PIDAPARTY Purna Satya HARIPRASAD
Koundinyasa gothram
Pidaparty China Purnayya Siddhanti – Grand father
"Daivajna Bhushana", "Ganita Kalanidhi", "Bharati teerthopadhyaya",   Pidaparty Krishnamurty Sastry (1897-1977) – Father
Born in Rajahmundry (India) – on January 8, 1935
Now permanent resident of Secunderabad (India) since 1994

Education – ICWA – Final – 1966;
B.A. (Maths & Statistics) – 1957
No schooling – studied Sanskrit with father in a traditional way for > 10 years – Passed Government Sanskrit Entrance Exam (Combined Madras Government) in 1949

Employed in Calcutta, New Delhi, Madras, Bombay, Hyderabad & Bangalore – in India
Assignments outside India – Lusaka (Zambia), Port Harcourt (Nigeria) and Guneid (Sudan)

Designed & installed Sundials in Andhra Pradesh in:
- Ashram Public School, Kakinada in 2007;
- Dwaraka Tirumala, near temple in 2010;
- Shilparamam, Tirupati (2012) –

Post retirement hobby with no formal guidance from anyone – only blessings from father.
                    See inner cover pages

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(Second edition)

Vishuvat Chalana
(PRECESSION OF EQUINOXES)

(A brief and authentic journey from Vedic times to the present)

First edition of this booklet is available on the internet for free download http://crossasia-repository.ub.uni-heidelberg.de/ or under full name of the author

वेदमयीं नादमयीं बिन्दुमयीं परपदोद्यादिन्दुमयीं मन्त्रमयीं तन्त्रमयीं प्रकृतिमयीं नौमि विश्वविकृतिमयीं

PIDAPARTY Purna Satya HARIPRASAD
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Sundials designed and installed by the Author

In Shilparamam, Tirupati in 2012/2013

Dwaraka Tirumala near Temple (2008-2010)

__At Ashram Public School, Kakinada (2005-2007)__

__By my father Sri Pidaparty Krishnamurty Sastry (1897-1977)__

__At Sri Satyanarayana Swamy temple,__
__Annavaram Hills (1943)__

Second Edition

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DEDICATED to

Late Sri Pidaparty Subrahmanya Sastry

(My father's second elder brother) who was responsible for voluminous revision of earlier version of Ketkar's 'Jyotirganitam' and bringing out 1937 edition

And

"Daivajnabhushana", "GanitaKalanidhi", "Bharati Teerthopadhyaya"
Late Sri Pidaparty Krishnamurty Sastry
(1897-1977) – my father
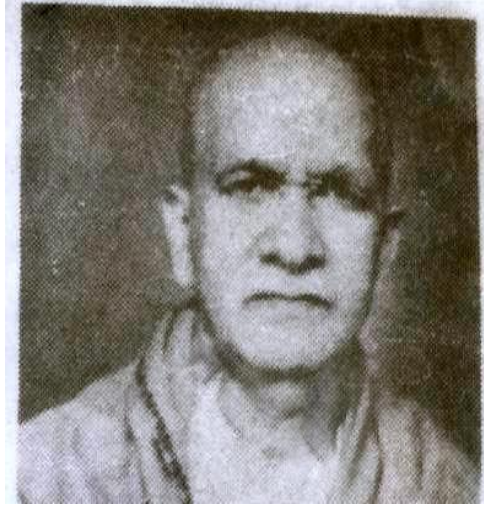
Both studied 'Ancient Indian Astronomy' in Varanasi under the learned guidance of 'Mahamahopadhyaya' Sri Muralidhara Jha.

My father and his elder brother devoted their life time for upholding the honour and legacy of PIDAPARTY family. They continued the tradition based on principles of accurate Panchanga and Dharma Sastra decisions based on ancient Indian Astronomy and related Sastras

गुरुर्ब्रह्म गुरुर्विष्णुः गुरुर्देवो महेश्वरः गुरुस्साक्षात्परब्रह्म तस्मै श्रे गुरवे नमः

Introduction

This booklet is addressed to the following categories within and outside India:

- **Those who seek re-validation of recommendations made by Calendar Reform Committee headed by Prof Meghnadh Saha, FRS, in their Report (1955) and see the reconciliation between scientific data accepted by the present day scientists and available on record in ancient Indian Literature such as Vedas, Vedanga Jyotisha, etc.**
- **Those who calculate and compile Indian Almanacs each year for day-to-day use of Hindu community for religious purposes.**
- **Those, Indians and aliens alike, who are ignorant of level of comprehension of ancient Indians about 'precession of equinoxes' and the origins of knowledge in India from Vedic times with respect to Astronomy in general and Equinoxes and their precession, in particular?**
- **Those who are ignorant about Vishuvat Chalana**

There is abundant evidence of knowledge available in ancient India such as Vedas, Vedanga Jyotisha, Suryasidhantha, etc. **Vedic Sanskrit is beyond the level of comprehension of average Sanskrit scholars today**.

Secondly there is adverse propaganda deliberately publicized and perpetuated by Western Indologists / pseudo Scientists and believed / followed by some pseudo intellectuals in India without making an attempt to understand what is available in ancient Indian Astronomical literature.

The writer does not claim or represent himself as an authority on the subject. He is neither a scholar nor a scientist. He has chosen to compile the information he is able to lay his hands on and present it in a logical manner for the benefit of interested readers.

Readers may kindly review the material critically and offer suggestions and comments for improvement to e-mail id: hariprasadpps@gmail.com. They will be gratefully received and acknowledged.

Secunderabad (India)
2017 (revised)

PIDAPARTY Purna Satya HARIPRASAD

Contents

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Some basic terms used in this booklet

Equator is known as 'Bhu-madhya Rekha' - The imaginary line that divides the Earth into two equal halves – That is Horizon.

Ecliptic is known as 'Kranti Vrutta' – apparent path of the Sun.

When Equator is extended indefinitely, the **Equator** and the **Ecliptic** intersect at two imaginary points. These two points are known as **Vishuvats or Equinoxes. These are Vasanta Vishuvat and Sarat Vishuvat – Vernal Equinox and Autumnal Equinox respectively.** Angle at the points of intersection is 23.5⁰

Stellar Segments

Sanskrit name	English equivalent
ASWINI	Beta ARIETIS
BHARANI	41 ARIETIS
KRITTIKA	Eta Tauri / Alcyon / PLEIADES
ROHINI	Alpha Tauri / ALDEBARREN
MRIGASIRA	Lambda ORIONIS
ARUDRA	Alpha Orionis / BETELGEUSE
PUNARVASU	Beta Geminiorum/CASTOR / POLLUX
PUSHYAMI	Delta CANCRI
ASLESHA	Alpha Cancri / HYDRAE
MAGHA	Alpha Leonis / REGULUS
PURVA PHALGUNI	Delta LEONIS
UTTARA PHALGUNI	Beta Leonis/DENEBOLA
HASTA	Delta CORVI
CHITRA	Alpha Virginis / SPICA
SWATI	Alfa Bootis/ARCTURUS
VISAKHA	Iota LIBRAE
ANURADHA	Delta SCORPIONIS
JYESHTHA	Alpha SCORIONIS / Antares
MULA	Lambda SCORPIONIS
PURVASHADHA	Delta SAGGITARII
UTTARASHADHA	Delta SAGITTARII
SRAVANAM	Alpha AQUILAE (Altair)
DHANISHTHA	Alpha DELPHINUS / DELPHINI
SATABHISHAM	Lambda AQUARII
PURVABHADRA	Alpha PEGASSI
UTTARABHADRA	PEGASSI / Alpha ANDROMEDAE
REVATI	Zeta PISCIUM

Unfortunately these segmentations are not visible to the naked eye. Therefore one has to necessarily depend upon what is visible.

VISHUVAT CHALANA

While **Ecliptic is stationary,** equinoxes are not because of cyclic wobbling effect of tip of the axis of the Earth. They keep moving in a very slow pace. Their motion is backwards. Rate of movement of equinoxes is known as Precession of Equinoxes or **Vishuvat Chalana** or also Ayana Chalana. This precession is slightly > 50".2 per year. To move 1°, they take 72 years approx.

For the benefit of those who are unfamiliar with the subject, it is necessary to clarify what is "Vishuvat-Chalana" or 'Precession of Equinoxes'.
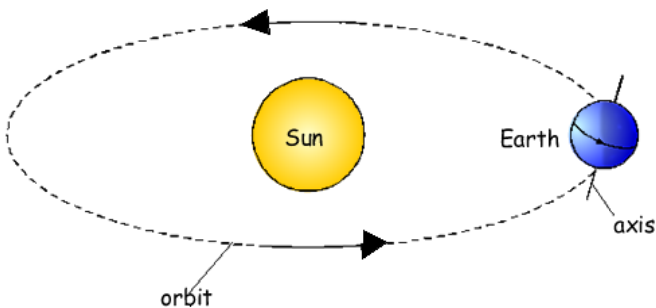
The system shown above is known as 'Heleo-Centric' i.e. Sun at the centre. Axis of the Earth is

slightly inclined and makes a revolution at the end of the Axis while revolving around the Sun.

This motion is known as precession of equinoxes or 'Vishuvat-Chalana'. It is a cyclic wobbling motion in the orientation of Earth's axis. It takes approximately 26,000 years to complete one revolution. See the picture.
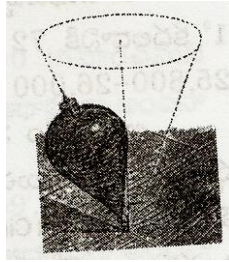
Knowing the accurate position of equinoxes on the Ecliptic and the rate of precession is important for the purpose of calculation and compilation of Hindu Almanacs, determining the planetary positions and their effects on humanity. Therefore they are the backbone in Astronomical/Astrological calculations.

That is the subject matter of this booklet.

Tally of Precessions from Vedanga Jyotisha Period to Positional Astronomy Centre in India – for the year 2017-2018 A.D.

Cumulative Precession of Equinoxes / Ayanamsa

1	From Vedanga Jyotisha period To Varahamihira period	+ 26° 40'
2	Vedanga Jyotisha period	- 23° 20'
3	Varahamihira Period	+ 3° 20'
4	Varahamihira period to Salivahana Saka 450 or 628 A.D. i.e. precession in 1350 years @ 1° in 72 years	+ 18° 49'
5	**For Salivahana Saka 1800**	**22° 09'**

22° 09' is the basis for Tables in 1937 edition of Jyotirganitham

"एवं शालिवाहन शके १८०० वर्षे शास्त्रशुद्धाः, गणितशुद्धाः"

– Shri Ketkar confirmed.

5	For Salivahana Saka 1800	22° 09'
6	For Salivahana Saka 1938	24° 05'
7	For Salivahana Saka 1939	24° 06'

Salivahana Saka 1938 = 2017 A.D.
Salivahana Saka 1939 = 2018 A.D.

* Salivahana Saka means beginning of Saka year which is approximately March-April Christian Era.

Therefore there are approximations of arc seconds ("). This may be noted by the readers.

This agrees with precession now being followed by POSITIONAL ASTRONOMY CENTRE, Kolkata. A successor to

THE INDIAN EPHEMERIS & NAUTICAL ALMANAC CENTRE

ASSUMPTIONS

Sri Dattatreya Venkatesh Ketkar & Sri Pidaparty Subrahmanya Sastry who were joint authors of 1937 edition of JYOTIRGANITAM based their calculations on the strength of following assumptions:

- Vedanga Jyotisha period was 1470 years before the beginning of Salivahana Saka i.e., 1938 + 1470 = 3408 – 2017 = 1391 B.C.
- Varahamihira Period was Salivahana Saka 450 or 528 A.D.

Readers will notice in the following pages that these periods are the best estimates under the circumstances. They lend themselves to review for further research in the areas identified as inherent limitations explained later.

2

<u>VEDANGA JYOTISHA</u>

<u>Author – Lagadha?</u>

"प्रणम्य शिरसा कालं अभिवाद्य सरस्वतीं कालज्ञानं प्रवक्ष्यामि लगधस्य महात्मनः"

1st sloka in Vedanga Jyotisha

Meaning: I am transmitting the knowledge and wisdom of 'significance of time' to Lagadha Mahamuni (Mahatma). Who is 'I'? It is unknown. That is, such texts are known as *'apaurushiyas'*. *Author is unknown. There are many such texts in ancient Indian Sanskrit Literature such as Vedas, Vedanga Jyotisha, Surya Siddhanta etc.*

There are many who interpreted the above sloka and believed that Lagadha was the author of Vedanga Jyotisha.

If Lagadha was the author, he would not have addressed himself as "**महात्म".** The expression "**लगधस्य"** would not have been used.

That **Lagadha** was the author was advanced by some vested interests only to counter the fact that it was *"apaurusheya"*. The fact is that Lagadha was a Special Purpose Vehicle used by the divine power.

Lagadha was not the author.

Objective of Vedanga Jyotisha

Please look at these verses:

"``` **कालज्ञानं प्रवक्ष्यमि** ``”   **verse 2**
"``` **वेदा हि यज्ञार्थं अभिप्रवुत्ताः कालानुपूर्व्या विहिताश्च यज्ञाः**
तस्मादिदं कालविधान शास्त्रं यो ज्योतिषं वेद स वेद यज्ञान्"   **verse 3**

Objective of the text is to accurately determine the time (**कालविधान शास्त्रं**) for observation and performance of various religious ceremonies including *YAJNAS* such that best results of such functions can be obtained for the benefit of the society. It is more to do with accurate computation of planetary positions and their movements with reference to date and time.

[Thrust was more on Astronomy rather than Astrology]

Indologists, scientists and scholars lost sight of very purpose and objective of the text. Kindly notice the language of D W Whitney in the following passage:

[Ref. Oriental and Linguistic studies, 2nd series, New York 1874 Page 384]

Mr. D W Whitney wrote: "The so called Vedic astronomical manual (Vedanga Jyotisha) whose first object seemingly ought to be to give rules on such points (as Amavasya, etc.) is mostly filled with un-intelligible rubbish, and leaves us in the lurch as regards valuable information."

[Mr. Whitney's arrogance and ignorance are here for readers to know.]

Mr. D W Whitney continued: "**…**and when we come to add that the jyotisha (Vedanga Jyotisha) has no definable place in Sanskrit literature, or relation to the **Vedic ceremonials** … we shall see that this famous datum which has seemed to promise so much, has caused so much labour and discussion, and is even yet clung to by some scholars as the sheet anchor of ancient Hindu chronology, is nothing but a delusive phantom."

Please look at the tree below carefully. Is there no definable place for Vedanga Jyotisha in Sanskrit literature?

What is it Mr. Whitney looking for?

Mr. Whitney's curiosity, if he has any, is addressed in the photo (tree) showing the relationships.

Aadiyuga & Astronomical Conditions

*Please notice use of the word **"Aadi-yuga" in Vedanga Jyotisha and the conditions associated with it** below.*

"स्वराक्रमेते सोमकौं यदा साकं सवासवौ
स्यात्तदादियुगं माघः तपः शुक्लोयनं ह्युदक्"

Vedanga Jyotisha, 7th sloka

Stellar segment 'Dhanishta' is a group of stars. 'Yogatara' (principal star) is recognized and acknowledged as beginning point of 'Alpha Delphini'.

'Aadiyuga' starts when Sun and Moon shine at the beginning of Dhanishta Nakshatra, then the beginning of Magha masa (month), Tapo masa, Sukla paksha (1st fortnight), Uttarayana (beginning of Sun's transit towards North).

Aadiyuga in Brahma's LIFE SPAN

Brahma Ayuh-pramana should have been referred to. Duration of each Brahma's life is 100 years in Brahma's time scale.

The very first yuga in the Brahma' lifespan is known as AadiYuga. In the present Brahma's life, 50.0006 years is over i.e. 155,521,955,885,117 solar years. That is 100 years in Brahma's life is 311,040,179,288,075 solar years. This is the Ayuh-pramana in present Brahma's life.

BRAHMA'S LIFE is limited to 100 years in his time scale.

But Brahma's time scale is different from the time scale of human beings.

At the end of LIFE of each Brahma, the world will come to an end.

Then another Brahma will come into being.

432 crore years for human beings = one daytime for each Brahma. [1 crore = 10 million]

864 crore years for human beings = 24 hours or day & night for each Brahma.

Duration of a month (30 days) for each Brahma = 30 x 8,640,000,000 = 259,200,000,000 solar years for human beings.

Duration of a year (360 days) = 360 x 8,640,000,000
= 3,110,400,000,000 solar years for human beings

Following extracts explain life span of Brahma:

"परमायुः शतं तस्य तया अहोरात्र संख्यया
आयुषो अर्धमितं तस्य शेषकल्पोयमादिमः २१
कल्पादस्माच्च मनवः षड्व्यतीताः ससन्धयः
वैवस्वतस्य च मनोः युगानां त्रिघनो गतः २२
अष्टाविंशद्युगादस्माद्घातमेतत्क्षुतं युगं
अतः कालं प्रसंख्याय संख्यामेकत्र पिण्डयेत्" २३
ग्रहर्क्ष-देव-दैत्यादि स्रुजतोस्य चराचरं
क्रुतद्रि वेदादिव्यब्दाः शतघ्नावेधसो गताः २४

Surya Siddhantha, Madhyamadhikaara

Brahma Siddhantha, Surya Siddhanta, etc. quoted
in "Panchanga Peethika Lekhana Prakriya" – > 160
year old book written on palm leaves – recently
published by Rastriya Sanskrit Vidyapeetha,
Tirupati. [University supported by Government of
India}

Then a new Brahma's life starts and re-creation
process begins once again after a gap of nearly 2
crore years (scale for human beings)

**Mr. John Bentley had to say about our
Yuga system "…….The means were
adopted by Brahmins for completely doing**

away their ancient history and introducing the periods now in use by which they threw back creation to the immense distance of 1,972,947,101 before Christian Era, with a view, no doubt to arrogate themselves that they were the most ancient people on the face of the Earth"

[Ref: History of Oriental Astronomy, Proceedings of an International Astronomical Union Colloquium No 91, New Delhi, November 1985]

Many Scientists were unable to digest the fact that the knowledge was transmitted through Guru Parampara, from times immemorial in India.

These Scholars never found time to find out how many years ago AADIYUGA occurred satisfying the conditions spelt out in the text.

Vishuvat Revolutions

a. "इयासः क्रुष्णे दशभिः सहस्रैः अवतमिन्द्रैः"

(Rig-Veda 8-96-13)

Meaning: Indra or Vishuvath or equinox makes revolutions – 15 x 10 x 1000 = 150,000 times (in one Kalpa – implied). ***Kalpa is 4320 million years.** That is 150 revolutions in one Mahayuga. One Kalpa = 1000 Mahayugas. It comes to 28,800 years

which is equivalent to 45" per year for completing one revolution as against 26,000 estimated at present.

While interpreting Vedas, following are the acknowledged equivalents:

Agni = Vasanta Vishuvath / **Vernal equinox**
Indra = Sarath Vishuvath / **Autumnal Equinox**
Mitra = Winter Solstice
Varuna = Summer Solstice

b. Story from Vishnupurana

According to Vishnupurana, *Dhruva did penance. Having been pleased, Vishnu appeared and gave him a gift. As a reward for Dhruva's penance, "Saptarishi Mandalam" revolves around Dhruva once every 26,000 years. "Based on this, annual precession may be calculated as **49".846. See how close it is to current estimate of 50".27.**

*[a book "Nakshatramulu" in Telugu by Late Gobburi Venkatananda Raghava Rao]

"Saptarishi Mandalam" appears in the sky somewhat like this
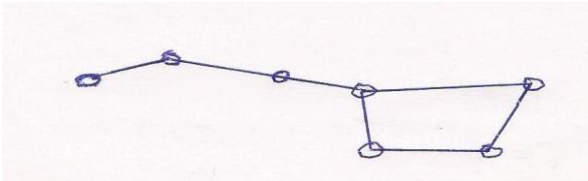
Only 49 verses available

Full text of Vedanga Jyotisha is not available in the archives. What is available is summarized below:

36 verses in Rig-Vedanga Jyotisha
43 verses in Yajur-Vedanga Jyotisha

There are duplications. When they are removed, 49 verses remain. This incomplete text makes determination of age of Vedanga Jyotisha with a reasonable accuracy more complex.

{Source: Report   of   the   Calendar   Reform Committee}

Prof K V Sarma found references to

35 verses in Rig-Vedanga Jyotisha
45 verses in Yajur-vedanga Jyotisha

Prof Sarma claims to have made a close review of 20 independent manuscripts.

In a number of places, original script was mutilated and therefore each editor created their own version.

Such is the inadequacy of information now available on Vedanga Jyotisha.

None of the Scholars made an attempt to determine or even estimate number of revolutions VISHUVAT completed, through any other alternate means, before assigning an age for the Text.

Distinguished INDOLOGISTS / SCHOLARS and RESEARCHERS – ATTEMPTED TO ASSIGN AN AGE FOR VEDANGA JYOTISHA.

Vedas, Upanishads, Vedanga Jyotisha, Surya Siddhantha etc are ancient Indian Literature and they are known as 'Apaurusheyas' meaning nobody knows who authored them and when. Western Scholars tried to attribute someone's name as an author and assign an age to the ancient text.

Indian counterparts followed blindly without a serious review.

Following is a list of a few distinguished persons – I came across in different sources presently available with me.

01. Prof T S Kuppanna Sastry
02. I.D. Swamikannu Pillai
03. Dr. G Thibaut
04. Mahamahopadhyaya Sudhakar Dwivedi
05. Shantanu Chakravarti / Subbarayappa
06. Sankara Balakrishna Dixit
07. Bala Gangadhar Tilak

08. Prof Meghanadh Saha & N. C. Lahiri
09. Shama Sastry
10. Satish Chandra Bhattacharya
11. H M Yagnik
12. Prof David Pingre
13. Michael Witzel
14. Prof K V Sarma etc

Why these honourable men took it upon themselves the responsibility to assign a date for Vedanga Jyotisha? What was the objective of the Mission?

Limitations are:

i. Limited availability of Vedanga Jyotisha
ii. Frequent editing for some reason or the other.
iii. Inability to determine number of revolutions of Equinox
iv. Lack of awareness of Life Span of Brahma and Age of ADIYUGA.
v. Limited or no knowledge of Vedic Sanskrit (for some).

Some of the scholars are blind to the realities with eyes wide open. They could not read and understand what is visible.

I am not qualified to comment on their knowledge and competence. But …………..
Some of the scholars like Whitney and Bentley feel proud of their assets and possessions - ARROGANCE AND IGNORANCE.   That is their culture.

While in pursuit of excellence, Scholars lost their way

Many scholars focused on the age of Vedanga Jyotisha rather than the content, relevance and quality. By so doing, People like D W Whitney and Mr. John Bentley allowed and encouraged themselves to exhibit dreaded combination of their ignorance and arrogance.

In a positive sense, this is a virgin field for Research Scholars and Indologists to discover answers to the limitations highlighted above.

Vedanga Jyotisha was dated 1370-1340 B.C. by Prof T S Kuppanna Sastry; and late Swamikannu Pillai from B. C. 1400 to B.C. 850 etc. For this purpose, they appear to have measured angular

distance of equinox on the date assigned to Vedanga Jyotisha, and the desired date (say today) and calculated the period / year - @ 1° in 72 years.

It is in this background, Sri D V Ketkar and Sri Pidaparty Subrahmanya Sastry assigned the last known age of Vedanga Jyotisha as 1391 B.C. for a limited purpose of arriving at the position of Vishuvat at the time.

CUMULATIVE PRECESSION -
Vedanga Jyotisha period

Sun and Moon changed (Vedanga Jyotisha period) the direction from South to North (beginning of Uttarayana), according to Vedanga Jyotisha, at the beginning of stellar segment Dhanishtha (Sravishtha).

"प्रपद्येते श्रविष्ठादौ सूर्या चन्द्रमसावुदक् सार्पार्थे दक्षिणार्कस्तु माघःश्रावणयोःसदा"

(Sloka 7, Yajur-Vedanga Jyotisha)

In Garga Samhita **"यदामाघस्यशुक्लस्य------ "**it is stated that Sun changes the direction from North to South (Dakshinayana begins) when sun is at the

mid-point of Stellar segment of Aslesha. Then moon is in stellar segment of Chitra.

Then Longitude was 270°. Then VISHUVAT was at (-) 23° 20'.

This was explained in 1937 edition of Jyotirganitam by Sri Ketkar and my father's elder brother Sri Pidaparty Subrahmanya Sastry. That was also confirmed by Prof T S Kuppanna Sastry in his commentary on Vedanga Jyotisha and endorsed by Prof K V Sarma

Late Prof T S Kuppanna Sastry, ex-Principal, Sanskrit College, Chennai, in his introduction to Vedanga Jyotisha, confirmed that "(-) 23° 20' perfectly agrees with what Varahamihira (530 A. D.) Observed and confirmed (vedha)".

Late Prof T S Kuppanna Sastry translated and commented on Vedanga Jyotisha in English. This book was later edited by Prof K V Sarma, an acknowledged Research Scholar in ancient Indian Astronomy and published by Indian National Science Academy, New Delhi.

3

CUMULATIVE PRECESSION – VEDANGA JYOTISHA Period TO VARAHAMIHIRA Period – (+) 26⁰ 40'

Varahamihira in Panchasiddhantika

In Varahamihira's Panchasiddhantika (Paulisa Siddhanta (III-21) see the following verse :

"आश्लेषार्धात्यदा निवृत्तिः किलोष्णकिरणस्य
युक्तमयनं तदासीत्सांप्रतं अयनं पुनर्वसुतः"

Meaning: Dakshinayana began when Sun is at the mid-point of Stellar segment Aslesha i.e. when Sun's transit changes direction from North to South. This happened during Vedanga Jyotisha period. During Panchasiddhantika Period Dakshinayana began when sun is in Stellar segment Punarvasu.

Varahamihira – Brihatsamhita

Meaning: According to ancient Indian Sastras, beginning of Ayana (change in the direction of Sun's transit from South to North and North to South) occurred when Sun is at the mid-point of Stellar segment Aslesha and beginning of Stellar segment Dhanishta respectively.

Varahamihira stated in *Panchasiddhantika that* beginning of Dakshinayana occurred when Sun was in mid-point of Aslesha Star. That implies Uttarayana began when Sun was in **Stellar Segment Punarvasu**.

Vikruti? – Varahamihira

This became an issue whether it is Mid-point of Punarvasu or ¾th of Punarvasu.

Prof T S Kuppanna Sastry in the introduction to Vedanga Jyotisha and Prof K V Sarma in "The Facets of Indian Astronomy" justified ¾th of Stellar segment Punarvasu.

Sri Ketkar and Sri Pidaparty Subrahmanya Sastry confirmed that it was mid-point of stellar segment, Punarvasu by quoting Brihatsamhita – Mareechi Bhashyam.

That means, according to Prof Kuppanna Sastry and Prof K V Sarma, equinoxes moved 1¾ stellar

segments from Vedanga Jyotisha period to Varahamihira period. ¼ in Punarvasu, 1 stellar segment in Pushyami, ½ in Aslesha = 1¾ Nakashatra segments. This was the interpretation given by Late Prof T S Kuppanna Sastry – in Introduction page 13. He also confirmed that it becomes equal to 23° 20' (-) during Vedanga Jyotisha period. He did not explain further.

English translation and commentary of Panchasiddhantika by G. Thibaut edited by Mahamahopadhyaya Sudhakar Dwivedi (my father's paramaguru) – published by Chowkhamba Sanskrit Series (Varanasi) also confirmed and proved that equinox was at 23° 20' (-) from **Nirayana Meshadi.**

This conclusion was based on the assumption VedangaJyotisha period was 1470 years before Salivahana Saka. Therefore (Vedanga Jyotisha period) 1470 + 450 Salivahana Saka (Varahamihira period) = 1920 years.

$$\frac{1920}{72} = 26^o\ 40'$$

Varahamihira in Bruhatsamhita (III-1) second stanza – see what he says:

"उक्ताभांशै: विकृति: प्रत्यक्षपरीक्षणै: व्यक्ति:"

Meaning: Equinoxes moved 27⁰ between the periods of Vedanga Jyotisha and Varaahamihira. There is Vikruti - **विकृति: here means 'distortion'**

Neelakantha Somayaji (Kerala), another acknowledged scholar, confirmed that Varahamihira's observation as above that 27⁰ was correct. Then why did Varahamihira say **विकृति:**

In *Mareechi Bhashyam* of Bruhatsamhitha, Mareechi said:

"सायनकर्कटकादिरत्र निरयन पुनर्वस्वर्धमेव भवति अयनयो: कर्कमकराद्यो: सायनत्वेन अभिमते पुनर्वस्वंतिम चरणादिति"

That is, if we consider the beginning of Karkataka and Makara are based on Sayana system, it is the beginning of ¼ of Stellar segment Punarvasu. If we go by Mareechi Bhashyam, beginning of Karkataka is Sayana, mid-point of Punarvasu is Nirayana, then difference between the two is 3⁰ 20'.

This is the Ayanaamsa or cumulative precession during Varahamihira period. The issue was thus resolved by Sri Ketkar and my father's elder brother Sri Pidaparty Subrahmanya Sastry.

"उक्ताभांशै: विकृति:…….?" – This is the answer.

Many scholars appear to have missed this point, including Prof T S Kuppanna Sastry and Prof K V Sarma. Sri Ketkar noted it, properly interpreting **"आश्लेषार्धात्दक्षिणं उत्तरायणं…."** In Brihatsamhita III.1,

Sri Ketkar stated Punarvasu yogatara is located at the beginning of Stellar segment Punarvasu. Therefore it is one and half nakshatras away from mid-point of Stellar segment Aslesha.

Even Brahmagupta does not appear to have mentioned Ayanamsa. Bhaskaracharya said it is probably because it was marginal during his period. There is evidence, in his own words, that Varahamihira determined it by his own intensive observations (vedha)

4

WHY 1937 EDITION OF JYOTIRGANITHAM?

Background in brief

Sri Venkatesh Bapuji Ketkar, a scholar who dedicated his life to ancient Indian Astronomy published a book 'Jyotir-ganitham' in 1897 A.D. It is a book containing tables – like a ready reckoner – to facilitate calculation and compilation of planetary positions for Indian Almanacs. He lived in Bijapur now in Karnataka state in India.

Under the patronage of The then Maharaja of Mysore, 2nd Karnataka Astronomical Conference was held for two-three days in Mysore in 1934 A.D. where several scholars from South India participated to discuss various issues facing ancient Indian Astronomers. Sir Vepa Ramesam, the then sitting judge of Madras High Court presided over the function.

Well known scholars such as Sri Venkatesh Bapuji Ketkar, his son Sri Dattatreya Venkatesh Ketkar, my father's second elder brother Sri Pidaparty Subrahmanya Sastry, my father Sri Pidaparty

Krishnamurty Sastry and many other scholars attended the Conference.

One of the issues, then facing astronomers, among others, was whether 'First point of Aries' also known as 'Meshadi' or 'Aswinyadi' should be reckoned with reference to Star 'Chitra' or 'Revati'. This is known as 'Chaitra Paksha' or 'Raivata Paksha'.   Among other decisions, Conference decided in favour of 'Chaitra Paksha'. My father and my father's elder brother proposed and argued in favour of Chaitra Paksha ayanamsa and other related issues. It was carried by the Conference.

Sri V B Ketkar and his son D V Ketkar approached, at the end of the Conference, my father with a request – that they were convinced with the arguments presented at the Conference, that it was necessary to make significant corrections in 1897 edition of Jyotirganitham and that my father should make all the corrections before it is re-printed. My father proposed that his elder brother Sri Subrahmanya Sastry is an expert in Ganitha Sastra and that he alone can do this voluminous job. **The 1937 edition of Jyotirganitham is the effort of my father's elder brother Sri Subrahmanya Sastry**. *Incidentally, my father Sri Krishnamurty Sastry and his*

second elder brother Sri Subrahmanya Sastry studied ancient Indian Astronomy in Varanasi under the learned guidance of 'Mahamahopadhyaya' Muralidhar Jha. 'Mahamahopadhyaya' Pandit Sudhakar Dwivedi was their Paramaguru.

Conclusions and recommendations carried by 1934 Conference in Mysore were validated by the Calendar Reform Committee in their Report submitted in 1955.

5

<u>Calendar Reform Committee</u>

Indian Almanacs followed for festivals and religious purposes in India were known as PANCHANGAS. The term CALENDAR was used as the synonym for Panchanga.

There were a lot of variations in the methods of computations followed due to differences in the systems. This led to the confusion in the minds of the general public in India.

The First Prime Minister of India, Pandit Jawahar Lal Nehru, saw the need for reform on a scientific basis in the systems followed for computation and compilation of Panchangas for religious purposes etc., in India.

Prof Meghnadh Saha, Fellow of the Royal Society, a distinguished scientist in India and a Member of Parliament was appointed Chairman of the CALENDAR REFORM COMMITTEE in 1953 assisted

by scientists and scholars. The Committee was assisted by Sri Nirmal Chandra Lahiri, a distinguished scholar as Secretary to the Committee and 5 distinguished scholars as members of the Committee.

The Committee submitted its Report to the Prime Minister of India in 1956. The recommendations of the Committee were approved by the then Government of India. Significant recommendations approved by the Government of India were as follows:

- 'First point of Aries' should be reckoned with reference to CHITRA or Alpha Virginis/SPICA i.e. what is known as **CHAITRA PAKSHA** in India and not Raivata Paksha.
- Cumulative Precession of Equinoxes from the First Point of Aries, **as on 21st March 1956,** should be taken as **23° 15'**.
- Annual Precession should be taken as **50".27.**
- Duration of Tropical year should be taken as **365.2422 days.**
- All calculations must be with reference to central point in India - 82° 30' (East) and 23° 11' (North).

These recommendations were made after a detailed survey, across India, of about 60 Panchangas.

In order to implement the recommendations of the Committee, Indian Ephemeris and Nautical Almanac Unit was formed under the leadership and guidance of late Sri N C Lahiri. This unit was later re-named as **POSITIONAL ASTRONOMY CENTRE which is fully operational with its office located in Kolkata under the administrative control of India Meteorological Department.**

6
Varahamihira's period

Edifice of *Ayanamsa* finally rested on Varahamihira's period. There was a lot of guesswork on the topic. Some of the results were:

1. That Varahamihira's period is the same as Sunyayanamsa period.
2. That Varahamihira and Mahakavi Kalidasa are contemporaries.
3. That Varahamihira's period – is it Salivahana Saka or Vikrama Saka?
4. That Kaliyuga 3042 / 59 B. C. – that it finds a mention in the history of Kashmir Maharaja – "Raajatarangini" and "Kutuhalamanjari"
5. That there was "Loukika Saka in practice"; that Saka began in 3077 B.C.; and when 'Dhruva' (?) is deducted, it is 551 B.C.
6. That Brahmagupta's period is not 7th century but it is 1st century, therefore Varahamihira's period is much earlier.
7. Based on 10th sloka in 'Kalakriyavadam' in Aryabhateeyam Aryabhata's age was 20 years when Kaliyuga was 360.

Well known Late Prof K V Sarma's (Krishna Iyer Venkateswara Sarma) Research Scholar's papers were published under the title "Facets of Indian Astronomy" by Rastriya Sanskrit Vidyapeetham, Tirupati. He concluded that it was Salivahana Saka 505 in his article 'Saka Era of Varahamihira'.

Prof Sarma argued that use of expression **'Saka Kala' in Varahamihira's** books Panchasiddhantika and Bruhatsamhita is the basis for such conclusion.

Our attention is invited to 3rd sloka in Saptarishi Chara, 13th Adhyaya in Brihatsamhita reading as follows:

"आसन् मघासु मुनयः शासति प्रुथ्वीं युधिष्ठिरे
षड्द्वीकपंचद्वियुतःशककालस्तस्य राज्ञ्श्व"

Meaning: Saptarishi Mandala was in 'Magha' Nakshatra during Yudhistira period. Any year in Sakakala + 2526 = yudhistira period.

Our attention is also invited to 8th sloka in 1st Adhyaya in Panchasiddhantika reading as follows

"सप्ताश्विवेदसंख्यं शककालमपास्य,
चैत्रशुक्लादौ अर्थास्तमिते भानौ यवनपुरे
सोमदिवसाद्ये"

Meaning: When 427 is deducted from Sakakala, in the beginning of Chaitra Suklapaksha, Monday, at the time of Sunset in Yavanapura.

It implies that Panchasiddhantika was written by Varahamihira in Salivahana Saka 427. 78 must be added to get Christian Era 505 A.D. is the year of Varahamihira.

In 1937 edition of Jyotirganitham, Sri Ketkar decided that Varahamihira's period as Salivahana Saka 450 which means 528 A.D.

A scholar known as Latadeva in his commentary on ROMAKA SIDDHANTA mentioned that 505 A.D. was the year in which Varahamihira was born and therefore he must have written his books between 525 A. D. and 550 A.D. In this context 528 A.D. seems to be very realistic. Prof K V Sarma was unable to lay his hand on Latadeva's commentary.

There is unexplained difference of 23 years between Sri Ketkar's Jyotirganitam and the findings of Prof K V Sarma leaving it for the imagination of readers and scholars.

7

Developments in the Western world

SIMON NEWCOMB (1835-1909) On Vishuvat

Newcomb was one of the scientists / astronomers who was associated with U. S. Naval Observatory. In the year 1867 A.D. he declared that annual precession was **50".2388**. The basis for Newcomb's calculation is difference between 'siderial year' and 'solar year'. That is the annual precession.

	Days	Hours	Minutes	Seconds
Sidereal Year	365	06	09	09
Solar year	365	05	48	46
Difference	-	-	20	23

Difference in Seconds (arc)   =   1,223 seconds
Sidereal year (time)   = 315,58,149 seconds
          360° = 12,96,000 seconds (arc)

In 315,58,149 *time* seconds

It can cover a distance of 12,96,000 **arc** seconds
In 1,223 time seconds   ???

$$\frac{1,223 \times 12,96,000}{315,58,149}$$

= 50".225 precession per year

Simon Newcomb later developed a formula, as given below, because annual precession is not static and it is changing.

50".2564 (for 1900 A.D.) + 0".000222 for every year.

The formula was changed and further refined in 2012 A.D. Now –

It is **50".245223 (for 2012 AD) + 000349 every year.**

U S Naval Observatory - (2014)

United States Naval Observatory determined total precession **in 100 years is 5028".8**. That is – **annual precession is 50".288**. This information was given to the writer by e-mail by Mr. James Hilton [james.hilton@usno.navy.mil] on 23rd September 2014.

Luni-Precession –
Percival Lowell 1855-1916 (NASA)

A scientist by name **Mr. Percival Lowell, who was with NASA** mentioned about '**Luni Precession' in 1914.** A rough paper was found providing explanation of Luni Precession. Conclusion was that every year 0".11 should be added. No additional clarification is available.

8

<u>My father's findings in 1967</u>

My father, late Sri Pidaparty Krishnamurty Sastry, an acknowledged authority in ancient Indian Astronomy analysed and delved into the subject as on 1-1-1967 as follows:

When one determines cumulative precession from the first point of Aries, following example may be useful and serve the purpose:

Sayana Chitra	203°22'50"
Chitra Dhruva	<u>180°00'00"</u>
Cumulative precession	
(Chaitra paksha)	23°22'50"
As per Indian Ephemeris	<u>23°23'34"</u>
Sayana Dhanishtha	316° 55'15".1
Vedanga Dhanishtha Dhruva	<u>293° 20' 0".0</u>
Cum. precession / Dhanishtha	23° 35'15".1

Cum.precession / Dhanishtha	**23° 35' 15".1**
Cum. precession / Chaitra paksha	**<u>23° 22' 50"</u>**
Difference	**0° 12' 25"**

The difference is caused by natural movement of stellar segments.

Dhanishtha segment moves per year   + 0".074
Chitra segment moves per year   - 0".027

The distance between the two Nakshatras increases @ 0".107 per year. This must be added every year to the cumulative precession.

My father suggested 0".107 and Percival Lowell suggested 0".11 – a difference of 0".003 per year. My father's explanation is quite clear. I could not lay my hands on explanation given by Percival Lowell.

9

Data collected by Calendar Reform Committee

Cumulative Ayanamsa

In 1953-54, Calendar Reform Committee invited all Panchanga makers in the country to provide information on various facets of compilation of Panchangas. Summary of replies received with respect to cumulative Precession, as on 21st March 1954, are as follows:

Cumulative Precession followed	No of Panchanga Kartas
21º 49'	2
22º 23'	1
23º 04'	1
23º 08'	2
23º 10'	2
23º 12'	**36**
23º 13'	3
23º 24'	1
23º 51'	1
23º 52'	2
Total	51

My father reported a figure of 23° 12' 7" (on 21st March 1954). Calendar Reform Committee adopted 23° 15' as on 21st March 1956.

Summary of replies received with reference to annual precession is as follows:

Annual precession	No. of Panchanga Kartas
48"	1
50" to 50".19	5
50".2	**34**
50".3 to 50".5	5
58".5	1
???	5
Total	51

My father reported a figure in his reply 50".268 per year.

There is an impression among some in India that Ayanamsa and annual precession recommended and fixed by the Calendar Reform Committee now being followed by Positional Astronomy Centre (successor to Indian Ephemeris and Nautical Almanac Unit) was ad-hoc, arbitrary and not based on scientific foundations.

Recommendation No 5 in Report of the Calendar Reform Committee could have been worded better. Please see the underlined wordings in the recommendation:

"The calculation of solar months ………. will start 23⁰ 15'……. <u>This tallies with the present practice of most almanac makers"</u> ………"<u>This recommendation is to be regarded only as a measure of compromise, so that we avoid a violent break with the established custom……"</u>

One can now safely conclude that the recommendation made by The Calendar Reform Committee in its report in 1956 on Vishuvat Chalana and now being followed by the POSITIONAL ASTRONOMY CENTRE (Successor to Indian Ephemeris & Nautical Almanac Unit), Kolkata is not Ad-hoc, and arbitrary.

The Recommendation is fully supported by VEDANGA JYOTISHA and VARAHAMIHIRA'S PANCHASIDDHANTIKA and BRIHATSAMHITA.

10
[Some issues]

Vishuvat Chalana – Circular or Pendular?

In Surya Siddhantha, there is a chapter known as Triprasnaadhikara. There are four Shlokas 9, 10, 11 and 12 which suggest that the movement of Equinox is pendular – 27° on one side and 27° on the other side.

त्रिम्शत्कृत्यो युगो भानां चक्रं प्राक् परिलंबते
तद्गुणाद्भूदिनै: भक्तात् द्युगणाद्यदवाप्यते   ९
तद्द्योस्त्रिघ्ना दशाप्तांशा विज्ञेया अयनाभिधा:
तत्संस्कृतात् ग्रहात् क्रान्ति छायाचर दळादिकं   १०
स्फुटं द्रुक्तुल्यतां गच्छेदयने विषुवद्द्वये
प्राक्चक्रं चलितं हीने छायार्कात्करणागते   ११
अंतरांशैरथान्नुत्य पशचाच्छेषैस्तथाधिके

Please see what Prof A. K. Chakravarty says in his commentary on Surya Siddhanta"

"…the language is cryptic, the principle is contradictory to the text itself and the results

obtained are erroneous. These errors could be easily detected by Gnomon shadow. Except these four verses the topic or its application nowhere occurs in the whole text…It is now believed that these verses were interpolated in the text in a later period. Such interpolations are not uncommon.…"

(The Surya Siddhanta, by Prof A. K. Chakravarty, Published by (Royal) Asiatic Society, Kolkata – page 113)

To prove that Vishuvat does not oscillate like pendulum and what was alleged to be in Suryasiddhanta is not correct, here is Satapatha Brahmana:

"एकं द्वे त्रीणि चत्वरीतिवा अन्यानि
नक्षत्राण्यथैताएव भूयिष्ठायत्क्रुत्तिका
एताहवै प्राच्यैदिशोनच्यावंते
शर्वाणिहवा अन्यानि नक्षत्राणि
प्राच्यै दिश:च्यवन्ते"

Satapatha Brahmana (2-1-2)

There are many stars in the group of Stellar Segment Krittika. There are only 1, 2, 3, 4 stars in the other Stellar Segments. The Stars in Stellar Segment Krittika are always in the East. Other stars keep moving from the East.

Krittika Principal Star (yogatara) was 36° away from 'Aswinyadi', the First Point of Aries. If movement of Equinox is not circular, but oscillates like pendulum, it is impossible Dr Madhavan (Kerala) says. If the shlokas 9, 10, 11, 12 in Surya Siddhantha are not interpolated, they are inconsistent with Rig-Veda (8-96-13) and Satapatha Brahmana (2-1-2)

Chaitra Paksha or Raivata Paksha?

This is no longer an issue. Even Calendar Reform Committee, in its report, chose to ignore the topic.

For the sake of good order brief summary is given below.

Can we pin-point this location 0° 0' 0" for the purpose of identifying 'First Point of Aries'? It is not easy. There are two theories. These are known as **"Chaitra Paksha" and "Raivata Paksha".**

"Chaitra Paksha" is a method followed to determine cumulative precession from "First Point of Aries" using mid-point of Stellar segment Chitra (SPICA) as a basis.

"Raivata Paksha" is a method followed to determine cumulative precession from "First Point of Aries" using end of Stellar segment Revati (PISCIUM) as a basis.

There are 32 stars in Stellar segment Revati. Which star is a principal star (Dhruva) or Yoga Tara is difficult to identify.

Stellar segment Chitra has only one star – that too at the mid-point of the segment. This is recognized as 'Yoga Tara". 180° on either side is the First Point of Aries. It is visible, easily identifiable and reliable.

Therefore "Aswinyadi" or 'Meshadi' or "First Point of Aries" is located precisely 180° away from mid-point of Stellar segment of Chitra

Chaitra Paksha is based on **beginning of Stellar segment Dhanishtha** and has the sanction of Vedanga Jyotisha and Garga Samhita etc. Therefore it is ancient.

The division of stellar segments was described in 'Daivajna Kamadhenu' based on Chitra Nakshatra only. Dhanishtha principal star (yogatara) is at the very beginning of Stellar segment Dhanishtha. Therefore 'Meshadi' or 'First Point of Aries' is 5 Stellar segments (Dhanishtha, Satabhisham, Purvabhadra, Uttrabhadra, and Revati) away i.e. 13° 20' x 5 = 66° 40'. Therefore Ayanamsas

determined with reference to mid-point of Chitra Nakshatra segment are authentic and correct – they are known as Chaitra Paksha Ayanamsa.

Raivata Paksha ayanamsa Is not authentic.

Since Dhanishtha principal star (yoga Tara) is located at the very beginning of Stellar Segment Dhanishtha, even western astronomers identified and recognized beginning point of Dhanishtha as 'Alpha Delphini' as a reference point. In Indian Panchangas, the year starts with 'Chaitra' month. This is based on Chitra Nakshatra. Look at this:

"चित्रावशतःचैत्रनिर्णयः" – Adharvana Veda

There is absolutely no contradiction from any authentic text if stellar segments of 13⁰ 20' each are identified on Ecliptic.

Sunya-ayanamsa period

Calendar Reform Committee decided cumulative Precession was 23⁰ 15' as on 21st March 1956 and annual precession at 50".27. On this basis Sunyayanamsa period would be 291 A.D. Comparative table below provides more detail:

Institution/Scientist	Annual precession	Sunya ayanamsa Period
Varahamihira	50".00	282 A.D.
Newcomb (1)	50".225	290 A.D.
Newcomb (2)	50".2388	290 A.D.
Calendar Reform Committee	50".27	291 A.D.
U.S. Naval Observatory	50".288	292 A.D.

Basis: Cumulative Precession in 2010 was
$24^o = 86,400$"
These are best estimates

11

In Vedas – on Vishuvats

"त्वंअग्रेप्रथमोअंगिरारुषि: देवोदेवानांअभव: शिव: सखा"

(Rig-Veda 1-31-1)

Meaning: Agni (vishuvat) is in Meshadi (First Point of Aries). Gods are in their respective places .i.e. the **ecliptic**, which is located in between Aswini star and middle of Chitra Star, is on the Northern side of the Equator.

शीक्षाविभिंदो अस्मै चत्वारि अयुता ददत् अष्टपर: सहस्रा:"

(Rig-Veda 8-2-4)

Oh Vibhindo! You gave me knowledge and wisdom. 1 Kalpa = 432 x 10,000 x 1000 years = 432 crore years or 4320 million years.

The above mentioned references make it clear that ancient Indians were well aware that Vishuvat (equinox) makes revolutions. Rig-Veda refers to revolution period of 28,000 years for each. Rig-Veda also re-confirms reference to Mahayugas and Kalpas and their duration as given in Brahma's life.

In Upanishats & Brahmanas

Stellar Segments

There are 27 equal stellar segments or Nakshatra Vibhagas of 13° 20' each and 12 zodiac signs on the Ecliptic. These Stellar segments were mentioned in Vedas and Mythryopanishat.

"मघाद्यां श्रविष्टार्धं आग्रेयं क्रमेण
उत्क्रमेण सार्पाद्यां श्रविष्टर्धांतं सौम्यं"

<div align="right">Mythryopanishat.</div>

The period of Sun's transit from the beginning of stellar segment 'Magha' to the **middle of stellar Segment Dhanishtha** is '**Dakshinayana'.**

Dhanishtha is also known as **Sravishtha and** '**Agni Devatakam**'. Period of Sun's transit from the middle of stellar segment Dhanishtha to the end of stellar segment 'Aslesha' is **Uttarayana**. This confirms that segmentation of **Ecliptic into 27 equal parts** from Vedic period.

Unfortunately these segmentations are not visible to the naked eye. Therefore one has to necessarily depend upon what is visible.

'Udagayanam' or beginning of Uttarayana – let us look at the details.

Sun was at the end of Stellar segment Dhanistha during Taittareeya Brahmana period. Sun was at the mid-point of Stellar Segment Dhanistha during Maitryopanishad period. Sun was at the beginning of Stellar Segment Dhanishtha during Vedanga Jyotisha period – beginning of Uttarayana occurred. Transit of Sun shifts towards the North when Uttarayana begins

"सुर्योयोनिःकालस्य ………मघाद्यं श्रविश्टार्धं"

Maitryopanishat

"आद्यं, अर्धं" ….these words indicate sub-divisions of each stellar segment into paadas / quarters.

"नक्षत्राणि वसवः" – these words indicate stellar segmentation of 27 Nakshatras.

"यत्पुण्यं नक्षत्रं तत्वट्कुर्वीतोपव्युषं यदा वै सूर्य उदेति तदा नक्षत्रं नैति"

(१-५-१)Taithireeya Brahmana

"वसवोवाअकामयन्त अग्रंदेवतानां परियामेति ततोवै अग्रंदेवतानां पर्यायन्"

(३-१-५, ८) Taithireeya Brahmana

Krittikaa Kaala is referred here.

"सकल कर्मसु कृत्तिकाः प्रथमं आचक्षते
श्रविष्टतु संख्यायाः (प्रथमं आचक्षते)"

(Vedanga Jyotisha Bhashya by Somakara)

Look at the following table. Please note that Vishuvat / equinox is moving backwards.

Udagayanam	Day	Sun's position	Before Salivahana Saka
Krittika kala – Somaakarabhashya – VedangaJyotisha	Purnima in Maagha	End of Dhanishtha	Year 2364
Maithryopanisat	Ashtami in Maagha	Mid-point of Dhanishtha	Year 1883
Vedanga Jyotisha	Pratipat in Maagha	Beginning of Dhanishtha	Year 1470

If the movement of equinox is forward, Sun's position should have moved, at the time of Udagayanam, from end of Dhanishta to beginning of Satabhisha. Instead, it moved from the end of Dhanishta to the mid-point of Dhanishta from 2364 before Salivahana Saka to 1883 before Salivahana Saka – in 481 years.
Is it possible, still, to conclude ancient Indians were not aware of Precession of Equinoxes.

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SUMMARY

1. **Vishuvat-Chalana was known to our ancestors in India from Vedic period – References exist in Rig-Veda, Taithireeyopanishad, Maithryopanishat, Satapatha-Brahmana, Vedanga Jyotisha, Garga Samhitha, Varahamihira etc.**

1. **Clear link from Vedanga Jyotisha to the recommendations of Calendar Reform Committee exists and matched with U.S. Naval Observatory's findings as recently as in 2014. Recommendations are neither ad-hoc nor arbitrarily fixed.**

2. **That Lagadha was not the author of Vedanga Jyotisha and it was "Apaurusheya" was also explained.**

3. Meaning of "Aadiyuga" in Vedanga Jyotisha was brought out and highlighted together with elaborate explanation of Brahma's Life.

4. Demolished the theory that Vishuvat-Chalana was pendular and not circular.

5. Ayanamsa based on Raivata paksha is not authentic.

6. That Varahamihira's period was 450 Salivahana Saka was clearly brought out.

7. My father's findings were matched with Mr. Percival Lowell's LUNI PRECESSION' with a marginal difference of 0".003.

8. This is a virgin field for Research Scholars and Indologists to discover answers to the limitations highlighted above.

References

- Rig-Veda
- Adharvana Veda
- Vedanga Jyotisha
- Indian National Science Academy
- Satapatha Brahmana
- Taittiriya Brahmana
- Maitryopanishath
- Surya Siddhantha
- Pancha Siddhantika
- Brihat Samhita
- 1937 edition of Jyotirganitam
- Report of Calendar Reform Committee
- Facets of Indian Astronomy – Prof K V Sarma