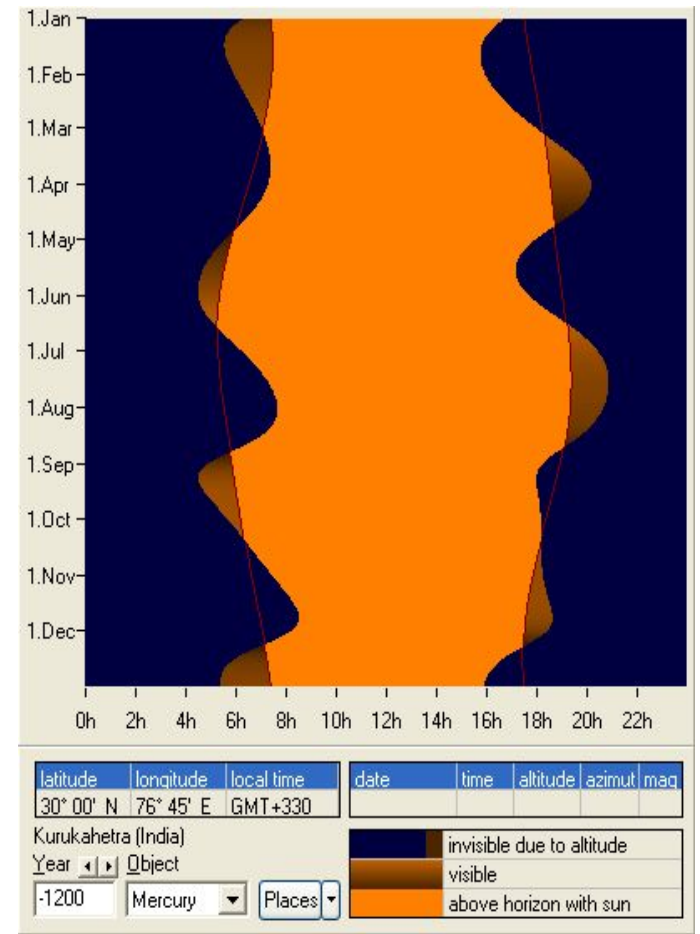
7.2 Mercury in its motion having risen for 40, 30, 22, 18, 15, 11 and 9  
nights (in the previous seven paths) is visible and it sets in the same way.  
The rise of Mercury indicates heat, cold, wind, fog, solar eclipse, lunar  
eclipse and destruction of crops.

[BS (7.12-13) gives the visibility numbers as in the text of PT.

Utpala commenting on this says

यद्यपि गणितवासनया एतन्नोपपद्यते तथापि पराशरमङ्गीकृत्य  
आचार्येणोक्तम्॥

This essentially means that the numbers of Parāśara do not match  
with the mathematical constructs of siddhāntic astronomy. Such  
an opinion highlights that medieval Hindu astronomers had  
inherited an ancient observational tradition of planet models  
with numbers, which were overtaken by the newly developed  
siddhāntic analytical models and methods.]



Vrddhagarga's  
description is same  
as above, with  
minor variations.

The *Ketucāra* chapter of the *Parāśara Tantra* and of VGJ have details of twenty-six observed comets with inter arrival times adding to 1000-1300 years. We infer that the above texts have inherited ancient information of the Vedic period side by side with some direct observations and tentative theories, which are of historical importance. The importance given to *Ketu* that is comets, that sometimes included meteors, halos, atmospheric lights and other anomalous observations in MS, PT, VGJ and some of the early Purāṇas, is beyond comparison with corresponding sky descriptions in the later period.

The treatment of comets is more or less similar in PT and VGJ. However, in all the manuscripts of VGJ that we have collected, the end colophon of the 7th section reads *ketumālā*. This seems to be due to the inherited records of 26 or 27 comets that were purportedly observed and hypothesized to return cyclically like the *nakṣatra-cakra* (star-wheel/cycle) repeats itself, except for the *ketu-cakra* happens over a period of more than thousand years.

Both PT and VGJ mention about 101 comets, even though in the names and counts there are differences. Both the texts agree that the first comet was from the Era of the Flood. The inter arrival times in year are similar but not exactly same. In any case the total adds to 1000 to 1300 years. This means there has been a vague long count had been maintained till the epoch of PT and VGJ estimated to be c 1300 BCE.

Ketuchara of Parashra and Garga. Among 101, twentysix were seen.

शतमेकोत्तरं केतूनां भवति तेषां षोडशमृत्युनिःश्वासजाः। द्वादशादित्यसम्भवाः। (एका)  
दशदक्षयज्ञविलयने रुद्रक्रोधजाः। षट् पैतामहाः। पञ्चदशक्रुद्धोद्दालकसुताः।  
पञ्चप्रजापतेर्हासजाः। सप्तदशमारीचिकश्यपललाटजाः। त्रयो विभावसुजाः। चतुर्दश  
मध्यमाने समुद्रे सोमेन सह संभूताः। धूमोद्भव एकः। एकस्तु ब्रह्मकोपजः इति॥ एभ्यः  
षड्विंशतिरुदयैः फलमावेदयन्ति। तन्नामतोरूपतः फलतस्तत्कालतो अभिधास्यामः।

तत्र मार्त्यवाः त्रय उदयन्ति। एकैकशो वसाकेतुरस्थिकेतुः शस्त्रकेतुर्वा॥ तत्र वसाकेतुः  
स्निग्धो महान् उदगायतशिखः त्रिंशत् वर्षशतम् प्रोष्य संप्लवेषु पश्चिमेनोदितः सद्यो  
मरकफलः सौभिक्षकरः। रूक्षो अस्थिकेतुः असौभिक्षकरः तुल्यप्रवासकालफलः। पूर्वेण  
स्निग्ध एव शस्त्रकेतुः शस्त्रवृत्तराजविरोधमरकफलः समो रूक्षः इति ॥

From the Flood, seventh is Kaliketu. After the set of Kaliketu, 115 years elapsed for the rise of Chalaketu the eighth destructive comet.

अथ पैतामहः चलकेतुः। पञ्चदशवर्षशतं प्रोष्योदितः पश्चिमेनांगुलिपर्वमात्रां शिखां  
दक्षिणाभिनतां कृत्वा कलिकेतोश्चरान्ते नभस्त्रिभागमनुचरन् यथायथा चोत्तरेण व्रजति  
तथातथा शूलाग्रकारां शिखां दर्शयन् ब्राह्मणक्षत्रमुपसृज्यात्मना ध्रुवं ब्रह्मराशिं सप्तर्षीन्  
स्पृशन् नभसः अर्धमात्रं दक्षिणमनुक्रम्यास्तं व्रजति। यः स्ववर्गं दारुणकर्मा  
स्ववर्गप्राप्तत्वादेवं कृत्स्नमभिहितस्ति। लोकमपि वा भूमिं कंपयित्वा दशमासान्  
मध्यदेशे भूयिष्ठं जनपदमवशेषं कुरुते। अन्येष्वपि च क्वचिच्छत्रुदुर्भिक्षव्याधिमरकभयैः  
क्लिशनात्यष्टादशमासान् इति॥

अथ यत्रैतद्धूमकेतुः सप्तर्षीन् उपधूपयति तदयोगक्षेमाशङ्कमित्युक्तम् ॥

(कौ सू १२७.१)

यस्य दीर्घा शिखा मुखं च परिमण्डलम् ।  
तमहं ब्रह्मणः पुत्रं केतुं आवाहयामीह ॥

Atharva Shantikalpa

पालाशधूमसंकाशान् तारकाग्रहमस्तकान् ।  
रौद्रान् रुद्रात्मकान् घोरान् तान् केतून् प्रणमाम्यहम् ॥

Rgvediya Navagraha Puja vidhi

Table 4. Twenty-six Comets of Parāśara Tantra (Chapter 11)

No	Name	Rise/set/location	Brief Description	Interval	Epoch BCE
1	Vasāketu	West -North	Destruction on Land	130 years after The Flood	2570
2	Asthiketu	West-North	Famine	130*	2570
3	Śastraketu	East	Destruction	130*	2570
4	Kumudaketu	West	Bright like milk spray head bent east	---	2560
5	Kapālaketu	East	New Moon evening, smoky crown centre of sky	125 yrs 45 days	2435
6	Maṇiketu	West (one night) Crown bent east	Milky white like star Arundhatī	End of KK	2434
7	Kaliketū	East, Travels one-third of sky. Copper red colour. Trident like head	Famine, Reduces population to one-third	300 yrs 9 months	2130
8	Calaketu	West, bent south. Travels north close to star Abhijit, touches the Pole star and U.Major. Returns south to set.	Head like a trident. Destroys Madhyadeśa	115	2015
9	Jalaketu	West. Well-formed star head	Benevolent to people	9 months after Calaketu	2014
10-17	Ūrmī-Śita	Eight of them adding to about 120 yrs interval.	Good for agriculture	13, 14 & 18 yrs.	2004-
18	Bhavaketu	East. Like the Kṛttikā star. Looking like the tail of a lion.		----	1884
19-20	Śvetaketu	East, crown bent south	Destruction on land	110 yrs	1774
21	Ka	West, seen with Śvetaketu	Looking like a yoke or pole		1774
22	Padmaketu	West	Lotus stalk like	---	1765
23	Svadhiketu	Rises in star Jyeṣṭhā. With a swirling type head.	Dark and harsh extending for one-third of the sky.	115 yrs	1650
24	Āvartaketu	Rises late night. Head like a Conch	Benevolent to people.	After Svadhiketu	1640
25	Raśmiketu	Rises in Pleiades cluster Smoky red in colour.	Effect similar to Śvetaketu	100 yrs	1540
26	Saṁvartaka	West. Coppery red, spear like head. Occupies one-third of the sky	Wars and Destruction.	108 yrs	1432
27	Gadāketu (Vṛ.Garga)	Mārgaśira Amāvāsyā, near stras Ārdṛā, Punarvasū, Puṣya, Āśleṣā and Maghā		----	C 500 BCE

\* VGJ mentions that the first three comets each arose at interval of 130 years after The Flood.

← संप्लवः

वृद्धगर्ग ; केशुमाला १३१  
श्लोक

नक्षत्रचक्रमाकाशे यथैव परिवर्तते ।  
केतुचक्रं तथैवेदमाकाशात् परिवर्तते ॥  
वेदार्थानिव यत्नेन प्रसन्नमनसोद्यताः ।  
लोकसंदर्शनं कुर्युः केतूनां दर्शनादितः ॥  
ये केतुदर्शनं दिव्या धारयिष्यन्ति मानवाः ।  
समुत्पन्ने प्रवक्षन्ते सर्वमेव शुभाशुभम् ॥

सर्वे च ब्राह्मणा लोके  
धारयन्ति जितेन्द्रियाः ।  
वेदार्थानिव यत्नेन  
प्रसन्नमनसोद्यताः ॥  
भविष्यन्ति यदा सर्वे यदि  
वा धर्मबुद्धयः ।  
केतुदर्शनदुर्गाणि  
करिष्यन्ति च सर्वशः ॥

मार्गशीर्ष्या अमावास्यां गदाकेतुः प्रदृश्यते ।  
आदित्यरौद्रसर्पाणि बार्हस्पत्यं तथैव च ॥  
क्रोष्ठागारं च शिखया धूपयन्नरुणाभया  
गदानिभो गदाकेतुः हन्यात् दृश्यो नभोगतः ॥

## Agastyachara

अथ भगवन्तममितयशसं पराशरं कौशिकोऽभ्युवाच। भगवन् याम्यायां दिशि ज्योतिष्मद्ग्रहरूपमुदितमालक्ष्यते नक्षत्रग्रहमार्गव्युत्क्रान्तचरितं न वेद्मि । किं तत्किमर्थं वा प्राचीं दिशमपहाय दक्षिणेन प्रावृट्कालान्तोदितं शरत्कालान्तोदितं वा कतिपयाहान्यदृश्यं भवति । तन्नो भगवन् वक्तुमर्हसीत्येवमुक्तो भगवानुवाच॥

उल्कयाविनिहतः शिखिना वा क्षुद्भयं मरकमेव विधत्ते ।  
दृश्यते स किल हस्तगतेऽर्के रोहिणीमुपगतेऽस्तमुपैति ॥ बृ.सं १२.२१

उत्पलः □ यद्यप्यत्र गणितसाम्यं न भवति, तथाप्याऽऽचार्येण पूर्वशस्त्रदृष्टत्वात् कृतम्॥  
तथाच पराशरः । हस्तस्थे सवितर्युदेति रोहिणीसंस्थे प्रविशति ॥

संख्याविधानात् प्रतिदेशमस्य विज्ञाय सन्दर्शनमादिशेज्जः  
तच्चोज्जयिन्यामगतस्य कन्यां भागैः स्वराख्यैः स्फुटभास्करस्य ॥ बृ.सं १२.१४  
This means Agastya rises when sun is at 23<sup>rd</sup> degree of Leo that is 143<sup>0</sup> longitude. This was alright for the time of Varahamihira c 500 AD. But as per Parashara, the Agastya rise was when sun was in the Hasta sector. This would correspond to 1300-1200 BCE.

As per Samasa Samhita  
सप्तभिरंशैः कन्यामप्राप्ते रोमके तु दिवसकरे । दृश्योऽगस्त्योऽवन्त्यां तत्समपूर्वापरेऽप्येवम्॥  
This Romaka can not be the Rome in Italy, since the latitude of Rome is not same as Avanti/Ujjain.

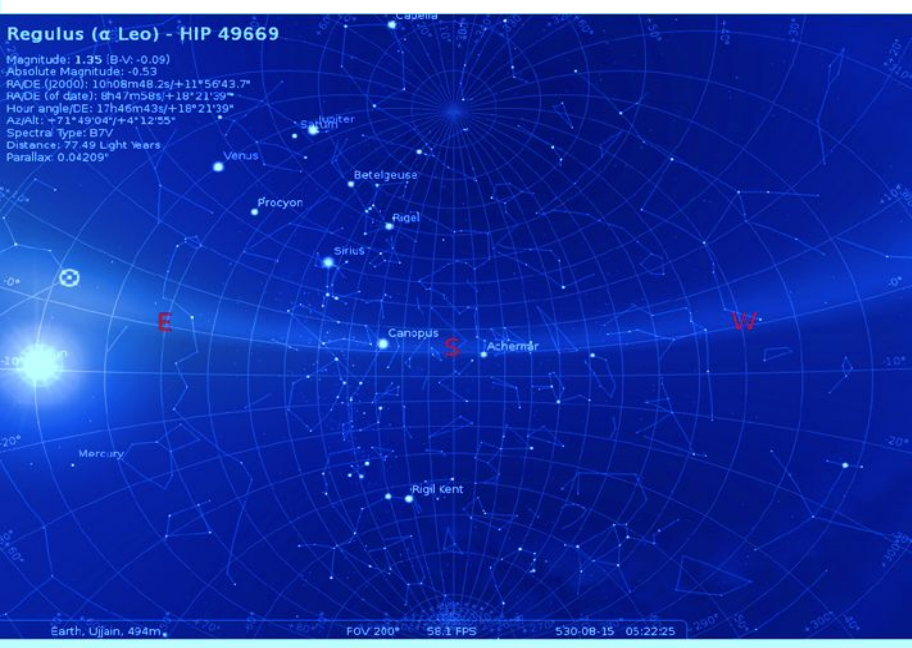
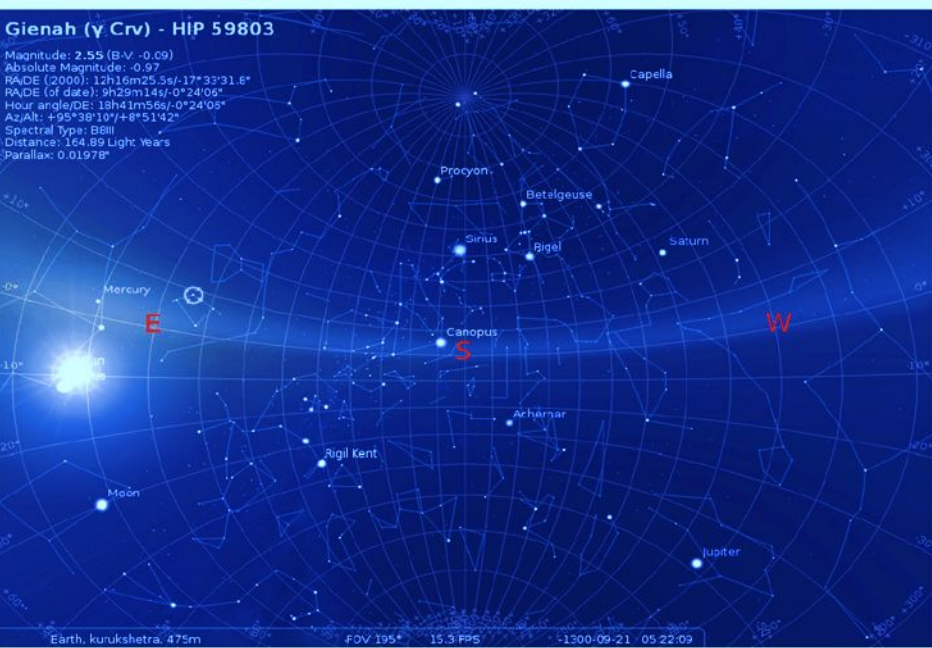


Fig.12.2 Early morning sky picture at Kurukshetra for (-1300-09-21)

Fig.12.4 First Visibility of Agastya (Canopus) at Ujjain on 15<sup>th</sup> August 530 CE. Constellation Hasta was well below the horizon. Star Maghā (Regulus) was above the horizon.



Agastya would have been visible in Kurukshetra for the Vedic people around **4000 BCE** as a star rising for short height. The star would be visible only for a few days in the nights/ early morning, and set in the southern horizon

From the Vedic texts onwards we see that stars (Taraa) and Nakshtras are discussed in detail. Perhaps due to the prescription of activities depending on the Soma-nakshatra conjunction as in the Mahasalila, identification of nakshatra becomes very important. **These are to be seen even now, if we have to apply the Vedic theories of predictive astrology.** Both Parashara and VG give great importance to counting, naming and identifying the 27/28 Nakshatras.

## ४॥ नक्षत्रकर्मगुणाः ॥

कृत्तिका<sup>1</sup>-स्वग्निसाध्यानि<sup>2</sup> सर्व-कर्माणि<sup>3</sup> साधयेत्। आपणा<sup>4</sup>-श्वाग्निवृत्तीनां प्रयोगाश्च<sup>5</sup> गृहाणि च॥ १॥

गोऽजविक<sup>6</sup>-वृषोत्सर्गानथ<sup>7</sup> सङ्कलन<sup>8</sup>-चयम्। भाण्डानि चाश्मसारेभ्यो<sup>9</sup> विविधान्यत्र<sup>10</sup> कारयेत्॥ २॥

पीतलोहितवस्त्रं च भाण्डानि विविधानि च। न कारयेन्न कृणुयात्<sup>11</sup> सारवन्तान्तवानि<sup>12</sup> च॥ ३॥

कन्योपनयनं कुर्यादभिचारां-स्तथारिषु<sup>13</sup>। क्षौरं चात्र न कुर्वीत षड्वारे<sup>14</sup> वह्निदैवते॥ ४॥

स्वाध्यायाभिजनोरूपी<sup>15</sup> दीर्घायुः श्रुतिकीर्तिमान्<sup>16</sup>। तेजस्वी कृपणः<sup>17</sup> क्रोधी यज्वा दाता च जायते<sup>18</sup>॥ ५॥

रोहिण्यां स्थावर<sup>19</sup> कर्म प्रशस्तं चापि कारयेत्। परस्मा<sup>20</sup>-द्वाददेदन्नं प्रयोगाश्च न कारयेत्॥ ६॥

chariot construction, herding of cattle, elephant catching, sacrifices and religious rites, mention of *kanyopanayanam* stands apart as special. *Upanayanam* refers to the initiation ceremony prescribed for boys before they start Vedic studies. *Kanyopanayanam*, in VGJ refers to such a ceremony for girls, a custom long extinct. We find that this custom existed in ancient times as prescribed in the *Dharmasūtra* of Hārīta quoted by a famous later author Devaṇa Bhaṭṭa (c 1200 CE)

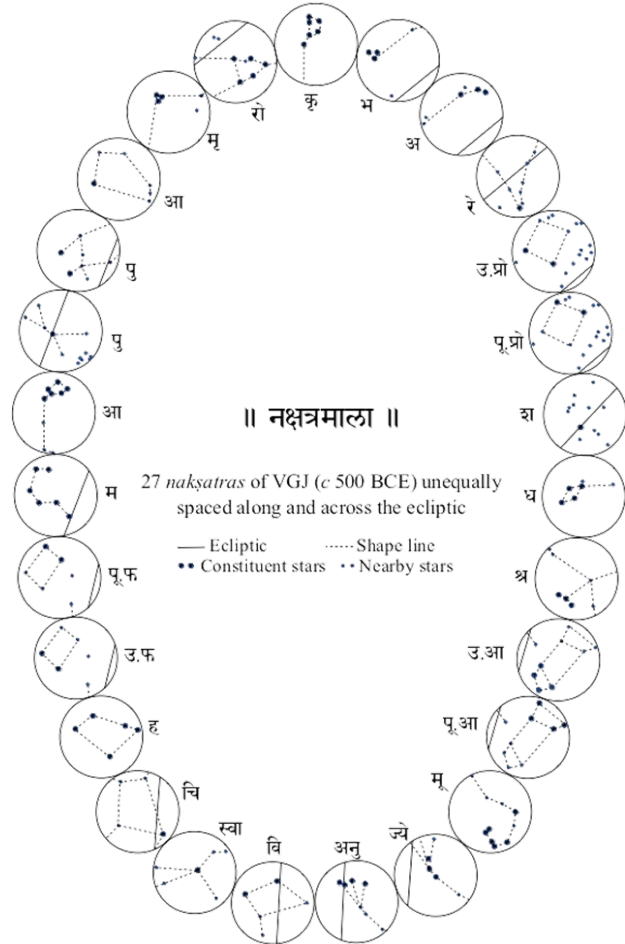
यत्तु हारितेनोक्तम् - "द्विविधास्त्रियो ब्रह्मवादिन्यस्सद्योवध्वश्च। तत्र  
ब्रह्मवादिनीनाम् उपनयनम् अग्नीन्धनं वेदाध्ययनं स्वगृहे च  
भिक्षाचार्येति। सद्योवधूनां चोपस्थिते विवाहे कथंचिद् उपनयनमात्रं कृत्वा  
विवाहः कार्यः॥" इति।



Nakṣatra	Star Count					Constituent Stars	Astrograph	Proxy Star
	VGJ	PT	AVP	SKA	SCP			
Kṛttikā	6	6	6	6	6	Tau 17,19,20,23,27,η	Knife/Cleaver	η Tau
Rohiṇī	5	5	1	5	5	Tau α,γ,δ1,ε,θ2	Cart	α Tau
Mṛgaśira	3	3	3	3	3	Ori α,γ,λ	Deer's Head	λ Ori
Ārdrā	1	1	1	1	1	Gem γ	Bāhuḥ (Arm) Red Dot2	γ Gem
Punarvasu	2	2	2	2	5	Gem α,β	Balance2	β Gem
Puṣya	1	1	1	3	3	Cnc δ	Śarāva (Pot-lid)2	δ Cnc
Āśleṣā	6	6	6	1	6	Hya δ,ε,ζ,η,ρ,σ	Snake Head Flag2	ζ Hya
Maghā	6	6	6	5	7	Leo α,γ1,ε,ζ,η,μ	Enclosure	ζ Leo
P Phalgunī	2	2	2	2	2	Leo δ,θ	Half-chair	δ Leo
U Phalgunī	2	2	2	2	2	Leo 93,β	Half-chair	β Leo
Hasta	5	5	5	5	5	Crv α,β,γ,δ,ε	Hasta (hand) Madhupuṣpa (Flower)2	δ Crv
Citrā	1	1	1	1	1	Vir α	Kīlaka (Wedge)2	α Vir
Svātī	1	1	1	1	1	Boo α	Divider Rope2	α Boo
Viśākhā	2	2	2	2	5	Lib α1,α2	Necklace	α2 Lib
Anūrādhā	4	4	4	4	5	Sco β1,δ,π,ω1	Elephant Tusk2	δ Sco
Jyeṣṭhā	3	3	1	3	3	Sco α,ε,σ,(τ)	Root Scorpion Tail2	κ Sco
Mūla	6	2	7	7	1	Sco ζ2,θ,ι1,κ,λ,ν	Gajavikrama (Elephant Step)2	λ Sgr
P Aṣāḍhā	4	4	4	4	4	Sgr γ,δ,ε,λ	Simhaniṣadya (Lion seat)2	τ Sgr
U Aṣāḍhā	4	4	4	4	4	Sgr ζ,σ,τ,φ	Gośīrṣāvali2	-
Abhijit	-	3	1	3	3	???	Ear Yavamadhya (Barleyseed)1	α Aql
Śravaṇa	3	3	3	3	3	Aql α,β,γ	Śakuni-pañjara (Bird cage)2	β Del
Śraviṣṭhā	4	5	5	4	5	Del α,β,γ2,δ	Puṣpopacāra (Flower Boquet)2	λ Aqr
Śatabhiṣak	1	1	1	1	100	Aqr λ	Cow's Foot	α Peg
P Proṣṭapada	2	2	2	2	2	Peg α,β	Cow's Foot	λ Peg
U Proṣṭapada	2	2	2	2	2	Peg γ,λ	Boat2	ε Psc
Revatī	1	1	1	1	32	Psc ε,(α,ζ)	Horseneck	β Ari
Aśvayuk	3	2	1	2	3	Ari α,β,γ	Bhaga (Perineum)	41 Ari
Bharaṇī	3	3	3	3	3	Ari 35,39,41		

१४.२ [अथ प्रत्येकं मिलितानां च नक्षत्रतारकाणां पीडाफलम् । तत्र पराशरः]

अथ ऋक्षोपसर्गाः। अयथावद्योगश्चन्द्रमसः सूर्यानुप्रवेशो  
ग्रहोदयास्तमयरश्मिसंसर्गाः । स्थानचारः परिवेष उल्काभियातो  
रश्मिहानिर्विवर्ण्यमिति । तेषां तारावयवशः पृथक्पृथक् फलमुपदेष्टव्यम् ॥



५ ॥ तिथिकर्मगुणाः<sup>१</sup> ॥

वने चैत्ररथे रम्ये महर्षीणां<sup>२</sup> समागमे। कृताह्निकमृषिं सिद्धं<sup>३</sup> गर्गं क्रोष्टुकिरब्रवीत् ॥ १ ॥

भगवन्<sup>४</sup> का तिथिर्नाम कुतश्चैषां<sup>५</sup> प्रवर्तनम्<sup>६</sup>। किं कर्म<sup>७</sup>-फलयोगाद्वा<sup>८</sup> भगवन् प्रब्रवीहि<sup>९</sup> मे ॥ २ ॥

एतस्य तिथिवर्गस्य<sup>१०</sup> प्रवृत्तस्येह<sup>११</sup> सर्वदा। सर्वस्य विस्तरेणेह ब्रूहि कर्म शुभाशुभम् ॥ ३ ॥

<sup>१२</sup>पृथक् देवता<sup>१३</sup>-स्तिथ्यो नामानि च<sup>१४</sup> पृथक् पृथक्। क्रोष्टुकेर्वचनं श्रुत्वा गर्गो वचनमब्रवीत् ॥ ४ ॥

शृण्वन्तु<sup>१५</sup> ऋषयः सर्वे देवाश्च सपुरोहिताः<sup>१६</sup>। यदा स भगवान् यक्षः<sup>१७</sup> सोमो<sup>१८</sup> यक्षमाणमुत्सृजत्<sup>१९</sup> ॥ ५ ॥

ततः प्रक्षीयमाणस्य<sup>२०</sup> तिथिरेवं<sup>२१</sup> च संज्ञिता। द्विलवोनमहोरात्रम् एतस्य परमा गतिः<sup>२२</sup> ॥ ६ ॥<sup>२३</sup>

[ मासस्त्रिंशद्दहोरात्राः पक्षोऽर्धं साकनं स्मृतम्। अहोरात्रलवानां तु चतुर्विंशं शतात्मकम् ॥ ६ ॥ ]

वक्ष्यामि च पृथक्त्वेन देवता नाम कर्म च। नन्दा भद्रा बला<sup>२४</sup> रिक्ता पूर्णा मासा<sup>२५</sup> प्रकीर्तिता ॥ ७ ॥

मित्रा महाबला<sup>२६</sup> चैव उग्रसेना सुधर्मिणी<sup>२७</sup>। आनन्दा च यशा चैव जया प्रोक्ता<sup>२८</sup> त्रयोदशी ॥ ८ ॥

उग्रा चतुर्दशी ज्ञेया सौम्या पञ्चदशी<sup>२९</sup> तथा। द्विरेताः परिवर्तन्ते चान्द्रे माने<sup>३०</sup> पृथक् पृथक् ॥ ९ ॥

शुक्लः<sup>३१</sup> कृष्णश्च पक्षौ द्वौ प्रवर्तयति यः प्रभुः। नामदैवतकर्माणि तासां वक्ष्यामि कृत्स्नशः ॥ १० ॥

नन्दा<sup>३२</sup> प्रतिपदा प्रोक्ता प्रशस्ता ध्रुवकर्मसु। ज्ञानस्य च समारम्भे<sup>३३</sup> प्रवासे चापि<sup>३४</sup> गर्हिता ॥ ११ ॥

When *Soma* (moon) due to *yakṣma* (curse of consumption) wanes, the decrease in measure is known as *tithi*. The maximum time extent of a *tithi* is 2 *lavas* short of a day (1 lava = 124<sup>th</sup> portion of a day of 30 *muhūrtas*).

*Garga* names the 15 *tithis* and says that they occur twice in a (lunar) month, during *kṛṣṇapakṣa* (waning fortnight) and *śuklapakṣa* (waxing fortnight).

FOR TRACING THE HISTORY OF INDIAN ASTRONOMY BEFORE  
ARYABHATA  
MAHASALILA,  
PARASHARA TANTRA,  
VRDDHA-GARGIYA-JYOTISHA  
ARE INDISPENSABLE.

THESE DERIVE THEIR INSPIRATION FROM THE MORE  
ANCIENT VEDIC TRADITION.

THE TEXTS CLAIM THEIR SUBJECT TO BE  
VEDANGA JYOTISHA WHICH IS APT.

PLANETS WERE KNOWN WITH VISIBILITY NUMBERS.

SUN, MOON, ECLIPSES, STARS, METEORS, COMETS,  
OCCULTATIONS, PORTENTS GET ABUNDANTLY DESCRIBED.

IMPORTANT TO RECOGNIZE THAT  
LAGADHA'S CALENDAR IS NOT THE MOST ANCIENT

*Vedanga Jyotisha*