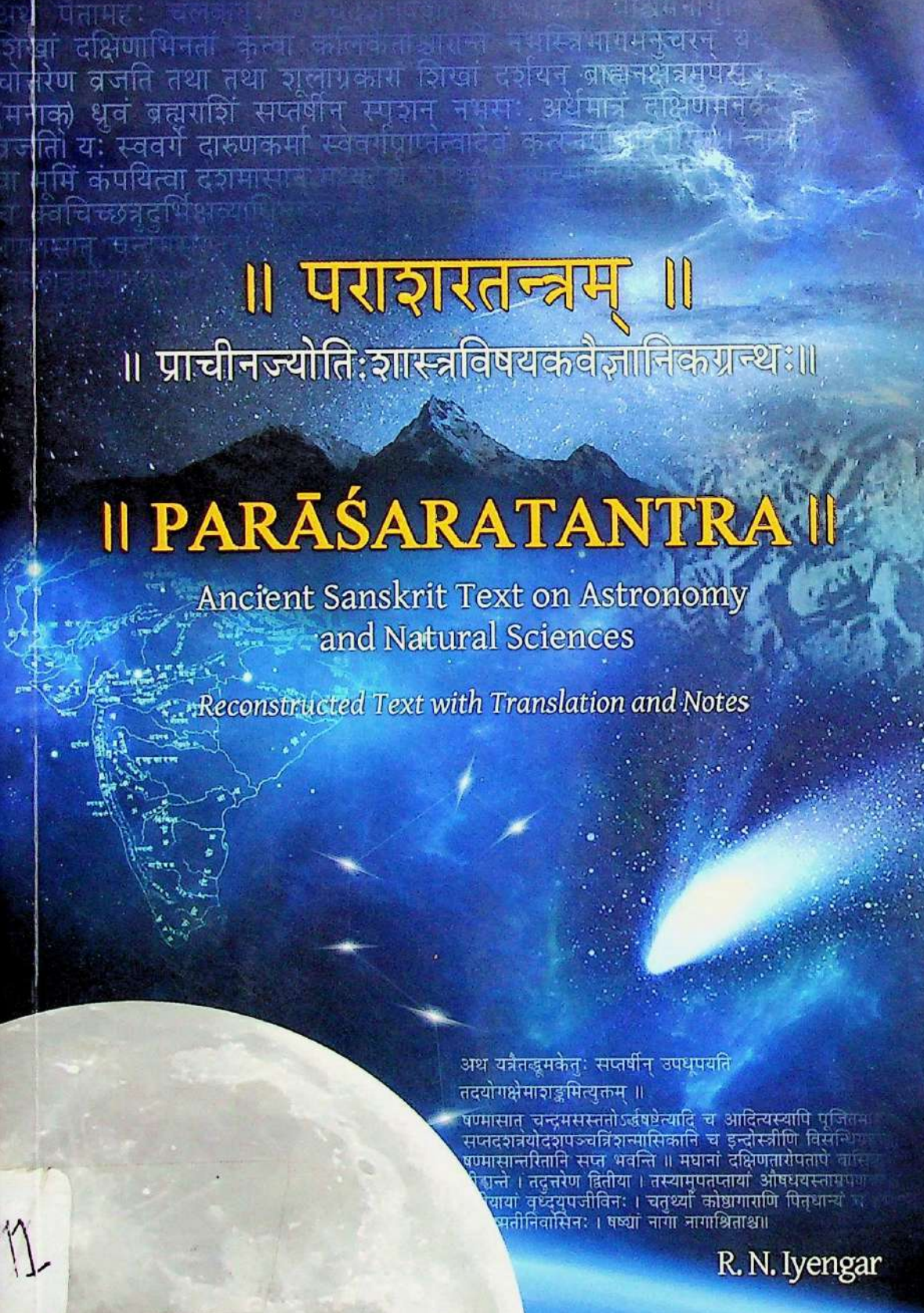
॥ पराशरतन्त्रम् ॥

॥ प्राचीनज्योतिःशास्त्रविषयकवैज्ञानिकग्रन्थः॥

॥ PARĀŚARATANTRA ॥

Ancient Sanskrit Text on Astronomy and Natural Sciences

Reconstructed Text with Translation and Notes



R. N. Iyengar

About the Book

Ancient Sanskrit texts of India are a treasure rove of knowledge. Parāśaratantra - Ancient Sanskrit Text on Astronomy and Natural Sciences, a reconstructed text with translation and notes by R.N. Iyengar is a fruition of a long journey of research and investigation into History of Science n India. The book is divided into 21 chapters with an intellectually lettered introduction. These chapters present a compilation of Sanskrit texts Parāśara, a sage and scholar from ancient dia dispersed in the commentaries of scholars ch as Varāhamihira, Utpala, Ballālasena and Bhaskarayogī living between 6th and 13th centuries. The text is accompanied by relevant archaeo-astronomical analysis of Parāśara's six season solar zodiac and observation of the heliacal rise and set of star *Agastya* (Canopus). This dates the astronomical tradition of Parāśaratantra to 1350-130 BC underlining its intellectual links with the ntecedent Vedic texts and culture. Parāśara's list of wenty-six comets with year numbers is unique in ncient world literature. Through his book, Iyengar as thrown light on the knowledge that existed in re-historic India on the sky, atmosphere, planets, tars, eclipses, comets, earthquakes, rainfall and ven dreams. He also brings forth how people in ncient India inferred what the observed anomalies n celestial and natural events portended to the ociety and the common man. This formed the asis for the development of astrology in India. arāśaratantra, a Sanskrit text, combined with orking translation and modern analysis by the uthor holds great appeal not only for scientists, istorians and Sanskrit scholars but also for anyone nterested in Indian history and culture.

॥ पराशरतन्त्रम् ॥

॥ प्राचीनज्योतिःशास्त्रविषयकवैज्ञानिकग्रन्थः॥

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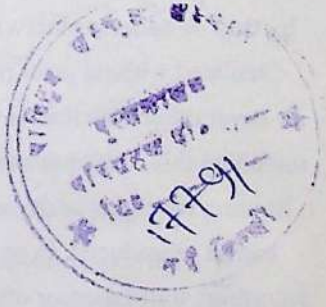

R. N. Iyengar

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॥ इदं नम ऋषिभ्यः पूर्वजेभ्यः पूर्वेभ्यः पथिकृद्भ्यः॥

To my grandfather,
Daivajña, Sri Srinivasa Gopalachar
To my parents,
Smt. R. Padmasini and Vidyaratna, Prof. S. Rangachar
for having decided I should learn Sanskrit for a few years
in the traditional style.

To all my esteemed teachers in the
Prāthama, Kāvya and Sāhitya (I year) courses during 1953-58,
at the Mahāraja Samskṛta Pāṭhaśālā, Mysore; especially,
Vidwan, Pandit N.S. Ramabhadrachar
who through his inimitable style of teaching impressed upon me
that the basic tenet of the intellectual tradition of India is :
॥ नवनवोन्मेषशालिनी प्रज्ञा बुद्धिः ॥

CONTENTS

Foreword

The origin of what has been characterized as Indian or Hindu Astronomy can be traced to the thoughts and practices of Vedic people (*c* 2000 BCE). The earliest text in Sanskrit on astronomy goes by the name *Vedāṅga Jyotiṣa* (VJ), one of the auxiliaries of the Vedas, which states : 'Just like the combs of peacocks and the crest of the jewels of serpents, so does *Jyotiṣa* stand at the head of the auxiliaries of the Vedas.' The kernel of Vedic life was the performance of *yajña* (sacrifice) which was in the nature of forging an inseparable consonance between the performer (microcosm) of sacrifices and the Universe (macrocosm). VJ avers: 'The Vedas have indeed been revealed for the performance of sacrifices; but these sacrifices have been set out to be performed according to sequences of time. Hence, only he who knows astronomy, the science of time, understands sacrifices.'

Vedāṅga Jyotiṣa specifically deals with astronomical ideas. It has conceived a five-year cycle, a lunisolar one, called *Yuga*, during which there would be 5 solar revolutions, 67 Moon's sidereal and 62 synodic months, 1830 civil days, 1835 solar days and 1830 lunar days or *tithis*. The text has also given the divisions of a day and associated aspects, besides a list of 27 *nakṣatras* (asterisms) starting with *Bharaṇī* and ending with *Aśvinī*. The *nakṣatra* list, but of 28 including *Abhijit*, also appears in the Yajurveda texts and the Atharvaṇaveda but beginning with *Kṛttikā*. The Vedic literature too has several other astronomical ideas. VJ (*c* 1200 BCE) is attributed to one Lagadha, and the extant text - Ṛgvedic recension (35 verses) and the Yajurvedic (43) - might have been fixed in text form a little later. In the history of astronomical literature in Sanskrit, the text next to

VJ is the *Āryabhaṭīya* of Āryabhaṭa I (499 CE) which appeared after a long span of time of more than 1000 years. Moreover, the *Āryabhaṭīya* belongs to a new genre of astronomical texts, called the *Siddhāntas*, which deal with mathematical astronomy. It is inconceivable indeed that there were no new astronomical studies and attainment in India during this long interregnum. On the other hand, the five *siddhāntas* redacted by Varāhamihira, a junior contemporary of Āryabhaṭa I, in the early sixth century CE, known as the *Pañcasiddhāntikā*, (the name given by his scholiast, Bhaṭṭotpala who lived in the tenth century CE) belong to a period much earlier than that of Āryabhaṭa I. According to traditional lore and references made in the related literature, there are 18 *siddhāntas*, the redactors or authors of which are: Sūrya, Pitāmaha, Vyāsa,Vasiṣṭha, Atri, Parāśara, Kaśyapa, Nārada, Garga, Manu, Marīci, Aṅgira, Lomaśa or Romaka, Pauliśa, Cyavana, Yavana, Bhṛgu and Śaunaka. Several of them appear to have been lost and some of them are referred to, or partially retained, in later texts. The importance of studying these sources can hardly be over-emphasized.

A few western historians of Indian astronomy like David Pingree, have opined that the Aryabhaṭan and later Indian astronomy were influenced by Hellenic astronomical ideas. Pingree even says that 'much of what we know about Greek astronomy between Hipparchus and fourth century A.D., can be found in Sanskrit texts'. He also states that Indian astronomers were ignorant of Ptolemaic astronomy till the seventeenth century. Contradiction of this kind apart, Pingree's assertion that 'because of the Indian tendency to modify intellectual imports and also of the corrupt nature of the earliest surviving texts, it is often difficult to determine precisely the nature of Greek texts on which the Sanskrit texts are based' is biased and hardly consistent. Pingree's approach, as of some other western savants, from the standpoint of historiography, leaves much to be desired. It would be an erroneous approach in history of science, if one were to conclude that if a scientific idea is present in a culture-area earlier than that in another culture-area, the latter should have borrowed it from the former, unless it is substantiated by undisputable pathways of transmission, including the concerned textual sources. Just comparing the contents without examining the cultural context is also an improper methodology.

The period between the three centuries before and after the Christian era, was a creative one; for, it witnessed the emergence of the two medical classics, new ideas on atomism, and revolutionary ideas of Buddhism, Tāntrism and, more importantly, the formulation of the versatile decimal place value system. It is more than likely that this period also saw some fresh thinking on orbital astronomy including planets, which formed the basis of the *Pre-Siddhāntic* astronomy and this could also have been a fountain-source for even the Alexandrian astronomical pursuits.

A few other western scholars like Burgess, think of a common source of transmission and, in this respect, the Pre-Āryabhaṭan/Pre-Siddhāntic astronomy and Vedic astronomical ideas merit our attention. Although we have some knowledge of Vedic astronomy, it is desirable, indeed necessary, that more systematic studies are undertaken to unravel especially the astronomical ideas hidden in Vedic symbolism and imagery. Likewise, the literature relating to the other *siddhāntas* needs to be examined in depth. Realizing the importance of such studies and their historical value, Prof. R.N. Iyengar, hailing from a family of Sanskrit scholarship and himself trained in Sanskrit, though an engineer by profession, has been a pioneer in these studies over the past three decades. His meticulous studies have brought to light the knowledge of comets (*dhūmaketu*) and meteoritic showers even during the Ṛgvedic times, the astronomical significance of the Vedic *Darśapūrṇamāsa* altar, *Dhruva* as ancient pole star, certain celestial luminaries associated with Kṛṣṇa, eclipses and planets in the *Mahābhārata*, besides the cycles of rainfall, earthquakes and the like, as recorded in ancient Sanskrit texts.

Now, Prof. Iyengar has ably brought out a reconstructed text titled: *Parāśaratantra* compiling the Sanskrit passages attributed to Parāśara and recorded in (i) Utpala's commentary on the *Bṛhatsamhitā* of Varāhamihira; (ii) *Adbhutasāgara* of Ballālasena; and (iii) Commentary named *Utpala-parimala* of Bhāskarayogi on the *Bṛhatsamhitā*. This composite text, the title of which is based on Utpala's commentary, is different from the other texts attributed to the name of Parāśara, like *Bṛhat-parāśara-horāśāstra* (a text on astrology), *Kṛṣi-parāśara* (a work on agriculture), *Parāśara-smṛti*

(a Dharmaśāstra text) and *Parāśara-āgama.* A notable aspect of this text is its listing of 27 *nakṣatras* beginning with *Kṛttikā* like the Vedic texts, but omitting *Abhijit*, as in the *Vedāṅga Jyotiṣa.* Probably the *Parāśaratantra* could belong to the Vedic tradition.

This text, which is in prose, has 21 Sections and the Sanskrit passages have been rendered into English effectively, though not literally. They deal with divisions of time, planets, *nakṣatras* and their afflictions, matters relating to rainfall, earthquakes, astrogeographical aspects and most importantly, 26 comets (*dhūmaketu*) - a topic that has not been discussed so vividly in any other text in ancient time - as well as *Agastya* (Canopus, the southern star). Parāśara was perhaps the first to state correctly the visibility periods of Venus in the east and west, the occurrence of lunar eclipses at intervals of six months, and fairly accurate statements about Jupiter, Saturn, and Mercury, all by his own observations. These and other expositions in the *Parāśaratantra* indicate that it could well have been the forerunner of the *Parāśara Siddhānta*, one of the eighteen *Siddhāntas* as mentioned before. The Introduction by Prof. Iyengar is scholarly and lucid alike. All those who are interested in the History of Indian Astronomy are grateful to him for bringing out this valuable text which has enriched our knowledge of Pre-Āryabhaṭan astronomy.

B.V.Subbarayappa
Former President
International Union of History &
Philosophy of Science
(ICSU-UNESCO)

पुरोवाक्

ज्ञानविज्ञानसम्पूर्णां विदुषां च प्रकाशिकाम् ।
ऋषिभिरुद्धृतां सम्यक् नौमि संस्कृतशारदाम्॥

अस्माकमेतन्महद्भाग्यं यद् सर्वेषां विषयाणां शास्त्रीयरीत्या विवरणं संस्कृतभाषायां विद्यते। "न कोऽपि जीवनसम्बद्धः विषयः संस्कृते अवर्णितः इति" नः प्रमोदाय कल्पते। गच्छता कालेन कैश्चिद्विद्वद्भिः विशिष्टस्य रुचिप्रदस्य शास्त्रस्य महता प्रयत्नेन आलोडनं कृत्वा विशारदत्वं समासादितम्। तदनन्तरं स्वात्मना भूयसा कष्टेन प्रयत्नेन च प्राप्तस्य ज्ञानस्य वितरणार्थं तज्ज्ञानं ग्रन्थे निविष्टम्। अनेन प्रकारेण हस्तलिखितानि प्रादुर्भूतानि॥

अतिप्राचीने काले यद्यपि वेदवेदाङ्गानामेवाध्ययनाध्यापनं प्राधान्येन पण्डितेषु परम्परया प्रचलति स्म तथापि मुष्टिमेयाः विद्वांसः विज्ञानादिशास्त्राध्ययनेऽपि कृतपरिश्रमाः परम्परापद्धतौ चापि निपुणतां प्रापुः। सैव लुप्तप्राया परम्परा अधुनाऽपि कैश्चित् पण्डितैः – विशेषतः शास्त्रीयविषयाणां अध्ययनस्य संशोधनस्य च क्षेत्रे विशिष्टां रुचिं धारयद्भिः – महता कष्टेन समाद्रियते। तेष्वेकतमो वर्तते प्रा. डा. आर्. एन्. अय्यङ्गार्महाभागः। पण्डितकुले प्रसूतोऽयं महायशाः यद्यपि शिक्षया व्यवसायेन च अभियन्ता इति पदवीं प्राप्य स्वात्मनः कार्यक्षेत्रे महतीं ख्यातिमवाप तथापि कुलपरम्परया प्राप्तस्य संस्कृतज्ञानस्य विषये गवेषणकार्यं प्रत्यहं करोति इत्यस्माकं महद्भाग्यं विद्यते॥

विज्ञानविषयकग्रन्थानामन्वेषणे ये के च विरलाः विद्वांसः वर्तन्ते सततं प्रयत्नं च कुर्वन्ति तेषां मध्ये अय्यङ्गार्महोदयस्य स्थानम् प्रथमपङ्क्तौ विद्यते। प्रसिद्धसिद्धान्तग्रन्थप्रणयनात् प्राक् भारतदेशे यज्ज्योतिःशास्त्रज्ञानमासीत् तद्विषयान्वेषणे अनेन भूरि प्रयत्नः कृतः। तेषामेव प्रयत्नानां फलितं वर्तते "पराशरतन्त्रं" नामकोऽयं ग्रन्थः। ग्रन्थेऽस्मिन् सङ्कलितं विद्यते तज्ज्ञानं यत् परम्परया वैदिकऋषेः पराशरस्य नाम्ना प्रसिद्धमासीत्प्राचीनकाले। किन्तु पराशरस्य नाम तस्य विशिष्टं ज्ञानं विलुप्तमिव गच्छता कालेन। केवलं कानिचित् अप्रकाशितानि त्रुटिपूर्णानि हस्तलिखितानि केचन पराशरनाम्ना उद्धृताः वाक्यांशाः श्लोकाश्च उपलब्धाः। तेषामालोडनेन अय्यङ्गार्महोदयेन पराशर्षेः तन्त्रस्य अथवा संहितायाः समीक्षिता आवृत्तिः पुना रचना इव प्रस्तूयते पुरस्तादस्माकम्। सिद्धान्तकाले प्रायः गणितविद्यात्मकं ज्ञानं प्रचलितमासीत्। कल्पकाले विद्यमानेषु ग्रन्थेषु ग्रहणानां केतूनां उल्कादीनां वर्णनं विद्यते। किन्तु गच्छत्सु वर्षेषु वेदस्थितानां सिद्धान्तानां वचनानां च ज्ञानं दुरूहं जातं। अवलोकनानां स्पष्टीकरणं विपरीतरीत्या कृतम् प्रतिभाति। वाक्यांशानां सदोषं व्याख्यानं भाषान्तरं वा परम्पराज्ञानस्य खण्डितत्वादसम्यगवगमनाद्वा पण्डितैः कृतम्। तेनैव परस्परविरुद्धं मतं प्रस्थापितं पण्डितप्रवरैः। एवं विप्रतिपत्तिः प्रचलिता मतवैभिन्नं निदर्शितम्॥

अस्यां पार्श्वभूमौ पराशरतन्त्रसंहितायाः सम्यगनुशीलनं कर्तुं प्रवृत्तः अय्यङ्गार् महाभागः। किन्तु दुर्लभत्वाद्विरलत्वाच्च मूलग्रन्थस्य तस्य सम्पादनेऽध्ययने च विघ्नाः अनुभूयन्ते। अष्टादशसिद्धान्तग्रन्थेषु समाविष्टोऽन्तर्गणितो वा कश्चित्पराशरसिद्धान्तः। विविधविषयकग्रन्थानां कर्तुः प्रणेतुः वा पराशरस्य साम्यम् अभेदो वा तत्कालनिर्णयः कष्टप्रदः विषयः। यतो हि तस्य नाम तदुल्लेखो वा वैदिककालादारभ्य पुराणादिग्रन्थेष्वपि विद्यते। अतः तस्य कालावधिविषये विसंवादो विद्यते। तस्यापि परीक्षणं विवरणं च कृतमस्ति ग्रन्थेऽस्मिन्॥

पराशरतन्त्रस्य वैशिष्ट्यमेतद्यत् तत् बहुशः गद्यरूपं यद्यपि कानिचित्पद्यानि अत्र तत्र दृश्यन्ते। प्रायः अन्याः प्रायशः सर्वाः वृद्धगर्गनारदादिसंहिताः

पद्यमयाः प्राप्यन्ते। पद्यं न तथा स्पष्टं सुकरं वा यथा गद्यं भवति यतो हि गद्यगुम्फितः अंशः भागो वा इत्थम्भूतव्याख्यानपरः वर्तते। पराशरतन्त्रे केचन विशेषविषयाः यदाधुनिककाले प्रचलिताः सन्ति ते दृश्यन्ते। तत्र चतुर्विधभूकम्पाः तेषां देशकालरीत्या विभजनं, वर्षा, धूमकेतूनां सङ्कलनं, नक्षत्रोपसर्गं इत्यादि प्रकृतिसम्बद्धविषयाणां अन्येषां प्राचीनतमवैज्ञानिक-कल्पनानां विवरणं वर्तते॥

ग्रह इति शब्दः अर्थगर्भितः नैकेषामर्थानां निदर्शकत्वेनोपयोजितः। अगस्त्यताराविषयकः प्राचीनतमः उदयास्तमनकालनिर्देशः तन्त्रस्य प्रणेतुः पराशरस्य प्राचीनत्वं वेदाङ्गकालसमीपत्वं च (१३५०-११३० क्रि.पू.) सूचयति। पराशरस्य ग्रहज्योतिषशास्त्रे महत्त्वपूर्णं योगदानं वर्तते। तेन कृतं षड्विंशद् धूमकेतूनां विस्तृतविवरणं वीक्षणान्तर्कालविभागः न प्राप्यते ग्रन्थान्तरेषु। वराहमिहिरस्य बृहत्संहितायां विद्यमानकेतुचारः यद्यपि पराशरस्य वचनान्यनुसृत्यैव विद्यते तथापि वराहेण उक्तकेतूनां आनुपूर्व्यां कश्चित् दोषः दृश्यते। किन्तु विस्मृतप्रायस्यास्य अलक्षितस्यास्य च विषयस्य अध्ययनं संशोधनं च नाद्यापि पर्याप्ततया केनचिदपि विदुषा सुष्ठुतया कृतं दृश्यते। एतद्विषयमेव श्रीमतः अय्यङ्गार्महोदयस्य विशिष्टं गवेषणकार्यं ग्रन्थेऽस्मिन् प्रधानतया दृश्यते। तदर्थं सः निश्चितं धन्यवादार्हः॥

पराशरतन्त्रस्थितानां वचनानां सिद्धान्तानां च उद्धरणानि द्वित्रिग्रन्थेष्वेव प्राप्यन्ते। तान्यपि केषुचित्स्थलेषु त्रुटितानि विगलितपाठानि च प्रतिभान्ति। प्राधान्येन भट्टोत्पलेन कृतायां बृहत्संहिताटीकायां बल्लालसेनकृते अद्भुतसागरनाम्नि ग्रन्थे भास्करयोगिनः उत्पलपरिमलनाम्नि टीकाग्रन्थे च पराशरवचनानि इतस्ततः प्रचुरतया विकिरितानि सन्ति। तत्रापि पाठप्रमादात् वचनविरोधात् तेषां सम्यग्ग्रहणेऽध्ययने च स्पष्टीकरणे च महत्कष्टमनुभूयते। प्रयत्नसाध्यमिदमन्वेषणं कर्तुं प्रवृत्तोऽयं अय्यङ्गार्महाभागः सूक्ष्मेक्षिकया स्वात्मनः प्रतिपादनं वस्तुनिष्ठतया कर्तुं प्रयतते। तस्य प्रस्तावनां कर्तुं मम प्रवृत्तिरियम्॥

केषुचित्स्थानेषु बृहत्संहितायां वराहमिहिरेण ये सिद्धान्ताः प्रतिपादिताः यानि च वाक्यानि ग्रथितानि तेषां मूलं तु पराशरतन्त्रे वर्तते इति उत्पलभास्करयोगिभ्यां स्वस्वटीकायां निर्दिष्टं सुनिश्चितं मतम्। यद्यपि वराहेण द्वित्रिस्थलेष्वेव पराशरस्य नामनिर्देशः कृतो दृश्यते॥

यथा मया उक्तचरमेव यत् एतादृशी महत्त्वपूर्णा पराशरतन्त्रसंहिता न केनापि सुचारुरूपेण पठिता न वा प्रकर्षाध्ययनं नीता न वा प्रकाशतां प्रापिता। न च मुद्रितपुस्तकानां हस्तलिखितानां वा टीकाकाराणां साहाय्येन संशोध्य मुद्रिता। तदेतत् श्लाघ्यं कार्यं अद्यावत् न केनापि संस्कृतपण्डितेन विदुषा वा अकारि, किन्तु विज्ञानशास्त्रिणा अय्यङ्गरमहोदयेन भूरि परिश्रमेण भूयसा प्रयासेन च समापितं भवतां विदुषां तुष्टये गुणदोषविवेचनाय च पुस्तकरूपेण प्रस्तूयते इति महान् प्रमोदस्य विषयः॥

अपरश्चास्य ग्रन्थस्य विशेषः यत् आङ्ग्लभाषायाम् अनुवादः सटिप्पणः कृतः येन आङ्ग्लभाषाज्ञातृणां वैदेशिकदृष्टिपूर्णनयनानां मनसि न कोऽपि सन्देहलवः स्यात् यतो हि कैश्चिद्वैदेशिकैः यद्विपर्यस्तं मतं प्रसारितं वर्तते तस्यापि विफलत्वम् अग्राह्यत्वं च सुस्पष्टं भवेत् ग्रन्थस्यास्य पर्यालोचनेन। एतत् पराशरतन्त्रं विदुषां पुरस्तात्स्थापयित्वा संस्कृतज्ञानाभिमानिना संशोधकप्रवरेण अय्यङ्गरमहोदयेन महदुपकृतं सर्वेषां विदुषाम् इति तमादरेण समभिनन्द्य आशासे यदयं ग्रन्थः विवेकशालिभिः विद्वद्भिः समादृतः स्यात्॥ इति शम्॥

वाकणकरकुलोत्पन्नः
यशवन्ततनयः सिद्धार्थशर्मा

S.Y.Wakankar
Deputy Director (Retd.), Oriental Institute Baroda.
Former Professor. Jain University, Bangalore.
Presently Visiting Professor, I.I.T. Gandhinagar

Preface

After the devastating Latur-Khilari earthquake of 30th September 1993 a Commission appointed by Government of India visited Bangalore for collecting information from scientists and engineers on how seismic studies were being carried out in India. In the meeting that took place an American scientist mentioned that since earthquakes repeat in the same tectonic province, South India, though geologically known as stable continental region, should have experienced earthquakes in the past. He quite forcefully remarked "...but, with three to four thousand years of history, no one in India knows when and where the ancient earthquakes occurred in the country." This observation, factual as it was, prompted me to look into ancient literature for information on past natural disasters in the country. As is well known Varāhamihira in his famous *Bṛhatsamhitā* has a long chapter on earthquakes. But to my surprise I found that Varāhamihira, was only a compiler of scientific topics prevalent in ancient India and not an original thinker. He depended on Parāśara and Vṛddhagarga for natural phenomena such as earthquakes, comets, eclipses and even rainfall as would be clear from the commentary on the *Bṛhatsamhitā* by Bhaṭṭotpala. In any case as far as earthquakes were concerned, two thousand years ago our ancients had five broad identified seismic provinces in the subcontinent. Hence, it is ironical that there should be so much quibbling in modern India about seismic zones which, in the last fifty years, have been altered several times arbitrarily without scientific basis.

Among the ancient scientific thinkers cited by medieval writers, Parāśara attracted my attention and I started collecting texts attributed to

him. Unfortunately beyond what is available in the published commentary of Utpala and the *Adbhutasāgara* of Ballālasena I could not get at the original text or manuscript of the *Parāśaratantra*. But the search about science in Sanskrit literature has been fascinating. To place the tradition of Parāśara in proper context I had to go through the History of Science in India as expounded by Indian and western scholars. I had to wade through the Vedic texts, the *purāṇas* and the two epics for natural events that may have a bearing on what Parāśara had to say. This made me realize that, contrary to the widely prevalent theories of History of Science, the roots of Hindu Astronomy were not planted in the country after either Chaldeans transmitted computational knowledge about eclipses or Greeks introduced their solar zodiac and planetary periods. While the work of Varāhamihira definitely shows foreign influence, nothing is noticeable in the text of *Parāśaratantra* that was available to him in 6th century at Ujjain, to his Kashmirian commentator Utpala in 10th century and to Ballālasena, the King of Mithilā as late as 12th century CE.

As I collected more and more information about natural events described in ancient literature it became clear that right from Vedic times we have had a legacy of observing and interpreting natural events however archaic and unintelligible it might be now. *Parāśaratantra* represents a branch of original knowledge on astronomy and other positive sciences. The origin of this school, based on internal evidences, can be traced back to 14th-12th Century BCE. This date, glaringly at variance from the history of India as taught in our schools and colleges by mainstream historians and indologists, fuelled my curiousity to verify this chronological marker by methods of archaeo-astronomy. It motivated me to compile the statements of Parāśara and subject them to a reality check. The present book is the result of such an exercise carried out over the last several years.

Compilation of a Sanskrit text from different sources separated widely in time is a daunting task and I was quite hesitant to publicize my studies. But the constant encouragement I received from Dr. S.Y.Wakankar, while he was my colleague at Jain University as Professor for a period of two-and-a-quarter years, provided me with the confidence to bring out the

Parāśaratantra text in book form. Prof. Wakankar not only helped me with difficult Sanskrit passages but also kindly read through different versions of my manuscript suggesting corrections and improvements. I am thankful to him for his invaluable support culminating with his Sanskrit foreword to the book.

Dr. B. V. Subbarayappa is the doyen of science historians in India. It has been my privilege to meet him often to discuss the subject of ancient Indian astronomy. He found time to read through my preliminary manuscript and suggested several improvements. Further, acceding to my request Dr. Subbarayappa has written a scholarly foreword to the book which highlights the importance of tracing history of astronomy and other sciences in ancient India starting from Vedic times, without preconceived notions and prejudice. I am grateful to him for his advice and encouragement.

Sri V.H. Sateeshkumar presently pursuing his doctoral degree in Astrophysics at Baylor University, USA has been a constant source of enthusiasm. When he was here at the Jain University, almost every day we used to discuss astronomy, both modern and ancient, and how it has enriched Indian culture. He has read several chapters of this book and offered useful comments for improvement.

My stay with Jain University after retiring from the Indian Institute of Science has been pleasant. Dr. Chenraj Roychand, President, Jain University Trust, is a great patron of learning. He has fully supported me in developing the Center for Disaster Mitigation and also has encouraged me to initiate studies on Indian knowledge traditions. He recognizes the importance of bridging the divide that exists in the country between the ancient indigenous intellectual schools and the more recent western type university education. When I showed him the manuscript of my book, he offered to get the work published by the Jain University Press. I am indebted to Dr. Roychand for his continued support and encouragement.

It has been a nice experience to work with the staff of the Jain

University publication unit. Notwithstanding the difficulties faced in combining the text in different scripts and styles with tables and figures, they have handled the book professionally with great care. They have cooperated with me beyond my expectations in planning, designing and bringing out the book on time. My thanks are due to every one of the JUP staff.

The book is in Sanskrit though, in line with such technical literature, the text may not be following rules of grammar strictly. However, anyone with a working knowledge of the language would be able to follow the original without difficulty. If younger scholars in our Sanskrit universities derive inspiration from this book to extend their horizon of study beyond the beaten track I consider my efforts amply rewarded. The working translation and notes are aimed at the general reader who likes to know about positive sciences, particularly astronomy, cultivated in India long before the advent of Mahāvīra and Buddha, two well known historical personalities belonging to the middle of the first millennium BCE. I hope scientists, indologists, historians and culture enthusiasts exploring the evolution of Indian intellectual traditions and concepts rather than just the chronology of kings and wars will find themselves on common ground in this book *Parāśaratantra.*

R.N.Iyengar
Jain University, Bangalore
(RN.Iyengar@jainuniversity.ac.in)

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Abbrevations

AS	Adbhuta Sāgara, Adbhutasāgara
Aśv. Śr. Sū.	Āśvalāyana Śrauta Sūtra
AVP	Atharva-veda-pariśiṣṭa, Atharvavedapariśiṣṭa
BCE	Before Common Era (same as BC)
BPH	Bṛhat Parāśara Horāśāstra
BS	Bṛhat Samhitā, Bṛhatsamhitā
c	*Circa*
CE	Common Era (same as AD)
Cent.	Century
IJHS	Indian Journal of History of Science
INSA	Indian National Science Academy
Kau. Sū.	Kauśika Sūtra
Kā. S	Kāṭhaka Samhitā
K.K.S	Kapiṣṭhala Kaṭha Samhitā
MAU	Maitrāyaṇī Āraṇyaka Upaniṣad (same as Maitrī Upaniṣad)
MB	Mahābhārata
MS	Maitrāyaṇī Samhitā
PT	Parāśaratantra
RV	Ṛgveda
Tai. Ara.	Taittirīya Āraṇyaka
Tai. Br.	Taittirīya Brāhmaṇa
Tai. Sam.	Taittirīya Samhitā
VJ	Vedāṅga Jyotiṣa of Lagadha

Note to the reader:

Due to software dependent type setting of the Sanskrit text, line justification becomes difficult with long composite words as depicted in the source books. Hence, in some places where *sandhi* is optional the words are resolved such that the preceding word ends with either the *anusvāra* or the *ardhākṣara* म् when the succeeding word starts with a vowel. Where the words can not be broken hyphens are used to indicate continuation.

Examples for astronomical negative years:
Year -1500=1499 BCE; 1350BCE= Year -1351
Year -1200=1199 BCE; 1400BCE= Year -1399

Introduction

India, home to one of the most ancient surviving civilizations, naturally has a long tradition of science and technology. This covers such diverse fields as Astronomy, Architecture, Agriculture, Mathematics, Medicine, Metallurgy, and Music to name only a few. History of Science and Technology in India is a well researched field. There are many publications covering the historical development of some of the above mentioned subjects in concept and in practice starting from the most ancient available literary source, namely, the Ṛgveda. Among these, perhaps astronomy takes the lead in terms of the number of books and papers written. This is not surprising, since the number of ancient source books available on astronomy is very large[1].

Dikshit[2], the first person to write a definitive History of Indian Astronomy, traces the subject in two distinct periods called *pre-siddhāntic* and *siddhāntic*. The word *siddhānta* in this context may roughly be translated as mathematical or computational astronomy. The content, outreach and limitations of *siddhāntic* astronomy are well known, with numerous texts starting roughly from the early centuries of the Common Era (CE). A typical feature of the *siddhānta* texts is their postulation of a long period of time called *kalpa* in which planets are taken to execute integral number of revolutions. These texts contain long chapters on eclipse calculation along scientific lines discarding the legend of an extraneous

1 B.V.Subbarayappa, *The Tradition of Astronomy in India*, vol. IV, pt.4. PHISPC, Center for Studies in Civilization, 2008, N.Delhi.

2 S.B.Dikshit, *Bhāratīya Jyotiṣa Śāstra*, (Vol.I and II) Govt. of India Press, 1969, Calcutta.

dark planet *Rāhu* causing solar and lunar eclipses. *Samhitā* texts written in the same period knew about comets and meteors by their generic name *ketu* and *ulkā* respectively, but comets were thought to be not amenable for computation. Varāhamihira in his *Bṛhatsamhitā* (BS) clearly takes *ketu* as comet only. He also concedes that he is writing what his predecessors Parāśara, Vṛddhagarga and others had said about comets.

Rāhu and Ketu

Sastry and Sarma, the learned editors of the *Pañcasiddhāntika* of Varāhamihira, point out that the *Pauliśa-siddhānta* denotes the two lunar nodes as *Rāhu's-head* and *Rāhu's-tail,* both being *Rāhu,* the eclipse causer as per the older tradition of the *purāṇas*[3]. In the astronomical texts, *pāta* was the standard word for the nodes. Gradually, the science of eclipses as it diffused to the lay public got overlapped with the mystical concepts of *Rāhu* the dark planet to be equated with the ascending node of Moon. Since there are two nodes and eclipses are possible near either of them, the confusing practice of naming the descending node as *ketu* arose. Since the nodes are 180 degrees apart, in recent centuries, due to popularity of horoscope astrology, the above nomenclature has been accepted as valid by several sections of the society that derive inspiration from Sanskrit literature. This has gone to the extent of using the ancient realistic synonyms of *ketu,* such as *śikhī* (one with a tuft) and *keśī* (hairy) with the invisible lunar node. Sastry and Sarma rightly point out "...there is no authority in astronomical works or *purāṇas* to bring in *ketu* here."

Nīlakaṇṭha (18th Cent. CE) in his famous gloss on the Mahābhārata (MB) interprets almost all the astronomical verses of the epic as being astrological. In one place, where a white object is said to be near star *Citrā* (Spica), he interprets this object as *ketu*[4]. Further, surprisingly he explains the original statements as indicating that *Rāhu* and *Ketu,* who, according to him, should always be 180^0 apart, were stationed in the same sign during

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3 *Pañca-siddhāntika of Varāhamihira* (Ed. & Transl.) T.S.K.Sastry and K.V.Sarma, PPST Foundn., Madras 1993.

4 *śveto grahaḥ tathā citrām samatikramya tiṣṭhati*|| (MB. Bhī.P. 3.11)

the Great War[5]. This implies that the ascending and descending nodes had coalesced, which by no stretch of imagination can be taken as a rational interpretation of the original verse of the Great Epic.

Max Mueller while translating the *Maitrayaṇī Āraṇyaka Upaniṣad* (MAU 7.6) of the *Kṛṣṇa Yajurveda* takes the words *Rāhu* and *Ketu* as the ascending and descending lunar nodes[6]. This wrong translation alleges existence of the knowledge of lunar nodes in MAU pre-empting proper dating of its contents since the concept of Moon's orbit intersecting the ecliptic at two imaginary points in space is evidenced only in Sanskrit astronomy texts appearing at the begining of the Common Era.

The *Atharvaṇa Veda* has a prayer for the celestial objects the Sun, the Moon, the planets, *Rāhu,* the *dhūmaketu* and meteors[7]. But Macdonell and Keith describe the word *dhūmaketu* as *'smoke bannered'* an epithet of *death*[8]. This meaning has to be rejected in the overall context of a 'peace hymn' to personified celestial objects.

Neugebauer, a renowned historian of astronomy, in a short note investigated the background of the Islamic pseudo-planet or comet *Al-kaid* for which an ancient table of motion from Byzantine literature is available in the Vatican library[9]. He points out how the word *kaid* has been correctly traced to the Hindu *ketu* on linguistic grounds by some, but mistakenly translated as the descending lunar node. The above table actually refers to a comet, with a stated period of 144 years, observed probably in 722

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5 *kārtikyāh' param hi sangrāmārambhaḥ tatra tulāstham arkam rāhurupaiti| tadeva śveto grahaḥ ketuḥ citrām atikrāmati svātyādau vartate| nityam samasaptakasthau rāhu-ketū idānīm ekarāśigatau mahā aniṣta sūcakau iti bhāvaḥ||* (Nīlakaṇṭha in his commentary on Bhī. P. 3.11. MB. Gita Press Edition)

6 *"Sani (Saturn), Rahu and Ketu (the ascending and descending nodes), the serpents, Rakshas, Yakshas, men, birds, sarabhas, elephants, &c.– these rise below;..."* Sacred Books of the East; The Upanishads Vol.2, (Transl) Max Mueller. 1888.

7 *śamno grahāḥ candramasaḥ śamādityaśca rāhuṇā| śamno mṛtyurdhūmaketuḥ....* (AtharvaṇaVeda XIX 9.7-10)

8 A.A. Mcdonell and A.B.Keith, *Vedic Index of Names and Subjects*, Vol.1, 1912, London.

9 O.Neugebauer, *Notes on Al-kaid,* J American Oriental Soc. V.77, 3, 1957 pp.211-215.

CE near about the vernal equinox. This object has not been yet identified by modern astronomy, but there is no basis to treat this as the invisible descending lunar node.

The above examples should suffice to demonstrate that the historical roots of Indian Astronomy can hardly be understood without investigating ancient concepts and theories about the eclipse causer *Rāhu* and the comet *Ketu.* Surprisingly traditional scholars, historians of science and modern astronomers have generally ignored Indian comet observations as non-existent and blindly interpreted *ketu* as the descending node, leading to conclusions that are at times glaringly absurd.

For the *pre-siddhāntic* period of Indian Astronomy we have only one published text namely, Lagadha's *Vedāṅgajyotiṣa*[10] (VJ). This text is solely devoted to the calendar and is silent about planets, eclipses and comets. However, several scholars have pointed out that a class of texts called *tantra* or *samhitā*, containing astronomical information, authored by Parāśara, Vṛddhagarga and others should have existed in the *pre-siddhāntic* period[11]. These were preserved through oral tradition over a period of time before someone recorded them in script form. Unfortunately copies of the texts of these authors are not available in their original form, except for quotations by later authors. Between Parāśara and Vṛddhagarga, the former is more interesting since his statements are in prose. Vṛddhagarga in verse follows Parāśāra closely with some important additional information. Al-beruni in the 11th century knew about the ancient Hindu astronomer Parāśara and his *samhitā*[12]. Varāhamihira in his *Bṛhatsamhitā* (8.8-13) while describing the motion of Mercury attests Parāśara and *Parāśaratantra* by name. But nowhere has he literally quoted the original *tantra* even though in many places he has repeated the opinions of Parāśara including visibility numbers for Mercury. Hence in the interest of tracing the history of Indian astronomy it becomes necessary to find out what was known to Parāśara

10 *Vedāṅga Jyotiṣa* (Ed. & Transl.) T.S.K. Sastry and K.V.Sarma, INSA, 1984, N.Delhi.

11 S.R.Das, *Scope and Development of Indian Astronomy,* Osiris, 2, 1936, pp. 197-219

12 E.C.Sachau, *Alberuni's India,* (English Transl.) 1910, London.

several centuries before Varāhamihira who lived at Ujjain in 6th century CE. Fortunately, there are reliable sources from which we can reconstruct, in part, the text of Parāśara. These are in the form of long quotations contained in the commentaries of Utpala (10th Cent.) and Bhāskarayogi (13th Cent.) on the *Bṛhatsamhitā* (BS) and the encyclopedic text *Adbhutasāgara* (AS) started by Ballālasena but completed by his son Lakṣmaṇasena (11-12th Cent.). Parāśara's text is in prose a literary form rare in Sanskrit. Many of his sentences end with the word *iti* similar to the prose of Vedic Brāhmaṇa texts.

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[13]. He wrote referring to the commentary on 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."* Since there is no reason to disbelieve this statement, it follows 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 would be carrying information belonging to a period more ancient than Yāska's *Nirukta*, Vedic *Sūtras* and Pāṇini's grammar. It could be older than some of the Upaniṣads too. As the original manuscript to which Jones had access is not available for our scrutiny, existence of an accented text in Vedic format needs to be verified with the help of authentic old manuscripts. The specific passage which Jones cites indeed *contains information of the greatest importance* and will be discussed later.

Parāśaratantra (PT)

The *Census of Manuscripts on Exact Sciences in Sanskrit*, by Pingree lists about ten individual titles attributed to Parāśara with copies spread over libraries in India and abroad. Till such time someone sifts through

13 W.Jones, *A Supplement to the Essay on Indian Chronology*, Asiatick Researches, 1790; v. 2b, pp. 391-403.

all available manuscripts and prepares a critical edition of the prose text, we have to be satisfied with what little of *Parāśaratantra*, sometimes denoted as *Parāśarasamhitā*, is available as quotations reported by Utpala (also known as Bhaṭṭotpala), Ballālasena and Bhāskarayogī. The present effort is limited to combine and compile the available information into a single text. There is a published text called *Parāśarasmṛti* concerned with *dharmaśāstra*. There is also a *Parāśarasamhitā* which is a *Pāñcarātrāgama* text having nothing in common with the present compilation. Hence to avoid possible confusion the present reconstructed text is called *Parāśaratantra* and abbreviated as PT.

Three published sources are available for compiling the statements attributed to Parāśara. These are;

i) Commentary of Utpala edited by K. C. Dvivedi (*Bṛhat Samhitā of Varāha Mihira* with Sanskrit commentary; Sampurnananda Sanskrit University, Varanasi. 1996).

ii) The *Adbhutasāgara* edited by Muralidhar Jha (*Adbhuta Sāgara of Ballāla Sena*, Sanskrit Text, Prabhakari & Co, Benares Cantt. 1905).

iii) Commentary of Bhāskarayogī edited by K.V.Sarma (*Bṛhat Samhitā of Varāha Mihira* with the commentary *Utpala-parimala of Yogīśvara;* Rashtriya Sanskrit Sansthan, N.Delhi 2007).

The *Bṛhatsamhitā* (BS) is well known as a compilation of knowledge about positive sciences in India prevalent during the time of Varāhamihira. *Adbhutasāgara* (AS) is a compilation, specifically focusing on anomalous phenomena. Ballālasena the author of this book is well known to Indian history[14]. Ballālasena, originally from Karnāṭaka in South India, was a king ruling at Mithilā in the Bihar-Bengal region of India[15]. He collected information on anomalous happenings from available sources and named

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14 R.C.Majumdar, *The Chronology of the Sena Kings*, J. Asiatic Society of Bengal vol.17, 1921 pp.7-16

15 C.P.N.Sinha *Mithila under the Karnātas*, Janaki Prakashan, 1979, Patna.

his book aptly *Adbhutasāgara* or the *Ocean of Wonders*. His primary intention was to bring in one place scientific information, legends and religious beliefs prevalent during his time about rare and anomalous natural events. He mostly repeats the statements of his predecessors Varāhamihira, Vṛddhagarga, Garga, Asita, Devala, Atharvamuni, Parāśara and others. The book of AS has three sections, classified into celestial *(divya)*, atmospheric *(antarikṣa)* and terrestrial *(bhauma)* anomalies *(utpāta)*. Among the authors quoted by Ballālasena, Parāśāra and his prose text attracts our attention. A comparison of these quotations with the commentaries of Utpala (10th Cent.) and Bhāskarayogī (13th Cent.) clearly brings out that the unique prose text PT of Parāśara was widely known in India till at least 13th-14th century CE through authentic palm leaf manuscripts. The available quotations of Parāśara preserve reference to *nakṣatra* as the background for observing the sky. The seasons are indicated conspicuously in terms of *nakṣatra* divisions without invoking the twelve zodiacal signs or *Rāśi* of *siddhāntic* astronomers. Another remarkable feature of PT is its list of twenty six comets with year numbers. It also has long chapters on occultation of stars, astral-geography, earthquakes and rainfall. Thus, PT is a treatise on natural sciences as cultivated in ancient India long before Varāhamihira wrote his more famous *Bṛhatsamhitā*.

Bṛhat Parāśara Horāśāstra (BPH)

A Sanskrit work of the above name is available in print as a text on Indian astrology. This work written in verse form has no similarities or textual connections with PT. The contents of the two books appear to be mutually exclusive, except in prescribing religious rites to be done to reduce purported ill effects of celestial bodies under particular conditions. But it should be pointed out that PT contains statements on three types of anomalies *(divya, antarikṣa, bhauma)* and their portentous effect on kings, their families, ministers, priests, geographical regions and ethnic groups of greater India. PT has statements about *janma-ṛkṣa* or the birth-star of a person getting afflicted visibly by other celestial objects. It characterizes the birth-star in terms of five other stars called *karma, sāṅghātikā, sāmudāyikā, vaināśikā,* and *mānasa* placed at certain intervals. It also prescribes rituals for mitigating ill effects of visible afflictions of

these stars. Thus, some form of natal astrology was practiced in the pre-horoscope period by the followers of PT. It is possible that this model was enlarged by others to develop Hindu horoscope astrology based on the time of birth, planetary positions, the lunar nodes and attribute a formal treatise on the subject to Parāśara who would have been famous as *nakṣatra-darśa,* literally a star-seer, a phrase already known to ancient Vedic texts. Interesting information that we get from the *smṛti* and the BPH attributed to Parāśara is that *Rāhu* is the eclipse causer for both Sun and Moon. In Chapter 91 of BPH titled *Grahaṇa-jāta-śānti,* describing rites for a person born on an eclipse day, it is only *Rāhu* that finds mention. This text contains interpretation of horoscopes which is not even hinted at in PT. *Vṛddha Pārāśaryam* is again a text on astrology. A part of this work in published form is available in Telugu script[16]. Comparison of this text with BPH shows that the two are identical except for minor variations. BPH discusses the creation of planets, but the description is similar to that in *Pāñcarātrāgama* texts except for a vague relation with PT when BPH identifies the first *avatāra* of Viṣṇu, namely, the Fish (during the Floods) as coming from *Ketu,* the Comet. Hence the possibility of Parāśara, the originator of PT and the author of the BPH being the same is unlikely.

Parāśarasiddhānta

The *Parāśarasiddhānta* is a text on astronomy, traditionally included among the eighteen *siddhānta* texts, even though Varāhamihira does not refer to such a *siddhānta.* Is it possible that the *Parāśaratantra* known to Varāhamihira contained basic elements that were later incorporated into a corresponding *siddhānta?* This is likely, but without further comparison with the *Parāśarasiddhānta* presently available only in manuscript libraries, no definite conclusion is possible.

Identity of Parāśara

Texts on medicine and agriculture besides astronomy and astrology are attributed to Parāśara. Hence it is natural to wonder about the identity of our author. As is typical of ancient Indian authors, the identity of Parāśara

16 *Vṛddha-pārāśaryam; Daśā-bhukti-phala-candrikā;* (Ed.) N.Venkatasubba Shastri, Sarasvati Vilas Press, Chennai, 1887.

who composed or stated the *tantra* standing in his name is not known. It is likely there were several persons belonging to different generations identified by the same family name. However, it may be noted here that the most famous Parāśara was the father of Kṛṣṇa-dvaipāyana Vyāsa the renowned author of the Mahābhārata. The Mahābhārata knows this Parāśara well but also mentions another Parāśara in a group of *Nāgas* which word most probably refers to an ethnic group[17].

The *Viṣṇu-purāṇa*, a highly respected ancient Indian text, is traditionally considered to be the work of Parāśara the father of Vyāsa. This *purāṇa* does contain interesting astronomical information. But textual evidences are not strong enough to equate the author of PT with the author of the *Viṣṇu-purāṇa* or to establish firm correlation between the two texts. There is a text by the name *Parāśara-upa-purāṇa*, considered a subsidiary *purāṇa* outside the recognized eighteen *purāṇas*. This is a religious text propounding devotion to Śiva, with no astronomical content.

Vedic literature knows Parāśara as the grandson of Vasiṣṭha the composer of the seventh *maṇḍala* of the Ṛgveda. Parāśara is specifically mentioned by name along with Vasiṣṭha in the verse (RV 7.18.21) celebrating the victory of King Sudāsa. The explanation of the word Parāśara, as can be understood from the *Nirukta*, is that he was the son of an aged person[18]. This refers to the Vedic legend according to which, Śakti, the father of Parāśara, was killed when the latter was very young. Hence, the child was brought up by his grandfather Vasiṣṭha who was already aged and due to this reason, the boy was said to have acquired the name Parāśara. The name appears again in the verse (RV 7.124.21) where the *Nirukta* mentions that the word can refer to Indra also, who kills demons in hundreds. As per Vedic tradition Parāśara, son of Śakti, was the composer of nine hymns (RV 1.65-1.73) in the first *maṇḍala* and fourteen verses (RV 9.97.31-44) in the 9th *maṇḍala* of the Ṛgveda. Outside

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17 *parāśarastaruṇako maṇiskandhastathāruṇiḥ|iti nāgā mayā brahman kīrtitāḥ kīrtivardhanāḥ||* (MB.1.52.17-18)

18 *parāśaraḥ parāśīrṇasya vasiṣṭhasya sthavirasya jajñe* || Nirukta (6.30)

the Ṛgveda the name occurs in the list of Vedic teachers of the *Kauthuma* branch of the Sāmaveda. Aurasa, Parāśara, Bhāgavitti were the sons of Kuthumi and students of Pauṣpañji. The *Śrauta Sūtras* list Parāśara also as a clan or *gotra* name[19]. In fact, Parāśara is a family (*gotra*) name prevalent to this day in many parts of India. Hence it is reasonable to surmise that the primary author of PT should have been a descendent in the line of the Ṛgvedic Parāśara.

Date of Parāśara of PT Tradition

The above discussion points out that no special personal characteristics can be detected for the author of the text under study. Hence the PT text need not be taken to be by a single author belonging to a particular period. It follows, any statement about the date of astronomer Parāśara should be taken as the traceable initial period of the oral tradition of *Parāśaratantra,* same as that of its originator, but not of the text PT fixed in script. Nevertheless, in delineating the historical development of Hindu astronomy the importance of the initial date of PT tradition is too precious to be ignored. The earliest person to investigate the date of Parāśara was William Jones suggesting 1180 BCE as the likely date[20]. However, Wilford mentions that as per Davis, Parāśara lived around 1390 BCE[21]. Scholars such as Elphinstone[22], Prichard[23] and Brennand[24] writing on History of India in the 19th century highlighted the above chronological information in their monographs. But, with the advent of the Aryan Invasion (Immigration) Theory spearheaded by German linguists, the situation changed. As main stream Sanskrit scholars, indologists and Indian historians patronized this not rigourously verifiable Eurocentric linguistic approach for deciding chronology, the above scientific astronomical date markers got relegated to the background without valid explanations. Thus, Pingree a scholar who

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19 *parāśarāṇām vāsiṣṭha-śāaktya-pārāśarya iti* || (Āśvalāyana Śrauta Sūtra 12.15)

20 f.n. 13; on p. 24 and Letters of Sir William Jones to the late Samuel Davis, Esq., F.R.S., from 1785 to 1794. Trans. Roy. Asiatic Society of Great Britain and Ireland. 3.1, 1831, pp.1-31.

21 F.Wilford, *On the Chronology of the Hindus*, Asiatic Researches; 1797, p 288.

22 M. Elphinstone, *The History of India,* Vol.1; 1841, London

23 J.C.Prichard, *Physical History of Mankind,* Vol. IV,1844, London

24 W.Brennand, *Hindu Astronomy;* 1896. London

has contributed significantly to studies on history of Indian astronomical literature dismisses without any critical analysis, works ascribed to Parāśara as omen texts borrowed from Mesopotamia[25].

Before proceeding further, it would be worthwhile to review statements from ancient sources that refer to changes in time. First we note that Varāhamihira in BS (3.1) mentions that it is said in ancient treatises that the southern sojourn of Sun started at the middle of *Āśleṣā* (ζ-Hydrae) while the northern course started at the beginning of *Dhaniṣṭhā* (β-Delphini). Both Utpala and Bhāskarayogī in their commentaries attribute the above statement to Parāśara even though BS does not explicitly say so. However, BS explains how to identify the star position at the time of the solstices. Varāhamihira living in the 6th century mentions that during his time the summer solstice started at the third quarter of star *Punarvasū* (β-Geminorum) and not at the middle point of *Āśleṣā*. Such changes in the observed nakṣatra positions at solstices occur due to precession of the rotational axis of Earth, which information can be used for dating. It is however known that the division of the ecliptic in terms of the *nakṣatras* has some ambiguity. In the most ancient times the division was in terms of specific visible single or clustered stars. Vedāṅgajyotiṣa (VJ) promoted twenty seven equal divisions which contained the most prominent visible stars on either side of the ecliptic as recognized by the antecedent Vedic Samhitā and Brāhmaṇa culture. Identification of some of the prominent *nakṣatras* like *Kṛttikā, Rohiṇi, Maghā, Citrā, Svāti, Viśākhe* are non-controversial. But even for a famous star like *Dhaniṣṭhā,* which of the four or five in the Delphini cluster has to be chosen as *Dhaniṣṭhā* has not been unanimously settled. Thus the visible 27 *nakṣatras* (*yoga-tārā*) with specific names and their eponymous divisions are not devoid of controversy. This underlines the approximations in the dates based on statements about visibility of background stars. Nevertheless it would be interesting to see how well the above method gets validated when the dates are known from other sources. Fortunately useful data is available in the BS and the AS whose authors lived in historical times within well constrained dates.

25 D.Pingree, *Jyotiḥśāstra*; in "A History of Indian Literature" (Ed. J. Gonda) Vol VI, Fac.4, 1981, Wiesbaden.

Let us consider the second chapter of the AS where the position of solstices as stated in the BS is given along with positions observed at its own time. The summer solstice point had shifted, as observed by Ballālasena, from the third quarter of star *Punarvasū* to the beginning of *Punarvasū*[26]. This amounts to a precession of 9-10 degrees indicating a time difference of 648-720 years at the rate of 72 years per degree. Allowing for inaccuracies of naked eye observations the above report in AS is quite reliable. We know from other evidences that Varāhamihira's life time was 505-587 CE whereas Ballālasena started his AS text in 1168 CE but the work had to be completed by his son Lakṣmaṇasena who reigned during 1178-1206 CE. This example indicates that both Varāhamihra and the Sena kings knew the same star as *Punarvasū* and identified the division in the same way. For much older observations the error in dating could be of the order of ±200 years.

Utpala and Ballālasena quote Parāśara stating the six seasons in terms of the position of Sun in the different *nakṣatra* segments. Four-and-half *nakṣatra* length makes a season. This is same as the measure of a season in the VJ. The winter season *śiśira-ṛtu* started with Sun and Moon at the beginning of star division *Śraviṣṭhā* also known as *Dhaniṣṭhā*. *Grīṣma* started when Sun was at the middle of *Āśleṣā*. Parāśara describes the solar zodiac in terms of the six Indian seasons, each of two months duration. He upholds the equal division of the 27 *nakṣatras*, similar to that of VJ of Lagadha. This is the *nakṣatra* system of astronomy, using stars along the ecliptic as background for sky observations. Since the winter season started at the first point of star *Dhaniṣṭhā* (β-delphini) this would be same as the year beginning of VJ, which is a well discussed topic. From the time of BS which may be taken as 530 CE when the winter solstice was at the first quarter of star *Uttarāṣāḍhā* (σ-Sagittari) to the stated era of PT, the precession amounts to one and three-fourth *nakṣatra* length, equal to 23°20'. In the Vedic texts not all the *nakṣatras* were counted to be single. The name *Śraviṣṭhā (Dhaniṣṭhā)* refers to a cluster of five stars and the two *Āṣāḍhā* are made up of eight stars. Hence, there is room for the precession

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26 *idānīm tad visamvādād ayanam dakṣiṇam raveḥ| bhavet punarvasorādau viśvādāvuttarāyaṇam||* (AS. *Sūryādbhutāvarttaḥ*)

to be in excess by another three degrees. This is the argument presented by Sastry and Sarma for fixing the date of VJ. As per this analysis, not only VJ but also Parāśara's season statement has to be assigned to 1150-1370 BCE. This is almost same as what Jones and Davis had concluded two centuries before the above critical edition of VJ by Sastry and Sarma was published in 1984 by the Indian National Science Academy.

In Chapter3, we present a new method of estimating the period of Parāśara, compatible with his season zodiac, independent of Varāhamihira's statement about solstices.

Ancient Indian tradition has left chronological signatures through such shifts in season markers either directly or figuratively. The above remote dating for the start of the tradition of PT brings up the question of its connection to the VJ and the still older Vedas. The former is a calendar with no statements about planets, eclipses and comets. In contrast PT is silent on the calendar but has several interesting things to say about planets, eclipses and comets. The relation of PT to the older Vedic texts is yet to be investigated systematically. At present, a relative chronology between PT and the *Maitrāyaṇī Āraṇyaka Upaniṣad* (MAU; also knows as *Maitrī Upaniṣad*) can be established. There is a hymn in MAU indicating that the winter solstice started at the middle of the *Śraviṣṭhā nakṣatra*[27]. This leads to an interval of 400-500 years between the observations of MAU and PT. Since the MAU oral tradition has a mark of being more ancient it might have had some influence on PT. Significantly this *āraṇyaka* makes an interesting observation about drifting of *Dhruva* the Pole Star (MAU 1.4).

It is to be noted that PT also contains a statement that the shifting of the solstice points with respect to the stars is anomalous. Specifically it is stated "if Sun goes north without reaching the end point of *Śravaṇa* or goes south without reaching the midpoint of *Āśleṣā*, it causes great fear". Such an observation would have been possible after a few generations from the start of the PT tradition *c* 1400 BCE. This indicates that the available PT

27 *.....vatsarametasya āgneyamardhamardham vāruṇamaghādyam śraviṣṭhārdham āgneyam krameṇa utkrameṇa sārpādyam śraviṣṭhārdhāntam soumyam...*|| (MAU 6.14)

text might have been edited by transmitters with additions and alterations possibly suited to their times. However, this statement also reinforces the VJ tradition of winter solstice coinciding with the end point of *Śravaṇa*, same as the starting point of *Śraviṣṭhā*, as the accepted normal pattern for the school of Parāśara. Hence it is reasonable to infer that PT contains concepts and models of the broad discipline of VJ or Vedic astronomy, of which the calendar part of Lagadha had more followers as it had better practical application in timing Vedic rituals.

Scientific Content of PT

The original text of Parāśāra should have been the model of a *Samhitā* for others, including Varāhamihira, to follow. There are *Samhitā* texts attributed to Vṛddhagarga, Garga, Nārada, Atharva and others. All these compositions are in verse form in contrast to PT in prose. PT represents the most ancient Indian tradition on astronomy referring to planets, eclipses and comets in matter-of-fact language. PT contains chapters on earthquakes, rainfall, meteors and a few other topics of general interest. Natural events were observed and classified as celestial, atmospheric and terrestrial. Some type of normal state for an event was arrived at by direct observations or by inherited tradition. Deviation from this normal state was considered a precursor for prognostication of good or bad effects on earth. This type of empirical approach is in vogue even to this day, although in a better statistically quantified fashion, for forecasting seasonal atmospheric conditions based on antecedent anomalies.

Meaning of *Graha*

It is customary to translate the Sanskrit word *graha* as planet in English. It is also common practice in astronomy to discriminate planets from comets. However in ancient Indian parlance both were known by the generic word *graha*. In fact eclipses were also supposed to be due to *Rāhu-graha*. The word *graha* is rich with nuances important for understanding the scientific naturalism behind PT. Eclipses were denoted popularly by the word *grahaṇam* and this nomenclature continues to this day. The meaning of this word is similar to *grasping; grabbing; capturing; seizing; holding*. Thus the dark object *Rāhu* who could grasp and cover Sun and

Moon was a *graha*. Comets could make stars look hazy or eclipsed. It appears some comet apparition in the most ancient period of Indian history obscured Sun and/or Moon, the memory of which made *Ketu* a *graha*. PT states that a *graha* called *Tvaṣṭā* can cover Sun and Moon at odd times. Vedas consider *nakṣatras* to be the abode of deities[28] and hence occultation of stars distributed along the ecliptic was an event of importance. This eminently qualifies Moon to be a *graha*. The reason for denoting Sun as *graha* can be understood from the Vedic model described in the *Aitareya Brāhmaṇa* (40.5). As per this, Moon enters Sun at *amāvāsyā*, and later comes out of Sun. The technical word for planet in *siddhāntic* astronomy is *tārā-graha*. These were counted as five and hence *pañca-tārā-graha* is a standard phrase referring to the well known five planets. We see that like Sun, Moon, *Rāhu* and *Ketu* the five planets were also called *graha*, since stars can get occulted by them. PT devotes considerable space for afflictions that includes occultation of stars and their purported effects on people. Thus the knowledge of planets in India would have arisen out of constant observation of *nakṣatras* and their obscuration by other celestial objects which acquired the generic name *graha*. The total number of *grahas* which lay hold on other celestial objects would be nine, known as *navagraha*. *Atharva Veda Pariśiṣṭa* (AVP) makes this explicit as Sun, Moon, the five planets, *Rāhu* the eclipse causer and the ninth as the comet *Dhūmaketu*[29].

Planets

Identity of the planets with their names should have been inherited by PT from the older Vedic tradition prevalent at its time. Previously we have seen that the MAU has signatures of 1600-1800 BCE. It cites *śani-rāhu-ketu* as celestial objects in a sequence (MAU 7.6). This is an instance in a Vedic text where the slow moving planet Saturn, aptly known as *Śanaiścara* is called *Śani*, which name has come down to the present day in the same form. Parāśara quoted by Utpala mentions the names of the planets in terms of legends which were already popular during his period. After Sun,

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28 *devagṛhā vai nakṣatrāṇi*|| Tai.Br. (1.5.2.6)

29 *navamaścaiva vijñeyo dhūmaketurmahāgrahaḥ*|| (AVP 52.12.1)

Moon and *Rāhu*, the five planets are named *Bhauma*, *Budha*, *Bṛhaspati*, *Śukra* and *Śanaiścara*. As is known planets are not easily identifiable in the earlier Vedic texts. But the *Kāṭhaka Brāhmaṇa*, a traditionally accented Vedic text belonging to the *Kaṭha* branch of the Yajurveda states all the above planets with the same names in the *graheṣṭi* rites[30]. It knows Saturn as *Saura* which of course matches with its origin-legend as described in PT.

PT knows clearly that planets become invisible as they travel in the firmament against the background of fixed stars. The visible movement of all the planets is described verbally in detail. Parāśara knew visibility numbers for planets with the exception of Mars. As per PT 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, according to Parāśara is of 591 days. As per modern astronomy it is known that Venus as a morning star is seen for some 263 days and afterwards it remains invisible for nearly 50 days. Then it rises in the west, to be seen for another 263 days and to be invisible for about 8 days before rising in the east. The average synodic period of Venus is 584 days (solar). Since in ancient India counting in terms of *tithi* was common, PT might have reported Venus numbers in terms of *tithis*. In such a case 591 *tithis* are actually equal to 582 (solar) days which is a very accurate number. The visibility of the planet depends sensitively on several parameters and hence the synodic period implied by Parāśara, even if it were to be 591 days, is a remarkable observational result. The visibility numbers given by Parāśara for Mercury are reported in BS but criticized as being incorrect as per computations. Obviously Varāhamihira and his commentator Utpala followed basic *siddhāntic* parameters of *ahargaṇa*, *kaliyuga*, *kalpa* and integral number of revolutions of planets to come to the conclusion that Parāśara's numbers were wrong. However it is possible that the reported periods of visibility and numbers were valid for some particular latitude after allowing for observational inaccuracies. This question is to be studied

30 *Kāṭhaka Samkalana*, Edited with notes by Sūryakānta, Lahore 1943; ML Publns.1981, N.Delhi.

from the perspective of modern astronomy before accepting or rejecting the above criticism. 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 verbally classifying its retrograde motion under several heads.

Agastya the Ṛṣi and the star

The sage Agastya is known to Indian cultural history from the Ṛgvedic period. He and the *Saptaṛṣi* (Seven Sages) are considered the originators of the *gotra* system to which all Hindus owing allegiance to Vedas trace their lineage[31]. Like the seven Vedic seers getting identified with the constellation *Saptarṣi-maṇḍala* (U.Major), *Agastya* is identified with the southern star Canopus. This has remained an unbroken astronomical tradition of historical significance. Legends about Agastya abound in the Vedic, Purāṇic, classical Sanskrit and Tamil literature, some of which contain interesting astronomical information also. The belief that great sages after their worldly sojourn remain as celestial beings, that is stars, is a tradition going back to Vedic times. For example the *Taittirīya Āraṇyaka* declares that the Seven Sages and Agastya live with the *nakṣatras*[32]. Abhyankar has carried out a preliminary analysis of the visibility of Canopus in ancient India. As per his study, Canopus would have appeared as a bright southern star to Vedic people around Kurukṣetra for the first time in the period 2000-3000 BCE[33].

The PT text contains the interesting doubt of Kauśika, a student of Parāśara, whether the southern star *Agastya* (Canopus) should be taken as a planet or as a star. This doubt arose because *Agastya* was not visible all through the year like other known stars and such observation was similar to the familiar behavior of planets such as Venus. However the text mentions that *Agastya* became visible either at the end of the rainy season

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31 *viśvāmitro jamadagnirbhāradvājo'tha gautamaḥ|atrirvasiṣṭhaḥ kaśyapa ityete saptaṛṣayaḥ|| saptānām ṛṣiṇām agastyāṣṭamānām yadapatyam tadgotramityācakṣate||*(Āśv.Śr.Sū; pariśiṣṭa)

32 *ṛṣayaḥ saptātriśca yat| sarve'trayo agastyaśca| nakṣatraiḥ śaṃkṛto'vasan||* (Tai.Ara. 1.11.2)

33 K.D.Abhyankar, *Folklore and Astronomy: Agastya a Sage and a Star.* Current Science, 89, 12, 2005, pp.2174-76.

or at the end of autumn. This of course would not have been possible unless the two observations differed widely in time for precession to have come into play or reports should have come from different places where the Star was seen in different months. It is easy to see that such real observation is preserved as a fossilized statement in the text redacted at a later date. The statement of Parāśara that star *Agastya* rose when Sun was with star *Hasta* and set when Sun was with star *Rohiṇī*, is a valid naked eye observation for the Puṣkara-Kurukṣetra region in the period 950-1400 BCE. This point is considered in detail in Chapter 12. The first visibility of *Agastya* is considered to be an important religious event to the present day in the yearly cycle, notably in the northern parts of India. The later discussions surrounding the heliacal rise of *Agastya* in the *siddhāntic* books can be attributed mainly to regional differences in the observations. Bhāskarayogī in his commentary on BS explains that the first visibility information on *Agastya* as given in north and south Indian texts differs due to the latitude of the place of observation.

Eclipses

Eclipses are described under the title *Rāhucāra* that is movement of *Rāhu* said to be a dark object capable of covering Sun and Moon at appropriate times. More space is devoted to lunar than to solar eclipses. A question is raised about the regularity or otherwise of eclipses. Lunar eclipses are said to occur at six months interval which is correct, though not an exhaustive answer to the question. Solar eclipses are said to occur at a further interval of five-and-half months. Even though this statement is not very clear, this seems to be referring to recurrence of solar eclipses at intervals of twelve synodic months in an eclipse season. The six monthly cycle of lunar eclipses is reported in the AVP also[34]. Among the Vedic rites the *darśa-pūrṇamāsa* which is intimately linked to lunar cycles, occupies an important place. Followed by this, the *paśūbandha* involving animal sacrifice is to be observed at six monthly intervals. The *Taittirīya Samhitā* (II.1.2) metaphorically mentions that the eclipse shadow caused by

34 *tataḥṣatsu tataḥṣatsu tato adhyardheṣu vā punaḥ| ardhavarṣeṣu māseṣu ādityasya tato grahaḥ|| tataḥṣatsu tataḥṣatsu triṣu varṣeṣu vā punaḥ| etāvadeva rāhostu cāramāhurmanīṣiṇaḥ ||* (AVP 53.6-7)

Svarbhānu is the *devapaśu* or the celestial animal. The *Gopatha Brāhmaṇa* states that the *Aindrāgni-paśu* is obtained at six monthly intervals[35]. It is evident there are connections between the ancient Vedic rites, observation of eclipses and the later PT statement about their periods.

It is known to modern astronomy that *four total lunar eclipses* called *Tetrad* can occur in a row at six months interval known as the *Semester*. It is also known that such *Tetrads* are quite frequent in a long era of about 591 years followed by another period of equal length in which they are rare[36]. Lunar cycles have had deep connections with Vedic rituals not yet fully investigated. The present writer has studied the number 3339 that appears twice in the Ṛgveda as the number of deities (*Viśvedevāḥ)* approaching the waning Moon in the dark fortnights for drinking *soma*[37, 38]. This long count of *tithi* only in the dark fortnights is equivalent to a period of 6678 *tithis* which is equal to eighteen years, the so called *Saros* mistakenly attributed to the Chaldeans by historians of astronomy. *Siddhāntic* astronomers must have known this period of *Rāhu* which would have been prevalent widely as common knowledge in the society even though its use had been forgotten. This has prompted *Siddhāntic* astronomy to exhibit great refinement in eclipse calculations. This sophistication could not have suddenly raised its head without a long tradition. The missing link between the Vedic theories and the later *Siddhāntas* is to be found in the PT, AVP and in some of the *Purāṇas* in whatever little amount it is still preserved.

Ancient Indian Comet List

The most interesting and important part of PT is *Ketucāra*, the chapter on comets. Apart from providing a classification of comets based on their purported cosmic origin, a list of 26 comets with names and their sequential appearance interval in years is provided. Some of the comets

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35 *ya etamaindrāgnam paśum ṣaṣthe ṣaṣthe māse ālabhate*|| (*Gopatha Brāhmaṇa* II part. Prapāṭhaka 2)

36 *A.Pannekoek, Periodicities in lunar eclipses;* Proc.Netherlands Acad. Sci., B, 1951, pp 30-41.

37 R.N.Iyengar *Eclipse Period Number 3339 in the Ṛgveda,* IJHS, 40, 2005, pp.139-152.

38 R.N.Iyengar and V.H.Sateeshkumar, *Archaeo-astronomical Significance of the Vedic Darśapūrṇamāsa Altar,* IJHS, 47.3, 2012, pp. 513-519.

are described in terms of their rise, station, colour, movement and shape. The list of PT is repeated in almost the same form by Vṛddhagarga with one important addition of a comet called *Gadāketu,* which he could have seen during his life time. Vṛddhagarga was after Parāśara, since he names one of the sixteen comets of the *mṛtyu* group as *parāśara.* Varāhamihira uses the same list of Parāśara and Vṛddhagarga but mixes up the order without giving the year numbers stated by them. Even though Utpala quoted Parāśara faithfully on comets with their year numbers, he had to follow the disturbed sequence of BS verses. This led Al-beruni in the 11th century and Bhat in recent times to arrive at wrong conclusions about ancient Indian comets[39]. Fortunately AS preserves the original list in the proper order and one can easily see that the list starts with a comet after the Flood and ends with a comet named *Dhūmaketu* spanning a period of about 1300 years.

Varāhamihira believed that comets were beyond computations and hence unpredictable. This might have been the reason for BS not retaining any year number even though both Parāśara and Vṛddhagarga carefully stated the interval between the successive comet appearances. Interestingly Parāśara and after him Vṛddhagarga theorized that a particular comet can appear repetitively but may not be at fixed intervals. Parāśara (as quoted by Utpala and Bhāskarayogī) said about the comet *Dhūmaketu*:

aniyata-dik-kāla-rūpa-varṇa-pramāṇa-samsthāno dhūmaketuḥ..
daśa-ekavimśati-dviṣaṣṭhi-śatadhā darśanam icchanti munayaḥ dhūmaketoḥ||

The smoky-comet (dhūmaketu) has no fixed time, direction,
shape, colour, magnitude and location.....
Sages like to see the dhūmaketu in 10, 21, 62 and 100 ways (forms).

Vṛddhagarga whom we cannot consider here in detail observed that the head of a comet is like a star with its tail directed away from the Sun. He forthright declared

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39 *Bṛhat Samhita of Varāha Mihira,* (Text with English transl), M.R.Bhat., Motilal Banarsidass, 1981, N.Delhi.

nakṣatra-cakram ākāśe yathaiva parivartate|
ketu-cakram tathaivedam ākāśāt parivartate||

Like the nakṣatra-wheel repeats (rotates) in the sky, so also the comet-circle repeats itself out in the sky.

It is intriguing why the above astronomers, in the most ancient period of Indian history, should have been so keen on comets. Is it possible that some spectacular celestial events causing distress to human beings happened in the remote past, the memory of which forced the Vedic people to observe the sky with special attention?

It was held in several ancient cultures that comets were indicators of distress. Aristotle (340BCE) argued that comets were a type of fire formed due to atmospheric processes. He propagated that comets give indications of storms and disturbances that bring wind and rain. A few centuries later Seneca (4BC-65CE), wrote a compendium under the title: *Natural Questions* dealing with astronomy, meteorology and physical geography, reflecting mainly Greeco-Roman speculations. Ancient Greeks believed that comets were due to union of two or more planets. A few believed that comets were due to whirlwinds. Greeks distinguished three classes of comets; those in which the flame hangs down like a beard; those that shoot out hair-like protrusions all around; and those which have a scattered kind of fire stretched toward an apex. But all the three classes shared a common characteristic, of being long-haired and hence the Greek name *comet.* Seneca expresses a wish that all past comets had been recorded and hopes future generations will find a method to predict the orbits of comets[40]. Seneca's book has chapters on meteors, halos, mock-Sun, earthquakes and comets but there is no relation of any kind, between Parāśara and Seneca, in the treatment of the topics.

Knowledge of comets in India easily goes back to the times of the Ṛgveda. Many of the comets named in PT as *Aruṇa, Āṅgiras, Ka,*

40 *Quaestiones Naturales of Seneca.* Translated by J.Clarke, Macmillan & Co. 1910, London.

Kabandha, Tvaṣṭā, Triśikhā, Triśiras, Vibhāvasu, Viśvarūpā, Dhūmaketu carry the names of deities lauded or mentioned in the Ṛgveda. Since the Ṛgveda uses the word *ketu* more than seventy times, there is a distinct possibility that some of the Ṛgvedic celestial deities were visible comets. This correspondence has been investigated to a limited extent by the present writer highlighting the need for deeper studies[41]. For one of the ancient comet named *Calaketu* by Parāśara the orbit with the background *nakṣatra* location is available in PT. It is hoped, someone would decipher this *ketu* in terms of a comet known to modern astronomy with its probable date of past appearance.

Even a cursory reading of PT shows that the treatment of comets by Parāśara is unique with no parallels in ancient astronomical literature. Clearly the comet list and description in PT is of immense importance to anyone interested in Indian Astronomy. The list has broad chronological implications, even if the objects can not be identified and accurately dated. Unfortunately this aspect has been ignored by both traditional and modern scholars perhaps under the wrong belief that Indian astronomy developed only after Hindus came in contact with foreigners and that the beginning of the subject is mainly represented by texts *Āryabhaṭīya*, *Sūryasiddhānta, Pañcasiddhāntikā* among a long list other texts.

Samplava the Flood

The legend of the Great Flood is common to several ancient cultures. In Indian literature the first clear mention of this event is in the *Śatapatha Brāhmaṇa,* belonging to the Śūkla Yajurveda branch. This is popularly known as Manu's Flood correlated in later literature with the first earthly descent of Viṣṇu in the form of the Fish known as the *matsyāvatāra. Brāhmaṇa* compositions explain the ritual aspects of the antecedent Vedic texts and hence the above text represents a period later than the Ṛgveda and the *Yajurveda Samhitā.* The *Śatapatha Brāhmaṇa*, has interesting astronomical information about the *Kṛttikā* star group. It is stated that the *Kṛttikā* stars do not shift from the east. Dikshit has dated this perfect

41 R.N.Iyengar, *Comets and Meteoritic Showers in the Ṛgveda,* IJHS, 45,2010, pp.1-32.

eastern position for the Pleiades to *c* 3000 BCE. *Kṛttikā* remained as the first star of the Hindu Vedic *nakṣatra* list till the *siddhānta* period, when it was replaced by *Aśvini*. Hence the conservative interpretation of Pleiades not shifting would refer to its heliacal rise at the vernal equinox. It is found that *Kṛttikā* was very near the equinoctial point during 2720-1760 BCE approaching the point almost exactly in 2240 BCE. This information is important to conclude that Manu's Flood has to be dated to near about 3000 BCE. Mention of *samplava* of Parāśara appears in the section on *Ketucāra* where the first comet *Vasāketu* is said to have appeared after 130 years during the Floods. Since a sequence of comets at specific intervals is described, it is surmised the Era of Flood was remembered through a comet tradition, all the details of which are not available now. In any case, this dates the Flood to *c* 2700 BCE which is in harmony with the position of *Kṛttikā* asterism as mentioned in the *Śatapatha Brāhmaṇa*.

Lipta and Vilipta

It is noteworthy that PT names four-and-half *nakṣatras* as *ṛtu* (season) but does not indicate the seasons in terms of *rāśi* names *Meṣa, Vṛṣabha etc*, as done several centuries later by Varāhamihira and Brahmagupta. However, a curious interpolation appears in the available text as quoted by Utpala on the division of time and space. First, smaller divisions of measurable time starting with *akṣara* (time required for uttering a syllable) leading up to thirty *muhūrta* as one *dinam* (day-night) is stated. Next, divisions of space are said to be same as in the case of time, with no specific details. This is followed by an alternative division of time starting with *prāṇa, vighaṭikā, ghaṭikā*, leading to sixty *ghaṭikā* per day-night. The division of *kṣetra* or space is once again said to be similar to or same as that of time. Here *kṣetra* refers to marking the celestial path or space. The smallest unit of this space is called *tatpara*. Sixty *tatparas* make one *vilipta*. Sixty *viliptas* make one *lipta*. Sixty *liptas* equal one *bhāga;* thirty *bhāgas* make one *rāśi* and twelve *rāśis* make one *bhagaṇa*. The similarity between time and space measure is brought out in the equation of thirty *tithis* (days) to a month and thirty *bhāgas* to one *rāśi*. Twelve months make a year, similar to twelve *rāśis* making a *bhagaṇa*. It is easy to recognize that *bhāga* is the angular degree, while *lipta* and *vilipta* refer to minutes and seconds respectively.

It is to be noted that there are two sets of definitions here, the second added at a later date, without replacing the first one. This additional definition contains the word *lipta* which is the Sanskritized form of *liptos* an angular measure of Greek origin. Hence PT that was available to Utpala must have been edited over time. The PT text, as available to the commentators, might have been compiled some time around the beginning of the Common Era when presumably the current names of the twelve zodiac signs were still not popular in greater India. This inference in no way alters the originality of the ancient tradition of observations contained in PT. Moreover Āryabhaṭa (5th Cent. CE) stated the basic angular measures, minutes and seconds in terms of patently Sanskrit words *kalā* and *vikalā* respectively and showed no awareness of their Greek equivalents[42]. With no compelling evidences to the contrary, the initial point of the described tradition has to be assigned to *circa* 1400 BCE. Thus, even though we are unable to pin point the identity of the author, the core portion of PT represents a sample of indigenous knowledge on natural sciences including astronomy that existed long before the advent of *siddhāntic* (mathematical) astronomy in India.

Format of PT

The text of PT compiled here is based on the three printed sources mentioned previously. The title of the chapters is mainly based on Utpala's commentary, which in turn follows BS. In each chapter the text quoted by Utpala is presented followed by differences, if any, as per the AS. In a few sections both texts are given, at the cost of repetition, to bring out the fact that the text known to Utpala and Ballāla was by the same Parāśara. The commentary of Bhāskarayogi is not so extensive in quoting Parāśara. There are some places where only one of the sources is available. Comparison of PT with BS clearly brings out that Varāhamihira made use of Parāśara's text readily available to him for composing several chapters of his more famous book. The major portion of the PT text is in prose form, but verses here and there could have been present as handed down by tradition. These are also included in the present collection. Sometimes persons with

42 *Āryabhaṭīyam* (Critical Edn. With Transl.) K.S.Shukla, INSA, 1976, N.Delhi.

names related to Parāśara are quoted, for example; Pārāśarya, Pārāśara and Parāśarī. In the BS text edited by Pt. Dwivedi all these names have been combined under a single Parāśara. Fortunately Pt. Muralidhar Jha in his AS edition has kept up the difference among the various Parāśaras, as Ballālasena did in his text. For sake of completeness, these statements, always in verse form, are included in the text but these may not be from the original and the most ancient astronomer Parāśara. In some places, for better understanding it becomes necessary to give statements of the compiler or the commentator. Also there are introductory statements or questions raised by the students of Parāśara which indirectly indicate the kind of curiosity that was the driving force for observing the sky. Such statements are also shown before presenting the text specifically attributed to Parāśara.

After the Sanskrit text a brief working translation is provided that is neither literal nor exhaustive. Statements which elaborate portents and religious practices to mitigate the ill effects of bad omens are left out in many places of the translation. This is followed by technical notes to explain scientific information, wherever it is apparent.

The present effort is not to bring out a critical edition of the *Parāśaratantra* but only to draw attention of persons interested in Indian culture and history to a treasure of ancient scientific information that has remained concealed and hitherto unexplored. It is hoped this effort will motivate lovers of Sanskrit and historians of science in India to search the manuscript libraries to bring out new editions of the *Parāśaratantra,* the *Vṛddhagargasamhitā,* the *Adbhutasāgara* and such other texts with critical apparatus.

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॥ उपनयनाध्यायः॥ Prologue

१.१ [उत्पलविवृतौ। यथा भगवता पराशरेण पुष्करस्थाने कथा कृता॥]

हिमवति हिमवदवदातेऽवनिधरवरशिखरविपरिवर्तितमिव विवस्वन्तं भगवन्तं पराशरमभिसंगम्य विनयावनतः कौशिकः अभ्युवाच । भगवन् सर्वात्मा कालगतिविधाता सूर्यस्तस्य चरितमभिशुश्रूषामहे । द्वादश च श्रूयन्ते । एक एव तपन् दृश्यते । शीतोष्णवर्षाभ्रानिलानां कथमस्मात् प्रादुर्भावः । कथं च ऋतवः तन्मानमनुवर्तन्ते । मार्गप्रमाणवर्णसंस्थानादि शुभाशुभफलमखिलमभिव्याहर्तुमर्हसीति ॥

1.1 [*In Utpala's Commentary. As a discourse was held by sage Parāśara at Puṣkara.*]

Kauśika approached his teacher Parāśara seated in the Himalayas, pure like snow, and put the following question. Sir, the Creator of the flow of Time is Sun. We would like to hear his history. We hear about twelve, but only one Sun is seen burning. How cold, heat, rains, clouds and wind are generated by Sun? How seasons follow Sun's measure? Please explain the path, magnitude, colour, position etc of Sun with corresponding good and bad effects.

[Utpala also known as Bhaṭṭotpala lived in the 10th century in Kashmir. His reference to Parāśara holding a discourse at

Puṣkara could have been a legendary tradition. *Puṣkara-sthāna* refers to the location of the famous lake in Rajasthan, near Ajmere. However the text further refers to Kauśika questioning his teacher Parāśara sitting in the Himalayas.]

१.२ [तमुवाच भगवान् पराशरः]

पुरा खल्वपरिमितशक्तिप्रभाप्रभाववीर्यायुरारोग्यसुखैश्वर्यधर्मसत्त्वशुद्धतेजसः पुरुषा बभूवुः । तेषां क्रमादपचीयमानसत्त्वानां उपचीयमानरजस्तमस्कानां लोभः प्रादुरभवत् । लोभात् परिग्रहं परिग्रहात् गौरवं गौरवादालस्यं आलस्यात्तेजोऽन्तर्दधे। अथ भगवान् परमर्षिरचिन्त्यः पुरुषो नारायणः स्ववेद्यमाद्यं आत्मानं द्वादशधा कश्यपाददितेः जनयामास । येनानन्तं पुनर्जगदभवत् । यान् द्वादशादित्यानाचक्षते । इन्द्रो विष्णुर्विवस्वान्मित्रो अंशुमान् धाता त्वष्टा पूषावरुणो अर्यमा भगः सवितेति । अथ सवितारं पितामहोऽतितुष्टाव वरार्हं चैनं वरयाञ्चकार । यथा द्वादशादित्येभ्यः त्वामुपस्थास्यतीति । मत्तो योगस्तेजो रुद्रात् स्वयमग्नीषोमौ वायुरमृतं मर्त्यं चेति॥

1.2 [*Parāśara answered him.*]

In the remote past, people happened to be with unlimited strength, power, longevity, joy, health, wealth, morality and all good qualities. Gradually their Sātvic qualities decreased with increase in Rajas and Tamas leading to greed. With greed came acquisition, heaviness, laziness and their energy (tejas) vanished. Then the Great Sage Nārāyaṇa made Himself to be born twelve times by Kaśyapa in Aditi. The endless universe came into existence again. The twelve Ādityas were Indra, Viṣṇu, Vivasvān, Mitra, Amśumān, Dhātā, Tvaṣṭā, Pūṣan, Varuṇa, Aryamā, Bhaga and Savitā. Then Savitā received a boon from the Creator "all the twelve Ādityas stay in you. You will get conjunctions (with nakṣatras and planets) from me; energy (light) from Rudra; fire, Moon, nectar and death on their own naturally."

[There are variants of this story found in the *Purāṇas*. However

the names of all the twelve *Ādityas* are found in the Vedas, even though their functions might have been different. For example in the Ṛgveda, Indra is supposed to hit Tvaṣṭā in the sky, which may not refer to the Sun. In any case the origins of the cosmogony narrated by Parāśara could go back to Vedic times. In the present case the twelve *Ādityas* over a period of time got associated with the twelve months of a year. Naturally these twelve months would have been solar connected with the seasons.]

१.३ [चन्द्रस्य पराशरमुनिना सम्भवो नोक्तः॥ राहोर्यथा]

अथ भगवन्तं अनिलबलसमीरितप्रोद्धतहुतवहप्रभाभासुरं अवितथदर्शनं उदासीनमाश्रमस्थमभिसंक्रम्य कौशिको विनयात् पराशरमुवाच । भगवन् सकलभुवनविलयोद्भवस्थितिविकरणौ कथमुपरज्येते सूर्यचन्द्रमसौ गृह्णाति को वा ग्रहो ग्रहणप्रयोजनं फलं वा किमस्य ग्रहणे नियतमनियतं चेति ॥ तमुवाच भगवान् पराशरः॥

1.3 [*Utpala: The origin of Moon was not explained by Sage Parāśara. But about Rāhu it follows.*]

Then, Kauśika politely asked Parāśara. Sir, how is it that Sun and Moon get eclipsed? Which object captures them; what is the use or result of this seizure? Does this happen at fixed intervals or is it irregular? Parāśara answered:

१.४ पुरा पुरुहूतपितरं कश्यपमपत्यार्थमकाले सिंहिका अभियाचयामास तस्यै मुनिः अकालयाञ्चाकोपाद्दारुणं यमकालान्तकोपमं सुतमदात्। यं राहुरित्याचक्षते कुशलाः। स जातमात्र एव अदितिसुत-सङ्घावमर्दादनुविमुखीकृतः क्रोधाद्धिमवति दिव्यमत्युग्रमयुतं वर्षाणां तपोऽतप्यत। स पितामहाद्दिवि चरणममरतां सुरविजयं अर्कचन्द्रसंभक्षणं च वरमभिवरयामास । तस्मै भगवानमरगुरुः स्वयम्भूः प्रहसन्नुवाच ।

अतिवरमशक्तस्त्वमेतौ जरयितुं किन्तु एवमस्तु इत्युक्त्वाऽन्तर्हिते भगवति दिनकररजनिकरावभिदुद्राव राहुः । ततो हरिः अरिविमथनं चक्रमुपरि परिक्षिप्यास्य शिरश्छित्वोवाच । सर्वमवितथं पितामहवचो भवतु स्वे स्वे युगे पर्वणि ग्रहणं कुर्वन् जगतः शुभाशुभानां कर्ता भविष्यसीति ॥

1.4 *In the past, Simhikā desiring a child approached Kaśyapa at an inappropriate time. The sage angered at the wrong timing of her approach gave her a deadly son, whom people call Rāhu. Immediately after birth, Rāhu being rejected by the children of Aditi, did a long penance and asked from Brahma the boons of moving in the sky, immortality, victory against the gods, and eating of Sun and Moon. The Creator laughingly said 'you will not be able to digest them, any way let it be so'; Rāhu started harassing Sun and Moon. Then Viṣṇu with his wheel cut Rāhu's head and said; 'everything will happen as told by Brahma, you will cause eclipses in their respective periods at the junctions (new Moon and full Moon) heralding good or bad effects on earth.'*

[The question raised by the student already presupposes that eclipses might be occurring at fixed intervals. Folklore about *Rāhu* appears in many places with considerable variation. But all ancient literature refers to *Rāhu* as causing both solar and lunar eclipses. The nomenclature of *Rāhu* as the eclipse agent does not appear in the Ṛgveda. *Rāhu* as a celestial object appears first in the Atharavaṇa Veda along with Moon, meteors and comet. It is seen from the text, Parāśara held the opinion that eclipses occur at regular intervals called *yuga*. The meaning of this word varies from five to thousands of years in the literature. As per the Vedānga Jyotiṣa *yuga* is a period of five years. It is to be noted *Ketu* is not an eclipse causer associated with *Rāhu*. Naming *Rāhu* and *Ketu* as the ascending and descending lunar nodes is a very late interpretation linked with Hindu astrology.]

१.५ [भौमस्य यथा]

अथ भगवान् जगदादिसर्ग एव प्राक् प्रजापतिः सिसृक्षयेश्वरः करेण क्रोधात् स्वतेजसोऽभिनिष्यन्दमग्निं तेजस एव जुहाव। अथ तदग्नितः अवनिमुपसृत-मुर्व्यग्निसर्वतेजोभिः सम्भृतमुदतिष्ठद्यं प्रजापतिं प्राजापत्यं भौममिति मन्यन्ते। स स्वयम्भुवो नियोगादृक्षचक्रमनुचरन्नशेषग्रहसामान्यचारात् वक्रानुवक्राभ्यां चराचरं जगद्विशिष्टाविशिष्टेन कर्मणा युनक्तीति ॥

1.5 [*About Bhauma that is Mars*]

Then, the Creator in the very beginning being angry with desire for creation emitted his energy as fire. That fire which reached earth is known as Prājāpatya Bhauma. He (Bhauma) ordained by the Creator follows the star circle moving differently from other planets in curved and convoluted paths.

१.६ [बुधस्य यथा]

प्रागसुरसुरसन्निपातेऽसुरगुरुमायया भिमुह्यन्तः सुराः स्वयम्भुवमभिसङ्गम्योचुः। भगवन्निद्राभिभूताः स्मः। स्वपतां नो द्विषद्विघातहेतुमभिध्यायस्वेति। स्वयम्भुवा ग्रहपतिरपां तेजः सोमोऽभिध्यायोक्तः। सुतस्ते त्रिभुवनोद्भावनविलयनगोपायन-प्रजापतिर्भविता । सकलविबुधगणान् बुधोऽभिरक्षते । ततो जगदभिगुप्त्यर्थं गतिवर्णचारमार्गास्तमनोदयप्रवासैर्जगतः शुभाशुभकरो भवतीति ॥

1.6 [*About Budha that is Mercury*]

In the past when deities were ensnared by the magic of the teacher of demons, they approached the Creator and said 'We have become sleepy. Please think of a suitable remedy against our enemies.' Then the Creator thought of Soma the lord of planets (graha-patiḥ) and said 'your son will become the protector of the universe. He will protect all the intelligent species. For protecting the world he will indicate good and bad portents by his motion, colour, cycle, route, setting, rising and travel (invisibility).

१.७ [बृहस्पतेर्यथा]

अथामरवरगुरुमधिकृत्य गुरुर्भगवान् पराशरः शिष्येणाभिनन्दितः सुरगुरु-चरितमखिलमभिप्रणम्य गुरुमेवोवाच। आदिसर्ग एव पितामहोऽङ्गिरसं मनसाभिजज्ञे। अङ्गिरसोऽभिमुखाद् ब्रह्मधामैव त्रिभुवनगोप्ता प्रजापतिर्भगवान् बृहस्पतिरजायत । तमुत्पन्नमात्रमेव स त्रैलोक्याधिपतिः पिनाकभृत् सुरवरगुप्त्यर्थं वरार्हं वरयामास । पितामहमिव त्वां प्रभाप्रभावर्द्धिसिद्धियोग-ज्ञानमन्त्रब्रह्मकर्माण्युपस्थास्यन्ति । गुरुरपि च सुराणां जगति शुभाशुभकरो त्वमेव भवितेति॥

1.7 [*About Bṛhaspati that is Jupiter.*]

Greeted by his disciple, Parāśara said about the teacher of gods. At the beginning of the creation Brahma thought of Aṅgiras. In front of Aṅgiras was born Bṛhaspati Prajāpati. As soon as he was born, Śiva blessed him to have all greatness, power, knowledge of yoga, mantra and other rites. He was also blessed to be the teacher of gods and to induce good and bad effects on earth.

१.८ [शुक्रस्य यथा]

प्राग्भगवन्तममलतपसमनेकर्षिगणपरिवृतमशक्तदृशमपगतसंशयमुपेत्य संशयात् कौशिकः पराशरं विनयादवोचत् । भगवन् दितिसुतगुरुचरितमिति यदग्रे भगवानुवाच तत्संशयो नः कथममरवरवपुषस्तस्यायत्ताः प्रजाभावा-भावाः। तमुवाच भगवान् पराशरः॥

प्रागादिसर्गे च भगवतस्त्रिलोचनस्य शम्भोः रोरूयमाणस्य पितामहो भव इति यन्नामाकरोत्तस्यापो मूर्तिः सा भृगुकन्यका यस्यामुशना यं शुक्रं जनयामास स पुराऽयुतवर्षकेण कणधूम्रव्रतेन त्रिभुवनगुरुं पिनाकिनमाराध्य सकलधनपतित्वममरवरवपुः प्रज्ञाप्रभावतपःश्रुततेजोऽधिकत्वं असुरगुरुत्वं अर्कवर्षनिग्रहं प्रजापतित्वं च लेभे । तस्य भगवतश्चरितं उदयास्तमयर्क्षमार्गवर्ण-वीथीमण्डलैरुपदिशन्तीति॥

1.8 [*About Śukra that is Venus*]

Kauśika politely asked Parāśara about the teacher of the children of Diti. Parāśara explained:In the start of the creation, Śukra was born to Uśanas and the daughter of Bhṛgu. He obtained from Śiva the boons of immortality, lordship over wealth, brightness, and became teacher of the demons (asura). He also got the boon of controlling the Sun induced rainfall and to be a Prajāpati. His movement is explained in terms of rise, setting, star-routes, colour and path circles.

१.९ [सौरस्य यथा]

अथ भगवतः पुरा आदियुग एवातिभासुरमभितपतो विवस्वतः तेजसाऽभिव्यथ्यमानेषु भूतेषु स्वयं स्वयम्भूर्भगवन्तं विवस्वन्तमुवाच । अलमतितेजसा । न देवदेवा अपि तत्तेजसः परमं बलमतिसोढुं समर्थाः। किमङ्ग पुनः प्रजाः । प्रजापतिनेत्यादिष्टो रविः अतितेजोनिवारणादतिक्रुद्धः स्वभावात् क्रोधमेवापत्यं जनयामास यं शनैश्चरमित्याचक्षते । इति ॥

1.9 [*About Saura that is Saturn*]

In the beginning of creation all living beings were affected by the extraordinary heat of Vivasvān. Then the Creator told Vivasvān to reduce his heat. Ravi (Sun) so ordained, being angry at the reduction of his heat, generated an offspring who is known as Śanaiścara.

[Varāhamihira in BS (1.11) refers to the creation legends as of no practical use. Utpala comments that these were stories told by the ancients to keep their students amused. AS does not recount the above legends of PT. The stories do contain some interesting concepts original to Hindu astronomical lore. After Sun and Moon it was *Rāhu* that was considered before the planets. The names of the planets were *Bhauma, Budha, Bṛhaspati, Śukra and Śanaiścara* described also in the same order. This order is

same as the order of the week days, which has come into vogue after realizing that *Rāhu* was not a concrete dark celestial object but only a shadow.

Since we suspect that the original *Parāśaratantra,* was an auxiliary Vedic text like the VJ of Lagadha, it would be interesting to trace the list of the nine celestials in Vedic literature. The *Kaṭha Brāhmaṇa* is the only available Vedic text which names all nine celestial bodies referred above. In the published *Kāṭhaka-samkalanam,* sections 4, 5 and 6 are titled, *Graheṣṭi-brāhmaṇam*, *Graheṣṭi-mantrāḥ* and *Graha-brāhmaṇam* respectively. The first among these is a typical Vedic text in prose with modulations. This names the celestials as *Āditya, Śukra, Bṛhaspati, Budha, Bhauma, Saura, Candramā, Rāhu* and *Ketu* in that order. The next section is in plain verse starting with laudations to *Agni* and *Soma*. This is followed by hymns to *Sūrya, Śukra, Bṛhaspati, Budha (Soma-śiśu), Vakrī, Śanaiścara, Candramā, Svarbhānu,* and *Ketu*. We see here one to one correspondence between the two sections in the order of the objects and also the equivalence between *Bhauma* and *Vakrī; Saura* and *Śanaiścara*; *Svarbhānu* and *Rāhu*. This is the nomenclature adopted in PT with legends which match with the meanings of the names. This section of the *Kāṭhaka* text also has an extra set of verses to all the above *nava-graha,* followed by *Dhruva* and *Agastya*. In section (6) known as *Graha-brāhmaṇam*, adoration hymns to each of the nine *graha* are given without accents but in an entirely different sequence, that matches with the order of the week days as in PT. This section also includes cursory reference to the parent body of the celestial or the birth legend as follows:

i) *Āditya was born out of Kaśyapa and Aditi;*

ii) *Soma, that is Candramā is Brahmaputra born out of Amṛtakalaśa;*

iii) *Aṅgāraka was born out of Rudra and Rudrāṇī;*

iv) Budha was born out of Candra and Rohiṇī;
v) Bṛhaspati was born out of Brahma and Mānasī;
vi) Bhārgava was born out of Bhṛgu and Oṣadhī;
vii) Śanaiścara was from Ravi and Chāyā;
viii) Saimhikeya is offspring of Prajāpati and Simhikā;
ix) Ketu is the son of Agni in the womb of Sandhyā.

From the above it can be inferred that the creation legends of the planets narrated by Parāśara should have been closely connected with a naturally evolving Vedic tradition, which personified not only the *nakṣatras* but also other celestial objects. This also makes it amply evident that the primordial Vedic *Ketu* should have been a comet personified as a *celestial fire* visible either at daybreak or in the evening twilight.

The legend of Mars getting connected with Earth through a fire as described above carries in it a possible reference to meteorites falling on earth supposedly originating from Mars. Venus or *Śukra* being called *Prajāpati,* having control over summer rains is connected to its visibility pattern and its synodic period which was known to Parāśara. Visibility of Venus in the eastern sky in the monsoon season as a precursor to rainfall is mentioned by Kauṭilya in his Arthaśāstra[1]. The birth of Saturn out of *Vivasvān* presupposes a form of primordial Sun out of which the planet is said to have separated. All the planets are said to have originated out of the Creator *Prajāpati* and eventually seem to have acquired *prajāpatitva,* meaning thereby that they have control over people. After the five planets a doubt arose as to whether the star Canopus could be a planet.]

१.१० [अगस्त्यस्य यथा]

अथ भगवन्तममितयशसं पराशरं कौशिकोऽभ्युवाच। भगवन् याम्यायां

1 *Kauṭilīya Arthaśāstra* Pt.I (Chapter 2.24 .7-8) Ed. R.P.Kangle MLBD Pub., 2000, N.Delhi.

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

श्रुतपूर्वस्ते पृथिव्यां मेरुमन्दरातिरिक्तप्रभावः शैलराड् विन्ध्यो नाम । स स्ववीर्यबलसमुच्छ्रायविशेषमन्विष्यमाणो दिव्यं वर्षसहस्रमुग्रं तपस्तेपे। स पितामहादहन्यहनीषुपातप्रमाणमुच्छ्रायेण वर्द्धस्वेति ईप्सितं वरं लेभे। तस्यातिवृद्ध्या दिवसकर आवृतस्तेनान्धमिव जगदभवत् । ततो देवर्षिगन्धर्वोरगरक्षांसिपितामहमभिजग्मुः।भगवन्विन्ध्यवृद्ध्या जगदवसीदत इत्यूचुः। ततः स्वयम्भुवा अगस्त्यनामा महर्षिः अनेकवर्षसहस्रसम्भृततया ध्यातः उक्तश्च । त्वमेकः शक्तो विन्ध्यातिवृद्धिनिवर्तनं कर्तुं कृते चास्मिन् कर्मणि नभसि विराजिष्यसे । दर्शनादेव ते जगति सर्वविघ्नविनाशो भविष्यति। एवमस्त्विति कृत्वा महर्षिरगमत् विन्ध्यसकाशम् । उवाचैनमन्तरं मे प्रयच्छ तीर्थयात्रां करिष्यामि । अनागते च मयि त्वया न वर्धितव्यम् । इत्येवमुपश्रुत्य तपःप्रभावविस्तरस्याभिज्ञो महर्षेः विन्ध्याचलश्चलच्छिखरपादो भयविषादविक्लवमतिः उवाच । भगवन् बृहदसंकीर्णमविषमं अनेक-तरुगणोदकम् एकदेशमार्गमायोजयिष्यामि येन भगवन् यास्यतीति । एवमुक्तो महर्षिः चुकोप । क्रोधरक्तान्तनेत्रोऽवदत् । ममाज्ञाक्षोभात् कदाचित् सर्वथैव न भविष्यसीति । ततः शैलस्तत्प्रभावभयभीतः स्वभावमुपगतोऽनागते भगवति न वृद्धिं यास्यामीति । ततो महर्षिः दक्षिणां दिशमगमत् । स एषोऽगस्त्यः शैलवृद्धिव्याघातनिमित्तं न प्रत्येति दक्षिणस्यामुदेति तस्यामेवास्तं गच्छतीति॥

1.10 [*About Agastya that is Canopus*]

Then, Kauśika asked Parāśara. Sir, in the southern direction a bright planet-like object is seen. I don't know this object that moves not along the nakṣatra-planetary path (ecliptic). Why this object leaving the East rises in the South at the end of the monsoon or at the end of the autumn to be

seen for a few days? Please explain this.

Parāśara said:
We have heard that in ancient times Mount Vindhya grew too tall and covered the Sun as though to make the world dark. Then at the request of the gods the Creator told sage Agastya that he only can control Vindhya and after this act he would start glowing in the sky. Agastya went to the mountain range ordering it not to grow till he returned from his travels in the southern regions of the country. When Vindhya offered a wide lane with trees and water bodies to travel the sage got angry. Being afraid of the sage, Vindhya agreed not to grow till the sage returned north. Agastya to prevent Vindhya from further growth, rises and sets in the south only.

[The question of the student Kauśika is as important as the subsequent answer. The five planets and their movement along the *nakṣatra-graha-mārga* or ecliptic were known to the student. Canopus did not rise in the east but in the south. Moreover it was not visible always but seen towards the end of autumn in the morning sky, the star set within a few days. This behavior was similar to planets such as Venus which was visible for a few days before setting. Hence the question of the student is an observational fact which should have caused considerable curiosity in the early stages of observational astronomy in India. Influence of PT on later astronomers has been strong as far as predicting *Agastya's* rise is concerned. Almost all *siddhāntic* texts devote considerable discussion on this topic. A detailed discussion on visibility of *Agastya* will be presented later in Chapter 12.]

१.११ [केतोः केतुचारोक्ता एवोत्पत्तिः]

1.11 [*About Ketu its birth is described later in Ketucāra*]

१.१२ [तथा च भगवान् पराशरः]

सप्तषष्टिसहस्राण्यशीतियोजनकोट्यो भूर्यत्पृथिवीमण्डलं परमस्मादगम्यं तमः । तन्मध्ये हिरण्मयो मेरुश्चतुरशीतियोजनसहस्रोच्छ्रितः षोडश चाधस्तात्। त्रिगुणविस्तारायामो यं स्वर्गमाचक्षते । तन्मध्ये अर्कचन्द्रौ ज्योतिश्चक्रं च पर्येति ॥

1.12 (Paraśara said) The circle of the Pṛthvī is 67080 crore yojanas in total. Beyond this is unapproachable darkness. In the middle is the golden Meru, 84,000 yojanas above and 16,000 yojanas below. The region which is three times its spread is known as Svarga. In the middle of this region Sun, Moon and the Jyotiścakra (circle of the celestial lights or the ecliptic) move.

[The text here reads incomplete. In describing the universe, *purāṇas* and scriptures of Jainism provide cosmographic description of Earth, *Meru*, *Saptaṛṣi* (U.Major), *Dhruva* (Pole star) with respect to Sun, Moon, and other celestial bodies. It is likely the original PT also had a section on cosmography more detailed than the above.]

१.१३ [अद्भुतसागरे। अथोत्पातविवेकः । तत्र पराशरः]

प्रकृतेर्भूतविकृतप्रादुर्भावांश्च उत्पातमाचक्षते । तेषां द्यौरन्तरिक्षं भूरेताश्चाश्रयः पञ्चमहाभूतानि योनिः। नृपनृपतिसुतराज्ञीकोषलोकपुरपुरोहितवाहनेष्वेतेषां फलमतिनिवर्तते॥

1.13 [*In the Adbhutasāgara. Discussion on Anomalies. Parāśara says*]

Unexpected alteration in nature caused by the elements is called utpāta. The sky, atmosphere and earth are the locations (for utpāta). The five elements are the generators. The results are quickly realized in the case of the king, his son, queen, treasury, society, city, priest and vehicles.

[The word *utpāta* is used in the sense of an unexpected or abnormal or unprecedented natural event. The meaning of the word is

that which springs up suddenly without warning, for example an earthquake, a mud volcano or a ground fire. Such events are treated as portents indicating bad and sometimes good effects on people. Hence this word cannot always be taken to refer to a disaster without further details. In course of time anomalies that were fixed up as being away from the norm were also interpreted as *utpāta*. The word *adbhuta* used in the sense of anomaly appears to be older than the word *utpāta*. The word *adbhuta* which stands for strange and unusual objects or events is used in the Ṛgveda as an epithet for *agni* the fire which could have represented comets, meteors and novae. It is noted that the *Nirukta* (1.6) interprets *adbhutam* as *abhūtam*, that is, *unprecedented*.]

02

॥ सांवत्सरसूत्राध्यायः॥ Fundamentals

२.१ [उत्पलविवृतौ। तथा च भगवान् पराशरः]

यावता कालेन विकृतमक्षरमुच्चार्यते स निमेषः । निमेषद्वयं त्रुटिः । त्रुटिद्वयं लवः। लवद्वयं क्षणः । दशक्षणाः काष्ठा । दश काष्ठाः कला । दशकला नाडिका । नाडिकाद्वयं मुहूर्तः । त्रिंशन्मुहूर्ताः दिनमिति । एवं कालस्य वेत्ता। तथा क्षेत्रस्य वेत्ता । तत्र कालक्षेत्रयोः साम्यम् ॥

2.1 [*In Utpala's Commentary. As per Parāśara*]

The time taken to sound (utter) a compound letter is Nimeṣa. Two Nimeṣa make one Truṭi. Two Truṭi make one Lava. Two Lava make one Kṣaṇa. Ten Kṣaṇa are equal to one Kāṣṭhā. Ten Kāṣṭhā make one Kalā. Ten Kalā make one Nāḍikā. Two Nāḍikā make one Muhūrta. Thirty Muhūrta make one Dina. This is the knowhow of time. Then about space; Time and Space (measures) are similar.

[Thirty *muhūrtas* to a day is the equation in VJ also. The definition of *nāḍikā* in VJ is different from the one here. Sixty *nāḍikās* making one day is a tradition that has come down from the PT period. This has been followed by the later *siddhāntic* astronomers. All the three traditions take a basic unit in terms of the time required for uttering a compound letter or syllable.

But reduced to the same base, the time represented by *akṣara* differs. As per VJ, one *nāḍikā* is made of 6231 *akṣaras*, whereas in PT this would be equal to 8000 *akṣaras*. The time taken obviously depends on the speed of utterance also. Āryabhaṭa further standardized this definition by stating *nāḍikā* as the time taken to utter 3600 long syllables at medium speed. Further details are available in an article by S.R.Sarma[1].]

२.२ तद्यथा – काले षट् प्राणा विघटिका । विघटिकानां षष्ट्या घटिका । घटिकानां षष्ट्या दिनम् । दिनानां त्रिंशता मासः । मासैर्द्वादशभिः वर्षं भवति। अथ क्षेत्रे। षष्ट्या तत्पराणां विलिप्ता भवति । विलिप्तानां षष्ट्या लिप्ता । लिप्तानां षष्ट्या भागः । भागानां त्रिंशता राशिः । राशिद्वादशकं भगण इति ॥

2.2 *As follows - In time; six Prāṇas make one Vighaṭikā. Sixty Vighaṭikās make one Ghaṭikā. Sixty Ghaṭikās make one Dina. Thirty Dinas make one month. Twelve months make one year. Then about space; Sixty Tatparās make one Viliptā. Sixty Viliptās make one Liptā. Sixty Liptās make one Bhāga. Thirty Bhāgas make one Rāśi. Twelve Rāśis make one Bhagaṇa.*

[The basic measures of time and space are stated here. As discussed in the Introduction there are two sets of definitions here. Thirty *muhūrtas* to a *Dina* or day-night is the definition available in VJ also. In the first set the measure of space is not explicit. The notation of sixty *Ghaṭikās* to a *Dina* appears to be a later convention. The measures *Nāḍikā* and *Ghaṭikā* are equal. The definition of *Lipta* and *Vilipta* here is a clear late addition to the ancient text.]

२.३ यथा मन्त्रमुखोऽग्निः अग्निमुखा देवाः तथा दैवज्ञमुखो राजा राजमुखाश्च प्रजाः । तस्मात्तद्विज्ञानाद्यत्नत्वात् श्रेयसो नरपतिरिहामुत्र च श्रेयोऽर्थी विजिगीषुरेनमधिगच्छेत् । कुलीनं अनहङ्कृतं स्तब्धमशठमप्रमत्तं

1 S.R.Sarma, *Measuring time with long syllables*, IJHS, 36, 1-2, 51-54, 2001.

अविषयमव्यङ्गम् अविहतप्रशस्तलक्षणम् वेदवेदाङ्गेतिहासपुराणधर्मशास्त्रावदातं शुचिं शरण्यं सत्यवादिनमक्रोधिनं अग्निदेवद्विजगुरुवृद्धाचार्यपूजाभिरतम् अनुगामिनमाचार्यं शिष्य इवाभ्युपेत्य नावजानीयाद्रहसि चैनं पृच्छेद्यथास्य दैवं परे न विद्युः । नास्य पृष्टानर्थान्नतिक्रमेदिति ॥

2.3 *Like hymns are the forefront of Agni, like gods have Agni as their front so does a king have daivajña as his front and citizens have the king as their front. Hence the king desirous of good in this world and in the other world should approach the daivajña. He (King) should approach like a student, a daivajña who is from a good family, is egoless, stable, not dense, not intoxicated, handsome, expert in the Vedas, Vedāṅgas, itihāsa, purāṇa and dharmaśāstra, clean, benevolent, truthful, calm, and religious; and question him about the portents and their interpretations.*

> [The title of the second chapter in BS is *Sāmvatsara-sūtra.* This refers to fundamentals connected with the Year. The word *sāmvatsaraḥ* could also mean a person knowledgeable about the Year and its related parameters like the calendar. BS uses the word in this sense referring to a specialist trained in astronomy, portents, ancient lore and what would be called astrology. PT provides some of the most basic qualities of a *daivjña* or a diviner. BS has enlarged on the statements of Parāśara.]

२.४ [अद्भुतसागरे संवत्सराद्भुते पराशरः॥]

अथ वर्षेषु तावदाग्नेयः संवत्सरः परिवत्सरः सौरः इदावत्सरश्चान्द्रो वायव्योऽथ वत्सरः । आग्नेये विद्यात् प्राबल्यमग्नेः पैत्तिकानां च रोगाणाम्। सौरे शङ्करसूनुनामक्षामपुष्पफलशस्यदमतीव । चान्द्रे ग्रैष्मिकाणां व्याधीनां बहुत्वमन्नस्य सम्पदं सर्वौषधीनां च विशेषेण क्षीरिणीनाम् । वायव्ये वातवेगवान् वातरोगप्राबल्यं घनानामल्पोदकत्वं च । मार्त्यवे सर्वव्याधिप्राबल्यं बालमरकं गर्भस्रावं च इति ॥

2.4 [*Samvatsarādbhuta in AS. Parāśara says*]

Among the years Samvatsara is fiery, Parivatsara is solar, Idāvatsara is lunar, Vatsara is windy. In the year of Fire, fire is stronger with increase in bilious diseases. In the year of Sun growth of a weed called śankara-sūnu will be excessive. In the year of Moon summer diseases increase, food and herbal medicines will be abundant. In the year of Wind, wind induced diseases increase and clouds yield less rain. In the year ruled by Death, all diseases become strong, infantile mortality and abortions increase.

[The five year cycle of the VJ is stated here. Only four names are given in the order *samvatsara, parivatsara, idāvatsara and vatsara.* These are governed by Fire, Sun, Moon, and Wind respectively. The fourth year in the cycle called *anuvatsara* is missing; this is most likely a scribal mistake. This is followed by stating the effects where five years are mentioned with the fifth one governed by *mṛtyu.* The characters of the five years have been used in proposing a five year cycle in rainfall.]

03

॥ आदित्यचारः॥ Movement of Sun

३.१ [उत्पलविवृतौ । यदुक्तं पराशरतन्त्रे]
[In Utpala's commentary: As said in the Parāśaratantra]

श्रविष्ठाद्यात् पौष्णान्तं चरतः शिशिरः । वसन्तः पौष्णान्तात् रोहिण्यन्तम् । सौम्याद्यात् सर्पार्धं ग्रीष्मः। प्रावृट् सर्पार्धात् हस्तान्तम् । चित्राद्यात् इन्द्रार्धं शरत् । हेमन्तो ज्येष्ठार्धात् वैष्णवान्तम् इति ॥

३.१ [अद्भुतसागरे]
[In the Adbhutasagara]

तस्य श्रविष्ठाद्यात् पौष्णान्तं चरतः शिशिरः । वसन्तः पौष्णार्धात् रोहिण्यान्तम्। सौम्यात् सार्पार्धं ग्रीष्मः। प्रावृट् सार्पार्धात् हस्तान्तम् । चित्राद्यात् इन्द्रार्धं शरत् । हेमन्तो ज्येष्ठार्धात् वैष्णवान्तम् इति ॥

३.१ [विलियं जोन्स् इत्येतेन क्रि. श. १७९० तमे वर्षे उद्धृतायां उत्पलविवृतौ]
[William Jones's version of Utpala's commentary in 1790 CE]

श्रविष्ठाद्यात् पौष्णार्धान्तं चरतः शिशिरः । वसन्तः पौष्णार्धात् रोहिण्यान्तम्। सौम्यात् आश्लेषार्धान्तं ग्रीष्मः। प्रावृट् आश्लेषार्धात् हस्तान्तम् । चित्राद्यात् ज्येष्ठार्धान्तं शरत् । हेमन्तो ज्येष्ठार्धात् वैष्णवान्तम्॥

3.1 *When Sun moves from the beginning of Śraviṣṭhā to the middle of Revatī it is Śiśira (winter). From the middle of Revatī to the end of Rohiṇī is Vasantā (spring). From the beginning of Mṛgaśirā to the middle of Āśleṣā is Grīṣma (summer). From the middle of Āśleṣā to the end of Hasta is Varṣā (rains). From the beginning of Citrā to the middle of Jyeṣṭhā is Sárat (autumn). From the middle of Jyeṣṭhā to the end of Śravaṇa is Hemanta (dewy season).*

[This is the list of the six seasons corresponding to the position of Sun mentioned in the *nakṣatra* notation comprising 27 stars along the ecliptic. The star divisions are taken to be equal in size. Each season which is not about weather but is astronomical in nature, is said to span four-and-half *nakṣatra*. This is about the position of Sun and hence is the nearest description of the solar zodiac that we can get in ancient Sanskrit literature. PT true to its *pre-siddhāntic* origin does not invoke either the names of the *rāśi* (signs) or of the lunar months in delineating the seasons. The printed texts of BS and AS have not been edited properly. Since each season spans four-and-half star divisions, *Śiśira* has to end at the mid-point of the *Revatī* division from when spring starts. AS shows the beginning of spring correctly as *pauṣṇārdham* but the end of winter is wrongly shown as *pauṣṇāntam*. It is easy to see that the other seasons are stated correctly. The text of Utpala quoted by Jones is also shown above. This has slightly different words but the star points are stated correctly. Star *Śraviṣṭhā* is same as *Dhaniṣṭhā* usually identified with β-Delphini. As discussed in the Introduction, VJ also starts the winter season and the year in the same fashion. PT here refers to the season and not to the winter solstice. However it implies this to be the turning point of Sun to north is clear from what follows. A detailed discussion and analysis of (3.1) is presented at the end of this chapter to demonstrate that this season-*nakṣatra* scheme of PT is compatible with 1350-1130 BCE.]

३.२ यद्यप्राप्तो वैष्णवमुदङ्मार्गं प्रपद्यते। दक्षिणमाश्लेषां वा महाभयाय इति ॥

3.2 *If (Sun) without reaching the star Śravaṇa starts moving north or moves south without reaching Āśleṣa it causes great fear.*

[This statement clearly refers to the position of Sun at the winter and summer solstices days. It also appears to contradict what was said previously about the relation between Sun's position and the seasons. Since both the statements are attributed to Parāśara, we have to take it that the first statement was considered the normal course of nature whereas the second was considered anomalous. The winter solstice would have fallen back by one star division in about 1000 years. Hence the statement about Sun not reaching *Śravaṇa* would have happened around 400-300 BCE. Indirectly this points that the descendents of the original Parāśara carrying the same family name might have introduced their observations into an already existing tradition.]

३.३ [पराशरतन्त्रे अर्कस्य पञ्चधा गतिरुक्ता । तथा च]

पञ्चविधां गतिमुदयास्तमनयोरन्तरे भजन्त्यूर्ध्वाम् ।
तिर्यञ्चण्डलमधो नक्षत्रानुयायिनीमपि च ॥
तिर्यग्गच्छति काष्ठायां ऊर्ध्वं गच्छति चोदये ।
प्रातराशामनुक्रम्य मध्यं गच्छति भास्करः ॥
मध्याह्ने तापयंल्लोकान् मण्डलं कुरुते गतिम् ।
भ्रष्टस्त्वपि च मध्याह्नादधो गच्छति भास्करः ॥
अस्तं गच्छन्नपि रविः नक्षत्रमनुगच्छति ।
एषापि यदि सविकारा दृश्यते तथापि भयकृत् ॥ इति ॥

3.3 [*In the Parāsāratantra five types of movements are mentioned for the Sun*]

Sun, between rise and set has five types of movements known as vertical, lateral, slow (flat), downward and to follow the nakṣatra (ecliptic). Sun goes lateral while in kāṣṭhā, moves vertical at rise. Following the morning

direction Sun goes to the centre. In the noon heating the earth Sun has slow movement. After the noon position Sun goes down. Even after setting, Sun follows the nakṣatra. If any alterations are observed in these, it is a cause for fear.

> [It is noted here that "Sun after setting follows the *nakṣatra*" is an important observation. This over time would have given rise to observing early morning rise of the well known *nakṣatras*. This topic is considered again in (3.12, 12.7) and (14.2).]

३.४ [तथा च भगवान् पराशरः]

अपर्वणि शशाङ्कार्कौ त्वष्टा नाम महाग्रहः ।
आवृणोति तमः श्यामः सर्वलोकविपत्तये ॥ इति ॥

3.4 [*According to Parāśara*]

A big dark planet called Tvaṣṭā covers Sun and Moon when it is neither new Moon nor full Moon, foreboding danger to the world.

> [This is an obscure statement occurring in the text of BS also. Varāhamihira votary of mathematics for computing eclipse conditions was for some reason obliged to retain the above information. The only way this can be rationally explained is to accept *Tvaṣṭā* as a comet having come too close to earth so as to mask Sunlight. As is well known *Tvaṣṭā* is a Vedic deity who was opposed to the cosmic order and hence considered an opponent of gods. It is plausible PT retains ancient memories of early Vedic times in the name *Tvaṣṭā*.]

३.५ [ऋतुवर्णलक्षणम्]

शिशिरो ताम्रः कपिलो वा । वसन्ते कुंकुमाभो हरितो वा । ग्रीष्मे

कनकवैडूर्यप्रभः । प्रावृषि सर्ववर्णः । शरदि पद्माभो हेमन्ते रक्तवर्णो रश्मिः सर्वर्त्तुषु श्वेतः पाण्डुवर्णश्च शस्यते विपरीतो विपरीतकारीति ॥

विवर्णो भूमिवर्णो वा महाभयाय । श्यामो जनमरणाय । सुवर्णरजतपद्मनिभो विमलः स्निग्धो जनहिताय। धूम्राभो वृष्टिनिग्रहाय । ऊर्ध्वदण्डो जटिलः शस्त्रकोपव्याधिमृत्युकरः । महान् परिमण्डलः कुक्षिमान् विशालो घृतमण्डलनिभः क्षेमारोग्यकरः । संक्षिप्तः क्षयाय । वज्राकारो दुर्भिक्षाय। सर्वतश्छिद्रो द्विधा वा दृश्यमानो मृत्युदेशं विनाशं वा आचष्टे। शिरीषपुष्पसंकाशो वार्षुके निष्प्रभो जनमारकरः । घटसंस्थः क्षुत्कृत्। ताम्रो रुधिराभो वा शस्त्रकोपकरः । खण्डच्छिद्रो भूपालविनाशाय च। पुण्ड्राकारः उलूकसंस्थानः उन्मादापस्मारकरः । विरश्मिर्व्याधिभयकृत्। छत्राकारो देशविपर्ययकरः । शकटाकारश्च कबन्धाकृतिः महासंग्रामकृत्। तोरणसंस्थानः पुरनाशाय । अवर्णः प्रजानाशाय । प्रतिरूपः स्त्रीभयकारी। परुषो वेपनः सस्यनाशनः । शरासनाकृतिः ध्वजाभो वा सद्य आवहाय। विजयाकृतिः गर्भविनाशी । परुषाकारो रुधिरप्रभोऽनेकनृपतिहस्तोत्पाटनकरः। कृष्णवर्णो जगतःक्षयाय । अपर्वण्युपरक्तः सर्वलोकविनाशाय। व्यामिश्रवर्णो यावत्प्रदृश्यते तावत्परस्परं नृपविनाशाय । कृष्णरुधिरपीतवर्णो जगत्क्षयकरी। वैडूर्यकृष्णबभ्रुवर्णः पांशुवर्ण उत्सादनकरः। मयूरचन्द्रिकाभो द्वादशवार्षिकीमनावृष्टिं धत्ते । एवमन्योन्यव्यामिश्रवर्णो युगान्तकारी भवतीति ॥

3.5 [*Description of seasonal colours*]

Sun will be of copper or dark colour in winter. In spring the colour is saffron or yellowish. In summer it is of golden-beryl colour. In monsoon all colours are taken. In autumn it is of the hue of lotus flower. In the dewy season Sun is of red colour. The rays in all seasons should be white otherwise they indicate bad omens.

Lack of colour or of earth colour is fearful. Black is for large scale death of people. Golden-silvery-lotus colour is good. Smoky hue is for reduced rains. If elongated vertically it is for destruction by weapons and diseases.

If large and circular, it is good for health. If small it indicates reduction. Diamond shape portends drought. If broken everywhere or divided in two it portends death and destruction. If of the hue of śirīśa flowers and having no light in the rainy season it causes death. A figure like a pot indicates hunger. Coppery or blood colour indicates weapon based destruction. Broken or divided, portends death of the king. Figure of an owl indicates madness and epilepsy. Lack of rays portends fear of diseases. Umbrella like figure on Sun portends revolution in the country. Figures of a cart and kabandha are omens for a great battle. Figure of a portal is for the destruction of the city. Lack of colour is for destruction of people. A reflected Sun figure causes fear among women. Harsh and shaking Sun is for destruction of crops. Figures of a flag and arrow-hold (quiver) are for immediate war. Figure of vijaya induces abortions. Harsh and blood hued Sun portends large scale war among the kings. Black colour is for the destruction of the earth. If eclipsed at odd times it is disastrous for all the worlds. When mixed colours are seen, for that duration kings are destroyed. Black, blood red and yellow colours are for destruction of the earth. Beryl, black and dust colours are for disasters. If Sun is of peacock-blue colour it indicates twelve year long drought conditions. Similarly, mixed colours portend disasters (as at the end of an epoch).

३.६ उदयास्तमये भानुमुल्का हन्यात् समुत्थिता।
प्रज्वलन्ती तदा राजा क्षिप्रं शस्त्रेण बध्यते ॥ इति॥
ग्रहोपसृष्टं नक्षत्रं सवितुर्योगमागतम्।
विशोधयति तत्पापं तुषाग्निरिव काञ्चनम्॥
श्वेतः शिरीषपुष्पाभः पद्माभो रूप्यसन्निभः ।
वैडूर्यघृतमण्डाभो हेमाभश्च दिवाकरः ॥
वर्णैरेभिः प्रशस्तः स्यात् महास्निग्धः प्रतापवान् ।
भावनः सर्वसस्यानां क्षेमारोग्यसुभिक्षदः ॥

3.6 *If the rising Sun is hit by a burning meteor the king gets bound soon by a weapon. When a nakṣatra afflicted by a planet is near the Sun, the bad effect is purified like gold gets purified by burning.....*

[Bhaskarayogī attributes the first two verses above to Parāśara with minor variations]

३.७ स्निग्धाः परिपूर्णाः शुक्ला माञ्जिष्ठाः पीता अत्यन्तगामिनो रश्मयः शस्यन्ते । रूक्षा अविच्छिन्नास्तनवो ह्रस्वा धूमाभा लोहितवर्णा विगर्हिता इति ॥

3.7 [A few more colours with their good and bad effects are mentioned here. As mentioned previously PT is mainly a prose text. Some verses are also attributed to Parāśara by later authors which may be condensed versions of the original text. Here some further statements are made about the colours of the orb of the Sun and the rays. The most intriguing colour of Sun is the peacock-blue which is said to portend drought conditions for twelve years. We can only conjecture that like Tvaṣṭā covering Sun at odd times, Sun turning peacock-blue should have been a celestial event causing distress such as climate change for extended periods of time. The mention of a twelve year long drought occurs in the Mahābhārata also[1].]

३.८ [अद्भुतसागरे । शुभसूचकादिलक्षणमाह पराशरः]

रविर्महान् परिमण्डलः कुक्षिमान् विपुलो घृतमण्डनिभः क्षेमारोग्यकरः सुवर्णरजतपद्मप्रभो विमलः स्निग्धः जगद्धिताय ॥ यद्यप्राप्तौ वैष्णवमुदग्मार्गं प्रतिपद्यते दक्षिणमाश्लेषां वा महाभयाय ॥

3.8 [*In the Adbhutasāgara: Parāśara explains the auspicious qualities of Sun*]

Sun big, fully circular and clear is good for health and well being (of

---

1 *atha kāle vyatikrānte mahatyati bhayaṅkare|*
anāvṛṣṭiḥ anuprāptā rājan dvādaśa vārṣikī||
tasyām dvādaśavārṣikyām anāvṛṣṭyām maharṣayaḥ|
vṛtyartham pradravan rājan kṣudhārtā sarvato diśam|| (MB. S'alya Par.52.37-38)

people). Golden, silvery or lotus like hue with no impurity is good for the world. If Sun goes north without reaching star Śravaṇa or goes south without reaching star Āśleṣā, it creates fear.

[वैश्वादुत्तरेऽपि अयनविभागो बोद्धव्यः । तथा च स्वकालिकं ऋतुक्रममाह पराशरः ।]

[*Ballālasena: The solstice has to be indicated north of Uttarāṣāḍhā also. Parāśara states the order of the seasons during his time.*]

३.९ तस्य श्रविष्ठाद्यात् पौष्णान्तं चरतः शिशिरः । वसन्तः पौष्णार्धात् रोहिण्यान्तम्। सौम्यात् सार्पार्धं ग्रीष्मः प्रावृट् सार्पार्धात् हस्तान्तम् । चित्राद्यात् इन्द्रार्धं शरत् । हेमन्तो ज्येष्ठार्धात् वैष्णवान्तम् इति ॥

[This statement has been discussed under (3.1)]

३.१० [अथ वर्णफलम्।]

शिशिरे ताम्रः कपिलो वा। वसन्ते कौङ्कुमो वा हरितः । ग्रीष्मे कपिलवैडूर्यः। प्रावृषि सर्ववर्णः । शरदि पद्माभः । हेमन्ते लोहितः । सर्वर्तुषु श्वेतः पाण्डुवर्णश्च प्रशस्यते । विपरीतो विपरीतकरः ॥

रविर्विवर्णो भूरिवर्णोऽन्नाभावाय । श्यावो जनमरणाय । धूमाभो वृष्टिनिग्रहाय। ताम्रो रुधिराभो वा शस्त्रकोपं करोति । कृष्णवर्णो जगतः क्षयाय । व्यामिश्रवर्णो यावत् स दृश्यते तावत् परस्परविनाशाय । कृष्णरुधिरवर्णो जगत्क्षयकरः। वैडूर्यकृष्णबभ्रुवर्णः पांशुवर्णोत्सादकरः [पांशुवर्षणोत्पातकरः]। मयूरचन्द्रिकाभो द्वादशवार्षिकीं अनावृष्टिं विधत्ते ॥

३.११ मुण्डाकार उलूकसंस्थान उन्मादापस्मारकृत् । तोरणसंस्थानः पुरनाशाय । छत्राकारो देशविपर्याय शकटाकारे च । शरासनाकृतिः वज्राभो [ध्वजाभो] वा सद्य आहवाय । परुषो वेपनः शस्यनाशनः ॥ विलग्नाकृतिः

गर्भविनाशाय । ऊर्ध्वदण्डो जटिलः शस्त्रकोपव्याधिकरः । संक्षिप्तः क्षयाय । वज्राकारो दुर्भिक्षाय । परुषाकारो रुधिरप्रभो अनेकनृपतिसहस्रा-च्छादनकरः । अर्कमण्डले रथसेनातपत्रादिदर्शनं नृपनाशाय । कबन्धाकृतिः महासङ्ग्रामकृत् । सर्वतश्छिद्रो द्विधा वा दृश्यमानो राज्ञो मृत्युं देशविनाशं व्याचष्टे ॥ अर्धं प्रजानाशाय ॥

3.9-3.11 [The text and contents are almost same as the text quoted by Utpala. This shows that the Parāśaratantra known to Varāhamihira, Utpala and later to Ballālasena was the same text except for minor variations. In stating the seasons in the first sentence the word should be *pauṣṇārdham* as stated correctly in the second sentence about the position of the spring season. W. Jones in his quotation of Utpala gives the word as *pauṣṇārdhāntam*, which appears to be the original version.]

3.12 The solar zodiac of PT

We have seen that PT (3.1) states the sequence of seasons (*Ṛtu*) with respect to the *nakṣatras*. Since seasons depend on the Sun this style would have originated out of observations based on heliacal rising of the mentioned stars. Here we face a difficulty which is too well known to Indian Astronomy. Which is the zero point on the ecliptic for PT? It is obvious from the text, corroborated by the *Vedāṅgajyotiṣa* that the winter solstice was when Sun was at the first point of star *Dhaniṣṭhā*. But which star is *Dhaniṣṭhā* and from where to where on the ecliptic the stretch has to be called by the same name? There is no direct answer for this except by taking recourse to other statements of PT where *nakṣatras* which are identifiable without ambiguity as visible individual stars are available. PT is clear about six seasons making a solar year with each season comprising of four-and-half *nakṣatra* divisions. Hence each month is of 2¼ *nakṣatra* length. This division of the continuous time-space into discrete parts with an isolated point (visible star) representing a part or division has Vedic philosophical background. To analyze the PT zodiac[2] a discussion on

2 The word zodiac is of Greek origin meaning *circle of animals*. However, the word is popularly used to denote the region of the sky on either side of the ecliptic.

the older MAU text that describes *Time as Brahman* is helpful. In MAU the concept of Time, discretization of continuous Time in terms of year, seasons, months and recognition of the passage of this by means of stars rising with Sun is well stated. The text and translation is as follows.

.. .. सूर्यो योनिः कालस्य तस्यैतद्रूपं यन्निमेषादिकालात् संभृतं द्वादशात्मकं वत्सरम्। एतस्याग्नेयमर्धमर्धं वारुणम्। मघाद्यं श्रविष्ठार्धमाग्नेयं क्रमेणोत्क्रमेण सार्पाद्यं श्रविष्ठार्धान्तं सौम्यम् । तत्रैकैकमात्मनो नवांशकं सचारकविधं सौक्ष्म्यत्वात् एतत्प्रमाणमनेनैव प्रमीयते हि कालः .. .. ॥

(मै.आरण्यक ६.१४)

.... Sun is the abode of Time. The form of Time is the year, consisting of twelve months, made up of nimeṣā and other measures. Of the year one half is āgneya and the other half vāruṇa. The āgneya half begins with the asterism of Maghā, and ends with the half of Śraviṣṭhā; this being Sun's southern travel. That which is saumya, in the reverse order, is from Āśleṣā, to the half-end of Śraviṣṭhā; this is the northern course. And then, there are the months, one by one, belonging to the year, each consisting of nine-aṁśa (2¼) of asterisms, each determined by the Sun moving (with the asterisms). Because Time is too subtle (for sensory perception) this progress of the Sun is its evidence, and by it alone is Time cognized.

(MAU 6.14)

Here only the Sun and three *nakṣatras* are mentioned for our understanding of the months and the year. The two half of the year refer to the northern and the southern movement of the Sun as seen from the earth. The northward movement started when Sun was with the midpoint of the star division *Śraviṣṭhā* (Dhaniṣṭhā). The other part of the year is stated in reverse order as from *Āśleṣa* to midpoint of *Śraviṣṭhā*. What this means is that the summer solstice was when Sun was with the star *Maghā* at the beginning of its division. The end point of *Āśleṣā* would be same as the starting point of *Maghā*. Hence *sārpādyam śraviṣṭhārdhāntam* in reverse order is from midpoint of *Dhaniṣṭhā* to end of *Āśleṣā*, which is the northern sojourn of Sun. This is the explanation of the commentator

Rāmatīrtha also[3]. Here beyond the star *Maghā* which is well recognized as Regulus, doubts may be raised about the other two stars and the division there of. Nevertheless it can be seen that between MAU and PT the winter solstice had moved by half *nakṣatra* distance. In modern terminology this would be equal to 6°40'. Even if one were to argue that the star *Dhaniṣṭhā* of the *siddhānta* period should not be imposed on the Vedic period, the precession of 6°40' amounts to a time difference of 480 years between PT (3.1)and MAU (6.14). This of course is only a relative chronology but there is no ambiguity in this number. Another important terminology of MAU is the phrase *ardhāntam*, meaning the *end-of-the-half*. This technical word clearly refers to the middle but when Sun's movement is considered the text likes to make it clear that it is the end of the second quarter. Thus besides individual visible stars the concept of equal divisions using some support points was in vogue during Vedic times, which was inherited by PT.

The main objection of some indologists for dating VJ and hence PT to c 1400 BCE has been the assumption involved in taking the statement of Varāhamihira on face value that once upon a time winter solstice was at the first point of star *Dhaniṣṭhā*. This objection is partly valid as far as *Dhaniṣṭhā* is concerned. This constellation is made up of four or five stars and there is no unbroken identification of the constituent stars starting from the Vedic to the *siddhānta* to the present period. However the same is not true for *Kṛttikā, Rohiṇī, Maghā, Citrā, Viśākhā* and *Jyeṣṭhā*. These six stars have stood the test of time and are always identifiable with their modern names; Pleiades, Aldebaran, Regulus, Spica, α-Libra and Antares. Here *Kṛttikā* like Pleiades is a group of six stars but its spread is not too wide and hence can be safely represented by η-Tauri or Alcyone. *Rohiṇī* as a group has five stars but identification of its prominent star with Alderbaran is unambiguous. Arcturus has always been identified with *Svāti* but it being too close to Spica or *Citrā* causes some confusion when equal star divisions each with four further quarters are considered. In MAU the named star is *Maghā* and this should have been within the star division of the same name during the ancient epoch when the summer

3 *Maitrī or Maitrāyaṇiya Upaniṣad with Sanskrit Commentary of Rāmatīrtha* (Ed. Transl.) E.B.Cowell, London, 1888.

solstice was noted with the visibility of this star. This puts the longitude of the visible star *Maghā* to have been in the range of 90^0 to $103^020'$. A simple calculation using any software shows, only during 2340 to 1370 BCE the longitude of Regulus varied in the above range. This gives an upper and lower bound date for the zodiacal picture stated in MAU (6.14). Since no observations relating to the other five stars are available in MAU we have to be satisfied with the above estimate taking only internal evidences into consideration.

The concept of seasons determining the year is available in several Vedic texts. For example the Śatapatha Brāhamaṇa states *ṛtubhirhi samvatsaraḥ śaknoti sthātum*, meaning *"only by seasons year is possible to be established"*. Now, it is easy to note that Parāśara in PT extends the older concepts and gives positions of a few more identifiable stars. The *nakṣatra-ṛtu* (star-season) statement of PT can be better expressed as a table of solar zodiac with 2¼ nakṣatra divisions per month. The enumeration starts from the first point of *Dhaniṣṭhā* even if the precise identity of the star of that name is taken to be not known. What we know is that it should have stretched for a width of $13^0\ 20'$, which of course was true for the other 26 star parts also.

Table 3.1 Solar Season zodiac of Parāśara
**Vernal Equinox or 0° Longitude.*
The widths of the associated divisions are shown in degrees and minutes

Month	Nakṣatra Division			Season
1	*Dhaniṣṭhādyāt* (13°20')	Śatabhiṣak (13°20')	P. Bhādra¼ (3°20')	Śiśira
2	¼P.Bhādra (10°)	U. Bhādra (13°20')	*Revatyardhāntam* (6°40')	
3	*Revatyardhāt* (6°40')	Aśvini (13°20')	Bharaṇi¾* (10°)	Vasanta
4	*¾Bharaṇi (3°20')	Kṛittikā (13°20')	*Rohiṇyantam* (13°20')	

5	*Mṛgaśirādyāt* (13°20')	Ardrā (13°20')	Punarvasu¼ (3°20')	Grīṣma
6	Punarvasu¾ (10°)	Puṣya (13°20')	*Āśleṣārdhāntam* (6°40')	
7	*Āśleṣārdhāt* (6°40')	Maghā (13°20')	P.Phalguni¾ (10°)	Varṣā
8	¾P.Phalguni (3°20')	U.Phalguni (13°20')	*Hastāntam* (13°20')	
9	*Citrādyāt* (13°20')	Svāti (13°20')	Viśākhā¼ (3°20')	Śarat
10	¼Viśākhā (10°)	Anurādhā (13°20')	*Jyeṣṭhārdhāntam* (6°40')	
11	*Jyeṣṭhārdhāt* (6°40')	Mūlā (13°20')	P.Āṣāḍhā¾ (10°)	Hemanta
12	¾P.Āṣāḍhā (3°20')	U.Āṣāḍhā (13°20')	*Śravaṇāntam* (13°20')	

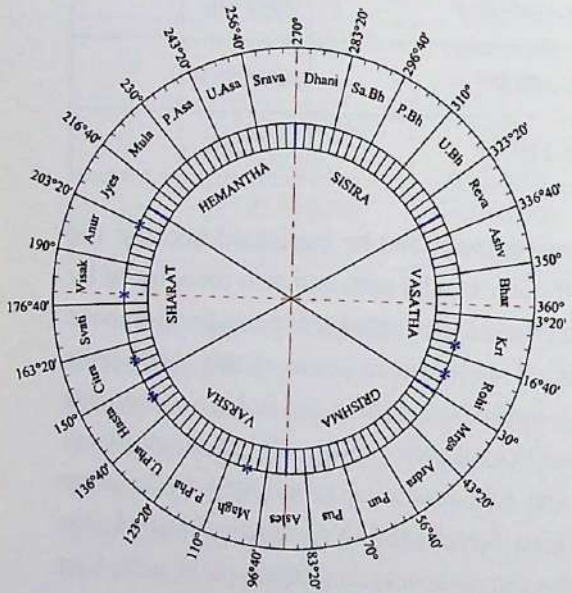
In this table the wording used by Parāśara for the beginning, middle and end of the star divisions is shown in italics. Since PT mentions only the seasons the above table is an expansion to include the months and the remaining stars also. As in the previous discussion with MAU if we look for the six identifiable stars we find that PT specifically names *Rohiṇī, Citrā* and *Jyeṣṭhā* and their corresponding divisions. Since the sequence of the *nakṣatra* names has remained unchanged over several millennia, it is easy to recognize the position of *Kṛttikā, Maghā* and *Viśākhā* also. The divisional position of these six stars in the zodiac scheme of PT and their possible epochs are shown in the Table 3.2. The period range shown in Table 3.2 demonstrates that the PT solar zodiac should have been conceptualized in 1350-1130 BCE. If only the three stars *Rohiṇī, Citrā* and *Jyeṣṭhā* named in PT are considered this result gets broadened to 1350-930 BCE.

Table 3.2 Six Prominent Visible Stars of PT

Single identifiable Nakṣatra	Nakṣatra Divisions of PT Longitude	Valid Period Range BCE
Kṛttikā (η-Tauri)	3°20'- 16°20'	2090-1130
Rohiṇī (Aldebaran)	16°40'-30°00'	1830-870
Maghā (Regulus)	96°40'-110°00'	1850-880
Citrā (Spica)	150°00'-163°20'	1890-930
Viśākhā (α-Libra)	176°40'-190°00'	1500-550
Jyeṣṭhā (Antares)	203°20'-216°40'	1350-400

Taking the solstice as the starting point can be explained because the visible stationary point of Sun in the sky can be seen and also recognized by orientation of normal shadows on ground. The stand still period is for about 21 days which number is associated with Sun in some of the Vedic texts also. As in all observations, there would be errors in the *nakṣatra* stretches which have to be taken as diffuse boundaries. Originally the rising stars should have helped to indicate the felt seasons corroborated by weather conditions. But PT in course of time formalized this empirical knowledge as a theoretical basis for dividing the year into six equal parts with Sun making one full tropical cycle. Nonetheless PT could have arrived at its zodiac in terms of at least a few isolated 27 stars available from the Vedic tradition. It has to be emphasized here that even though the well known 27 *nakṣatras* were at unequal distances, PT created an equal division for the two month long seasons with four-and-half *nakṣatra* spans. The twelve month division of the year and the nine *aṁśa* division of each month length would have been known from the antecedent Yajurvedic MAU tradition. With just a cryptic concept of *time and space are congruent* as stated in PT (2.1) Parāśara mapped a year of *six equal seasons* of time expended by humans on earth to six equal spaces of 4½ stars each, on the celestial path along which Sun traverses from winter solstice to winter solstice. It was one

more step from here to 12 equal divisions of the year and the twelve equal sky parts for Sun travelling through the 27 stars. This was the natural basis for the later twelve *Rāśi* division of the zodiac, but PT does not mention such a nomenclature, nor does it explicitly name solar months, except for a hint in (1.2). PT definitely knew the solar tropical zodiac with its first point being the imaginary winter solstice colure in the sky. For better clarity the Solar Zodiac of PT is shown as a circle with graduations for the 27 star divisions in Fig. 3.1. But it is noted that there is no reference to any angular measure numbers in the available PT text.



Discrete NaksatraPoints* 1350 BCE		
Krttika	Alcyone	13°34'
Rohini	Aldebaran	23°18'
Magha	Regulus	103°36'
Hasta	α - Corvi	144°32'
Citra	Spica	157°26'
Visakha	α - Libra	178°41'
Jyestha	Antares	203°20'

Fig. 3.1 : Six Season Solar Zodiac of Parāśara with prominent star positions.

At this stage one may question how PT could have arrived at the names of the *equal division nakṣatras* for demarcating seasons. The answer is partly contained in the MAU model where measure of time is declared as Sun following the *nakṣatras*. It is the early morning rise of the *nakṣatras* that was observed. Some prominent stars, even before the time of PT, were connected with the natural seasons in popular perception. The nearly equal 13-16 day interval between subsequent rises of some known stars would have given the idea of equal solar *nakṣatra* spans similar to

the lunar *nakṣatras* on subsequent nights. To make these points clear in Table 3.3 the six *nakṣatras* and their first visibility pattern for the period 1400-950 BCE are shown for the location of Puṣkara as a possible seat of learning of PT. In all the six cases the star was in the season division assigned to it by PT. All the stars would have been visible in the eastern sky roughly an hour before local Sunrise. The visibility dates between the two consecutive stars *Kṛttikā* and *Rohiṇī* differ by about 15 days as expected. The difference between the visibility dates of other stars also fairly match with their position in the scheme of PT.

The above points have been over looked by many indologists who have simply assumed *nakṣatras* to be the so called *lunar mansions* meant only for reckoning of lunar months by observing the position of Moon in the nights. While it is a fact that the Ṛgveda clearly says that year is measured by the Moon, this does not mean over a span of some 3000 years Vedic people did not observe that Sun's position also can be specified with respect to the nakṣatras. Infact *Parāśaratantra* in (3.3) emphatically states that the Sun even after setting follows the nakṣatras.

Concrete evidence of using early morning star rise for ritualistic purpose is available in the Taittirīya Brāhamaṇa. This Vedic text belonging to the Kṛṣṇa Yajurveda has the following dictum which like texts of its genre is cryptic, almost as a mnemonic, but the sense of the hymn is very clear. The original hymn and its explanation as per the Vedic tradition preserved in the commentary of Bhaṭṭa Bhāskara (10th century) are reproduced below[4].

यत्पुण्यं नक्षत्त्रम्। तद्वट्कुर्वीतोपव्युषम् । यदा वै सूर्य उदेति । अथ नक्षत्त्रं नैति । यावति तत्र सूर्यो गच्छेत् । यत्र जघन्यं पश्येत् । तावति कुर्वीत यत्कारी स्यात् । पुण्याह एव कुरुते ॥

(तै. ब्रा. १.५.२)

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4 *Taittirīya Brāhmaṇa with Commentary of Bhaṭṭa Bhāskara* . Vol. I (Ed.) by A.Mahadeva Sastri, Mysore, 1908.

Table 3.3 First Visibility of six prominent Stars at Puṣkara during 1400-950 BCE at critical altitude of 4°. Results are from the PLVS software with provision of arcus visionis for each star.

Support Star	Nakṣatra Division Long.	Star position Long.	First Visibility Date	Sun at F.V. Long.	Sun rise L.T	Star rise L.T.	Ṛtu
Kṛttikā (η-Tauri)	3°20'- 16°40'	12°51'-19°03'	12.5-15.5	37°42'– 43° 29'	5.51-5.46	4.44-4.39	Vasanta
Rohiṇī (Aldebaran)	16°40'-30°00'	22°36'-28°48'	27.5-30.5	51°58'- 57° 46'	5.39-5.37	4.45-4.40	Vasanta
Maghā (Regulus)	96°40'-110°00'	102°54'-109°04'	6.8-10.8	120°12'- 126° 57'	5.47-5.49	4.49-4.51	Varṣā
Citrā (Spica)	150°00'-163°20'	156°44'-162°56'	28.9-2.10	172°52'- 179° 34'	6.18-6.22	5.27-5.29	Śarat
Viśākhā (α-Libra)	176°40'-190°00'	177°59'-184°10'	25.10-28.10	193°07'-199° 49'	6.35-6.37	5.16-5.20	Śarat
Jyeṣṭhā (Antares)	203°20'-216°40'	202°38'-208°50'	13.11-16.11	219°38'-225° 18'	6.48-6.51	5.54-6.00	Śarat-Hemanta

(भट्टभास्करभाष्यम्)
यत्पुण्यमित्यादि ॥ पुण्यकर्मणोऽनुरूपं आत्मनश्चानुकूलं यन्नक्षत्रं इष्टं तत् बट् कुर्वीत । बडिति सत्यनाम । तत् सत्यं चिह्नं कुर्वीत । तेन वा चिह्नमाकाशं कुर्वीत । अस्मिन् आकाशावकाशे इदं नक्षत्रमिति । उपव्युषं उषस्समीपे विवासनकाले । छान्दसो डः समासान्तः । पुनः कालं विशिनष्टि – यदा सूर्य उदेति । अथ तत्पुण्यं नक्षत्रं नैति न तिरोहितं भवति तादृशे विवासनकाले तत्पुण्यं नक्षत्रं यत्राकाशावकाशे तिष्ठति तं प्रदेशं सत्यं कुर्वीत अविपर्यस्तं जानीयात् । अथैवं ज्ञात्वा तस्मात् चिह्नितात् प्रदेशात् जघन्यं पश्चाद्भागत्वेन यत्र पश्येत् तत्राकाशप्रदेशे यावति काले सूर्यो गच्छेत् तावति ततः प्रागेव कुर्वीत अविपर्यस्तः स्वं तत्कर्म यत्कारी यत्कर्म करिष्यन् स्यात् । पुण्याह एव कुरुते । एवं क्रियमाणं सत्स्वपि दोषेषु पुण्याहे कृतं भवति । अज्ञातानामपि मुहूर्तादिदोषाणां शान्त्यै भवतीति भावः॥

One has to confirm a nakṣatra which he prefers for some auspicious work. He has to mark also in the sky 'this space is for this nakṣatra'. This has to be done before Sunrise, nearer to day break. When Sun comes up, that auspicious star will not be seen. Hence that particular space in the sky wherein the star remains still visible has to be confirmed. Or knowing this part of the sky marks may be done. The rite has to be completed before the time taken by Sun to cover that space. *(Tai.Br.1.5.2)*

The above commentary explains the essence of the hymn. The word *baṭ* refers to fixing or confirmation. This could also be marking by some means the portion of the sky for the position of the desired star. *Uṣas* is the twilight period. But *upavyuṣam* is when the sky is still illuminated for the star to be visible. *Jaghanyaṃ* is the lower point or mark so that the person is sure of the visibility interval of the star. One is asked to select a *nakṣatra* in the eastern sky before Sun rise and also to mark or make sure of a point below. This point is at a lower altitude such that as Sun reaches this point the star vanishes from sight. The explanation provided by Sāyaṇa (14th century) in his commentary is same as above[5].

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5 *Tai.Br. with commentary of Sāyaṇa* (Sanskrit) (Ed.) Narayana Shashtri Godbole, Anandashrama Series No.301, 1979.

The spirit of the Vedic text is to observe the rise of the prescribed *nakṣatra* early in the morning, which could be even its first visibility and to have an estimation of the time taken for Sun to make the star invisible. The work done in such a period is deemed to have been done at an appropriate time without any other doubts about the auspiciousness of the time. Quite interestingly this belief in the auspiciousness of an hour and half before Sunrise continues to this day in many parts of India. This practice of heliacal auspiciousness, in the absence of any other time measuring instruments, would make the visible stars as supports for getting a sense of elapsed time. The fast movement of Sun near the equinox as also its slowness near the solstice would be felt and Sun as the cause of Time would be experienced in more than one sense of the term. Tables 3.2 and 3.3 quite clearly demonstrate that if all the six prominent stars should have been visible and stationed within their eponymous divisions the only possible period would be 1350-1130 BCE. These two figures naturally bracket the most probable date of PT solar zodiac. With the help of this information it should be possible to identify the position of the other 21 support *nakṣatras* also. This work is yet to be done. An example of a celestial event being specified in terms of the position of Sun relative to a nakṣatra that is, reference to solar *nakṣatra* division is available in Chapter 12 titled *Agastyacāra*.

We can conclude that the statement PT (3.1) represents a scientific development of considerable significance in the history of Hindu astronomy. The six division *ṛtu* zodiac evolved as an improvement over the older two division *ayana* zodiac of MAU. The date of c 1400 BCE suggested previously in the Introduction as the starting period of the PT tradition is still valid as per the above independent analysis of the position of six prominent visible stars.

04

॥ चन्द्रचारः॥ Moon's Movement

४.१ [उत्पलविवृतौ]

अथ मार्गेषु आग्नेयादुत्तरोऽतिवर्षकरो मैत्रसावित्राभ्यां प्रजाहितकारी । ज्येष्ठाग्नेयमैत्रत्वाष्ट्राणां दक्षिणतश्चरन् पुष्कलाशुभदः । उपरिष्टाद्वैरोधिको धान्यविनाशी । अधो यवसम्पत्करः । मघाऽनुराधाभ्यां मध्येन गमनमतिशोभनम्। शिशिरग्रीष्मयोर्दक्षिणे च शुभदो वर्षास्ववर्षकरः सर्वर्त्तुषु नैर्ऋतेऽपि विश्वेदेवानां चेति ॥

4.1 [*In Utpala's commentary*]

Among the paths (of Moon), lanes north of asterism Kṛttikā (āgneya) bring excessive rain. Passage (north of) Hasta (sāvitra) and Anūradhā (maitra) is good for people. Movement south of Jyeṣṭhā, Kṛttikā, Anūrādhā and Citrā stars is a bad omen. In addition it destroys grains. Movement in the middle of stars Maghā and Anūrādhā is very good. In winter and summer (seasons) passage south of the above stars is good. However in the rainy season there will be no rains. So also in all seasons passage southwest of the stars Uttarāṣāḍhā and Pūrvāṣāḍhā (is not conducive for rain).

४.२ [पराशरतन्त्रे अष्टौ संस्थानानि उक्तानि । तथा च पराशरः]

तत्राऽष्टौ संस्थानानि भवन्ति । तद्यथा – लाङ्गलं नौर्दुष्टलाङ्गलं दण्डो धनुर्युगं सममवाक्शिरः । तत्रैषां ईषदुन्नतोत्तरशृङ्गं लाङ्गलसंस्थानं तत्र

सुभिक्षक्षेमवृष्टिकारणान्युत्पद्यन्ते । उभयशृङ्गः कुक्षिमान्विशालो नौस्थायी फलतः समः । पूर्वेण दक्षिणोन्नतशृङ्गो दुष्टलाङ्गलं परसैन्योद्योगनाशकृत्। दण्डवद्दण्डसंस्थायी दण्डकृत्प्रजानाम् । धनुष्प्रख्यो धनुःस्थायी स धनुर्धरोद्योगकृद्यतोऽस्य ज्या ततो विजयः । यद्युदगायता दक्षिणेन चास्य लेखा भवति तद्युगसंस्थानमिच्छन्ति जगद्विद्रवभूकम्पाय। समोभयशृङ्गः समः तत्स्थानं महाभयकृत् । शस्त्रसारभयदोऽवाक्शिराः । अथैतानि शुक्लप्रतिपदि द्वितीयायां वा लक्ष्याणि भवन्ति ॥

4.2 [*In the Parāśaratantra eight forms are said for Moon. As per Parāśara*]

The eight forms are: the plough, the boat, the bad-plough, the stick, the bow, the yoke, the balance and the inverted head. Among these, the figure with a slightly elevated northern horn (tip) is the plough. This generates good rainfall and plentiful food. If both the tips are broad with a broad central depression, it is the boat and the effects are similar (as in the previous case). If the southern tip is raised from the east it is the bad-plough which destroys the preparations of the foreign army. The stick position looks like a stick and inflicts punishment on population. The position called the bow looks like a bow, the party towards which the chord is directed will be victorious. When the figure is extended from north to south, it is the yoke that portends earthquakes and distress. If both the tips are equal it is the balance (sama) position, which is very fearsome. The inverted head creates fear of weapons. These (precursors) become visible on the first or second night of the bright fortnight.

४.३ [अथ चन्द्रस्य कुजादिभिः ताराग्रहैः शृङ्गे भिन्ने फलमाह]

अथ शृङ्गाभिमर्दने गुरुः प्रधान नृपतिविनाशाय । भृगुः यायिनां कुनृपाणाम्। भौमः सौम्यो दुर्भिक्षाय अवृष्टये । क्षुच्छस्त्रभयदः सौर इति ॥

4.3 [*Now, when Moon's horns are divided by planets such as Mars, the results are said*]

Hitting (contact) of the orb by Jupiter portends death of the chief-king. Venus portends destruction of smaller chiefs; Mars and Mercury indicate drought and failure of rainfall. Saturn portends fear of hunger and weapons.

४.४ अथ भेदेषु असुरगुरुभिन्नः पाञ्चालमगधमद्रकुणिन्दकौलूतकैकय-यवनधूमाम्बष्टमार्गणाङ्गनाराज्यभृङ्गिमरुकच्छोशीनरपुलिन्दपुरुषादनेपालान् सप्तमासानुपतापयतीति । अमरगुरुणा दशमासान् गान्धारवसतिं सिन्धुबाह्लिक-पर्वतकाश्मीरान् । क्षितिसुतभिन्नः कुरुशिबिमालवत्रिगर्तकुलिन्दायोध्याधिपतीन् जयार्थिनः सह षण्मासानुपतापयतीति। अर्कसूनुसम्भेदे नृपतिविरोधामात्य-भेदगणपयौधेयार्जुनायनभयाय अनावृष्टिप्रादुर्भावाय च दशमासान् । बुधभिन्नः सुभिक्षक्षेमवृष्टिकरः। केतोस्तद्विपर्ययः। प्रवर्धमानो वपुष्मानपराजितो ग्रहभिन्नोऽप्यशुभफलसंहर्ता इति॥

4.4 *When Moon appears cut by the planets (i.e. Moon eclipses the planets or occultation): Split by Venus, Moon disturbs Pāñcāla, Magadha, Madra, Kuṇinda, Kaulūta, Kaikaya, Yavana, Dhūma, Ambaṣṭha, Mārgaṇa, Anganārājya, Bhṛṇgi, Maru, Kaccha, Uśīnara, Pulinda, Puruṣāda, Nepāla regions for seven months. Moon split by Jupiter affects people of Gāndhāra, Sindhu, Bāhlīka, Parvata and Kāśmira for ten months. Moon split by Mars affects Kuru, Śibi, Mālava, Trigarta, Kulinda, and Ayodhyā (kings) regions for six months. Moon eclipsing Saturn portends enemity among kings and ministers, fear for Yaudheya and Arjunāyana regions and failure of rains for ten months. Moon split by Mercury produces good crops and rainfall. Split by a comet Moon produces the opposite effect. When Moon is robust and bright and split by a planet, no ill effects are indicated.*

४.५ भस्मारुणवह्निताम्रपीतपाण्डुनीलरूक्षवर्णः क्षुद्वैरकरः । स्निग्धः प्रसन्नो रश्मिवान् श्वेतः क्षेमसुभिक्षवृष्टिकरः इति ॥

4.5 *Moon of ash, red, fiery, coppery, yellow, pale, dark and harsh colour produces hunger and enmity (among people). Glossy, pleasant, white and full of rays is for good crops and rains.*

४.६ [अद्भुतसागरे । शुभसूचकलक्षणमाह पराशरः]

चन्द्रमाः स्निग्धप्रसन्नो रश्मिवान् श्वेतः क्षेमसुभिक्षवृष्टिकरः । खण्डः स्फटितो विवर्णो वेपनो अशशाङ्कः चन्द्रमाः प्रजानाशाय राज्योपप्लवाय च। इति ॥ भस्मारुणवह्निताम्रपीतपाण्डुनीलरूक्षवर्णैः क्षुद्वैरकरः ॥

4.6 [*In the AS: Parāsara describes the auspicious signs of Moon*]

Moon when sharp, pleasant, white, full of rays portends health, food security and rainfall. Moon when broken, colourless, shaky and without the hare figure, portends destruction of people and revolution in kingdoms. Ash, crimson, fiery, coppery, yellow, dark and harsh colour of Moon induces enemy among people.

४.७ नाभ्युच्छ्रितोभयं शृङ्गं कुक्षिमान् विशालो नौस्थानम्। ईषदुन्नतोत्तरशृङ्गो लाङ्गलसंस्थानम् । तत् सुभिक्षक्षेमकरम् । अर्धोन्नतदक्षिणोन्नतशृङ्गो दुष्ट-लाङ्गलः पुरसैन्योद्योगनाशकृत् इति । दण्डवद्दण्डसंस्थायी दण्डकृत् प्रजानाम् । युगसंस्थानः जगद्विद्रवभूकम्पाय । अथैतानि शुक्लप्रतिपदि द्वितीयायां वा लक्षणानि भवन्ति ।

४.८ मघानुराधाभ्यां मध्ये गमनमतिशोभनम् । तथाऽऽग्नेयादुत्तरतोऽभिवर्षकरः । मैत्रसावित्राभ्यां प्रजाहितकारी इति ॥ ज्येष्ठाश्लेषामैत्रत्वाष्ट्राणां दक्षिणतश्चरन् क्षुच्छस्त्रभयदः । उपरिष्टाद्वैरोधिको धान्यनाशी च मघानुराधयोः । शिशिरग्रीष्मयोर्दक्षिणे शुभदो वर्षास्ववर्षकरः । सर्वर्त्तुषु नैर्ऋतावाप्यवैश्वदेवानाम् इति । रोहिणीनां प्राक् पश्चादनुगमनं चन्द्रमसो वर्षाभिवृद्धये। पार्श्वयोर्विपर्ययः। शकटभेदैर्दुर्भिक्षानावृष्टिरीतिभयम्। शृङ्गोल्लेखने शस्त्रकोपः । उभयशृङ्गपरिष्वङ्गे जनमारः । शुक्रबृहस्पतिसंयोगे शूकधान्यतिलमाषविनाशः । शौरस्य मध्यदेशाभावः । भौमस्य शस्त्रकोपः। केतोर्भयदुर्भिक्षप्रादुर्भावः । प्राङ्मध्यपश्चाद्भागेष्वाषाढानां योगः शशिनो वर्षासु तत्कालमेव । वर्षासु वैश्वदेवादुत्तरतः शशी वर्षाकरो न दक्षिणतः ॥

४.९ क्षितिसुतभिन्नः कुरुशिबिमालवत्रिगर्तकुलिन्दायोध्याधिपगणाधिपतींश्च यायिभिः सह षण्मासानुपतापयति । बुधभिन्नः सुभिक्षक्षेमकरः। अमरगुरुणा दशमासान् गान्धारवसतिं सिन्धुबाह्लीककाश्मीरान् इति। असुरगुरुभिन्नः पाञ्चालमगधकुलिन्दकुलूतकैकययवनधूम्राम्बष्टवङ्गनगराङ्गनाराज्यभृङ्गिभरुकच्छ–उशीनरपुलिन्दपुरुषादनेपालान् सप्तमासानुपतापयति ॥ अर्कसूनुसंभेदे नृपतिविरोधामात्यभेदगणपयौधेयार्जुनायनभयानावृष्टिप्रादुर्भावांश्च दशमासान्॥

4.7-4.9 [The text is almost same as that quoted by Utpala.]

[Eight specific colours are mentioned in (4.5) and (4.6) as anomalous for Moon. Some of these appear to be the ones observed during a lunar eclipse. In the next section on *Rāhu,* colours of Moon during an eclipse are again mentioned. Moon turning coppery red refers to a total eclipse, whereas the ash colour most likely refers to a penumbral total eclipse.]

05

॥ राहु चारः॥ Rāhu's Movement

५.१ [उत्पलविवृतौ]

तद्यथा ग्रहणनिमित्तानि । चन्द्रमसस्तावत्प्रस्पन्दनं सव्यावृत्तिदैन्यं पाण्डुत्वं सततपरिवेषणं चिरोत्पादितज्योत्स्नाप्रभाभङ्गः क्षीणता क्षामता दक्षिणशृङ्गतैमिर्येरितस्यात्यर्थं तुङ्गताऽऽविर्भावश्च । आदित्यस्यापि वेपनं परिवेषणं दीनमन्दरश्मिता कृष्णकल्माषता । उभयोरपि सन्ध्ययोश्च उल्कापातदिग्दाहभूमिकम्पाशनिवज्रनिर्घातस्तनयित्नुपांशुवृष्टिविषम-वातशीतोष्णविकृतानि । वज्रकनकरजतमणीनां प्रभाभङ्गः। अभ्रलेखा सन्दर्शनम्। अर्कमण्डलोत्थितायाः कृष्णराज्यायाः सोमानुप्रवेशश्च अशिवाखगगणरुतविकृतनीचैरभ्रपरिसर्पणरश्मिजालव्याकुलत्वम्। तप्ताम्भसा शीतता क्षीरिणां क्षीरक्षयः। अकस्मान्माल्यग्लानिः। पञ्चताराग्रहादिभिः रोहिणीपीडनमिति चन्द्रग्रहणे। अर्कविकृतिः अर्कग्रहणे। चन्द्रमसो बलवन्मध्यतनुनिमित्तहेतुकानि सर्वार्धकिञ्चिद्ग्रहणेऽप्यानुपूर्व्या। यतो निमित्तोत्पातस्ततः प्रग्रहणम् । यत एषामपसरणं ततो मोक्ष इति ॥

5.1 [*In Utpala's Commentary*]

The following are the portents for an eclipse. For Moon, shaking of the orb, loss of luster, paleness and repeated masking, sudden decrease in brightness, weak appearance, darkening of the southern part are the portents. For Sun also shaking, masking, weak rays and dark spots are the portents. Fall of meteorites, burning of the cardinal directions, earthquakes, abnormal dust veils, wind, thunder and lightning at the

morning and evening junction times (sandhyā) are eclipse portents for both Sun and Moon. Adamantine, gold and silver beads losing their luster, a dark streak arising from Sun entering Moon, hot water becoming cold unexpectedly, milch animals losing milk, fading of flower garlands, the five planets simultaneously afflicting star Rohiṇī are portents for lunar eclipse. Modification in Sun is the portent for solar eclipse. Strong, medium, weak intensity portents induce respectively full, half, slight eclipse of Moon. As the portents arise anomalously the eclipse takes place. As they (reasons) recede Moon is released.

५.२ शुक्लकृष्णाष्टमीपञ्चदश्योरन्तरात् ग्रहणनिमित्तानीन्दुभान्वोः प्रबलानि भवन्ति । तानि च निशामय । षण्मासात् चन्द्रमसस्ततोऽर्द्धषष्टेत्यादि च आदित्यस्यापि पूजितमाहुराचार्याः । सप्तदशत्रयोदशपञ्चत्रिंशन्मासिकानि च इन्दोस्त्रीणि विसन्धिग्रहणानि क्षुद्व्याधिमरकदुर्भिक्षोपद्रवाय वेदितव्यानि। एवमेवैतानि प्राकृतवैकृतग्रहणानि । अतः परं सप्तविधेः पर्वेशान् कथयिष्यामः । ब्राह्मसौम्यैन्द्रकौबेरवरुणाऽऽग्नेययाम्यानि षण्मासान्तरितानि सप्त भवन्ति । तत्र ब्राह्मं सस्यजननं तद्वत्सौम्यम् । ऐन्द्रं भूपालविरोधाक्षेमदुर्भिक्षकरम् । कौबेरमीश्वराणां ऐश्वर्यविनाशकरं क्षेमसस्यकृच्च । वारुणं वृष्टिसस्यक्षेमारोग्यकरम्। आग्नेयमन्नक्षयदम् । दुर्भिक्षायाल्पवृष्टये याम्यं चेति ॥

5.2 *For Moon and Sun eclipse portents become strong between the eighth and the fifteenth tithi of the bright and the dark fortnights respectively. Listen to them. Our teachers have said that at six month interval Moon and then (further) at five-and-half months Sun is worshipped (eclipsed). Lunar eclipses that occur at seventeen, thirteen and thirty-five month intervals are anomalous, and to be known as portending hunger, disease, death, drought and distress. These are the natural and anomalous eclipses. Next we explain the seven regent deities of the parvans. Brāhma, Saumya, Aindra, Kaubera, Vāruṇa, Āgneya, Yāmya are (the parvans) at interval of six months. There, Brāhma produces greenery; so also saumya (parvan). Aindra creates enmity among kings, ill health and lack of food. Kaubera*

destroys wealth of leaders. Vāruṇa leads to good rains, bounteous agriculture and health. Āgneya reduces food availability. Yāmya is for drought and low rainfall.

५.३ उदक्प्राग्दक्षिणप्रत्यग् ब्राह्मणक्षत्रियविट्शूद्रोच्छेदनाय आनुपूर्व्याऽपि च ॥

5.3 *(Eclipses in) North, East, South and West (directions) badly affect brāhmaṇas, kṣatriyas, vaiśyas and śūdras respectively.*

५.४ अथ कृत्तिकासु कलिङ्गनामाधिपतीन् पीडयति । रोहिण्यां हृच्छस्त्रकोपैः प्रजानां मृगशिरसि सालनिषादकैकयान् आर्द्रायां शुकान् हुकुरान् पल्वलोपजीविनश्च । पुनर्वसौ पण्यान् रुरुकार्पासं च । पुष्ये गोमतिसिन्धुसौवीरकुरुपाञ्चालान् । सार्पे काशिकलिङ्गसिंहलकराजन्यान्। पित्र्ये दण्डकनिवासिनः पितृधान्यं च । भाग्ये सुभगान् काम्बोजान् सुराष्ट्राधिपतींश्च । अर्यम्णे मगधान् यवनान् । हस्ते दाशार्णान् । त्वाष्ट्रे मद्रान् कुरुक्षेत्रं च । वायव्ये काश्मीरोशीनरान् वाजिनश्च । विशाखायां वृक्षाश्मकान् । मैत्रे काशिकोसलान् । ज्येष्ठायां ज्येष्ठनृपतीन् दरदांश्च । मूले क्षुद्रमालवकयौधेयान् । आप्ये पञ्चनदान् सुवीराधिपतिं च । वैश्वदेवे आर्जुनायनपौण्ड्रशिबिमालवान् । श्रवणे सत्त्वावतंसकांश्च । वासवे धनिनः शकानण्डजांश्च । वारुणे कैकयपाञ्चालराजांश्च । अजे वङ्गमगधकुकुरान् । अहिर्बुध्न्ये अश्मकेक्षुक्षुद्रकत्रिगर्तान् । पौष्णे च वैदेहानर्तकसिन्धुसौवीरान्। आश्विनेऽश्वानश्वजीविनश्च । याम्ये कलिङ्गान् दक्षिणानुपतापयति ॥

5.4 *(Eclipse) in Kṛttikā (asterism) troubles kings of Kalinga; in Rohiṇī affects people with fear of weapons; in Mṛgaśiras troubles people of Sāla, Niṣāda and Kekaya; in Ārdrā affects Śuka, Kukkura regions and those dependent on tanks and pools; in Punarvasu affects traders, cotton and the fruit tree Ruru. (Eclipse) in puṣya affects people of Gomati, Sindhu, Sauvīra and Kuru-pāñcāla; in Āśleṣā royalty of Kāśi, Kaliṅga and Simhalaka; in Maghā people of Daṇḍaka and sesamum cultivation; in Pūrva-phalgunī ladies, people of Kāmboja and kings of Surāṣṭra; in*

Uttara-phalginī Magadhas and Yavanas. Eclipse in Hasta affects Dāśārṇa; in Citrā people of Madra and Kurukṣetra; in Svāti people of Kāśmīra, Uśīnara and horses; in Viśākhā trees and people of Aśmaka; in Anūrādhā people of Kāśi and Kosala are affected. (Eclipse) in Jyeṣṭhā affects senior kings and people of Daradā; in Mūlā people of Mālavaka and Yaudheya; in Pūrvāṣāḍhā people of Pañcanada and king of Suvīra; in Uttarāṣāḍhā people of Arjunāyana, Pauṇḍra, Śibi and Mālawa; in Śravaṇa people of Sattva and Avatamsaka are affected. (Eclipse) in Dhaniṣṭhā affects the rich, and people of Śaka and birds; in Śatabhiṣak kings of Kekaya and Pāñcāla; in Pūrvābhādra people of Vaṅga, Magadha and Kukkura; in Uttarābhādra people of Aśmaka, Kṣudraka and Trigarta; in Revatī people of Videha, Ānarta, Sindhu and Sauvīra are affected. Eclipse in Aśvini affects horses and people dependent on horses. Eclipse in Bharaṇī troubles people of Kaliṅga and southern countries.

५.५ तद्यथा दशोपप्लवाः ॥
ग्रसनारोहणोपघ्रातोन्मर्दननिरोधपरिलेहनापसव्यसव्यान्तर्मध्यतम उपप्लवाश्च। तत्रार्धत्रिभागग्रहणं ग्रसनं प्रख्यातनृपतिविप्रच्युताय । मण्डलमध्ये ग्रहावर्त्तनमारोहणं नरपतिक्षोभकरं प्रजानाशनम् । ईषद्ग्रहणमुपघ्रातं जगद्धिताय । उन्मर्दनं चिरमर्केन्दुसकलमण्डलाक्रमणं प्रजाविद्रवकरम्। सर्वमण्डलधूमावरणं निरोधस्तदरोगक्षेमसुभिक्षलक्षणम् । समन्ताद् जिह्वयेवाभिलेहनं परिलेहनं समानफलम्। पूर्वेण दक्षिणमपसव्यं प्रजाभयाय। अप्रदक्षिणं सव्यमभयाय। मण्डलान्तर्मध्ययोर्ग्रहणमन्तर्मध्यं नृपतिक्षोभकरम्। महातमसाऽऽवरणं तम उपप्लवः परस्परं म्लेच्छसङ्करकृदिति ॥

5.5 *There are ten types of eclipses. These are: grasping, mounting, smelling (upaghrāta), pressing (unmardana), cover (nirodha), licking (parileha), clockwise, anti-clockwise, ring, and total darkness. Seizing of half to one-third of the orb is grasana, which portends the removal of a famous king. Ārohaṇa or mount is coming to the Centre, which disturbs kings and destroys people. Upaghrāta or smelling is a slight eclipse, which is good for the world. Unmardana is occupation of Sun or Moon completely for a long time, indicating distress to people. Nirodha is a smoky cover of the*

whole orb, portending health and prosperity. Parilehanam is like touching all around with the tongue. Shadow from east to south is fearsome. Opposite of this is anti-clockwise; good for people. Darkness at the centre like a circle (Ring) causes displacement of kings. Total cover of darkness causes war with the Mlecchas.

५.६ वर्णः कृष्णकपोतोऽतिवर्षाय शूद्रकुक्षिरोगाय तिलतोयवृद्धये दैत्यनाशाय च । पांशुधूमलोहितः क्षत्रियविनाशाय बालार्कांशुकपिलो दुर्भिक्षाय । हारिद्रो व्याधये । दूर्वाङ्कुरसदृशो जनमरकाय। पाटलकुसुमसन्निकाशोऽशनिभयदो भवतीति ॥

5.6 *Colours: Eclipse of the colour of a dark pigeon is for excess rains. The colour of a reddish dust cover destroys warrior class. Colour of the rays of the rising Sun is for drought. Yellowish colour is for diseases. Colour of grass sprouts is for destruction of people. Pāṭala flower like colour (pale red) produces fear of thunder.*

[Here six colours are mentioned for lunar eclipses. *Siddhāntic* astronomy texts usually list four colours. For more details on eclipse colours as per Indian tradition one can refer to an informative article by Petri.[1]]

५.७ उपरक्ते यदा सूर्ये प्रबलाद्वाति मारुतः ।
मासषट्के तदा विन्द्याद्राहोरागमनं ध्रुवम् ॥
उल्कायां द्वादशे मासे रजसाष्टादशे तथा ।
भूकम्पे च चतुर्विंशे त्रिंशे तमसि निर्दिशेत् ॥
षट्त्रिंशेऽशनिपाते स्यात् सर्वेषु स्यात् षडुत्तरे ॥ इति॥

5.7 *If during a solar eclipse there is a strong wind, it is certain that there will be an eclipse after six months. Similarly appearance of a meteor, dust veil, earthquake, darkness and fall of lightning portend eclipse in the*

1 W.Petri, *Colours of lunar eclipses according to Indian tradition*, IJHS, 3.2. 1964. pp. 91-98.

twelfth, the eighteenth, the twenty-fourth, the thirtieth and the thirty-sixth month respectively at six monthly intervals.

[Bhāskarayogi quotes the above verses with the last line ending as *purva jñeyam ṣaḍuttaram*.]

५.८ तत्र कार्तिके सुभिक्षक्षेमाय काशिकोसलशूरसेनाऽभावाय च। मार्गशीर्षे मृगपौण्ड्रसोमभयाय वृष्टये च। पौषे भयदुर्भिक्षब्रह्मक्षत्रोपरोधाय। माघे शस्त्रप्रकोपाय प्रावृड्वृद्ध्यै वङ्गानर्त्तकाशिदेशोत्सादनकृत्। फाल्गुनेऽन्नसम्पच्च। नटनर्त्तक-धनुष्करसस्यविनाशाय चैत्रे। वैशाखेऽश्मकपौण्ड्रम्लेच्छवृक्षसस्याभावाय । ज्येष्ठे ज्येष्ठपत्नीगणमुख्यसस्योपद्रवाय । साल्वनिषादवृष्टिसस्यघ्नमाषाढे। श्रावणे क्षेमसुभिक्षमन्यत्र चीनकाश्मीरपुलिन्दगान्धारेभ्यः । भाद्रपदे मगधदरद-कलिङ्गवङ्गाऽनयाय सस्यक्षेमाय च। आश्वयुग्ग्रहणे सुभिक्षक्षेमाय आवन्ति-बाह्लीकानर्त्तकाम्बोजसैन्धवाऽऽमयायेति ॥

5.8 [*This section states the effect of an eclipse, either solar or lunar, occurring in different months. The text starts with the month of Kārtika and ends with the month of Āśvyayug.*]

५.९ [अद्भुतसागरे । राहोरद्भुतानि। ग्रहणनिमित्तानि।]
उल्कापातसन्ध्यादिग्दाहभूमिकम्पाशनिवज्रनिर्घातस्तनयित्नुपांशुवृष्टि-विषमवातशीतोष्णविकृतानि । वज्रकनकरजतमणीनां प्रभाभङ्गो अभ्रलेखासंदर्शनं अर्कमण्डलोत्थितायाः कृष्णराज्याः सोमानुप्रवेशः शश्वच्च शिवाश्वगणरुतविकृतं नीचैरभ्रविसर्पणं रश्मिजालव्याकुलत्वं नभोऽम्भसामशीतत्वम्।क्षीरिणांक्षयः अकस्मान्माल्यम्लानिः पञ्चताराग्रहोदयो रोहिणीपीडनं चन्द्रग्रहणे। अर्कविकृतिः अर्कग्रहणे। चन्द्रमसो बलवन्मध्यतनु-निमित्तहेतुकारणानि सर्वार्धकिंचिद्ग्रहणीयान्यानुपूर्व्या यतो निमित्तोत्पातः ततो ग्रहणं यत एषामपसरणं ततो मोक्षः इति ॥

५.१० [अथ सूर्यग्रहणनिमित्तानि । तत्र पराशरः ।]

आदित्यस्य वेपनं परिवेषणं दीनमन्दरश्मिता कृष्णकल्माषभावाः इति ॥

५.११ [अथ चन्द्रग्रहणनिमित्तानि । पराशरस्तु ।]

चन्द्रमसस्तावत् प्रस्पन्दनं शशव्यावृत्तिर्दैन्यं पाण्डुत्वं सततपरिवेषणम-चिरोदितज्योत्स्नापराभङ्गः क्षीणता दक्षिणशृङ्गतैमिर्यः इतरस्यात्यर्थमुत्तुङ्गता द्विर्भावश्च इति ॥ शुक्लपक्षाष्टमीपञ्चदश्योरन्तरा ग्रहणनिमित्तानि इन्दुभान्वोः प्रबलीभवन्ति ॥

५.१२ अतःपरं सप्तविधं पर्वानुक्रमिष्यामः । ब्राह्मसौम्यैन्द्रकौबेर-वारुणाग्नेययाम्यानि षण्मासान्तराणि सप्त भवन्ति । तेऽत्र ब्राह्मं शस्यजननम्। तद्वत् सौम्यम् क्षेमारोग्यकरम् । ऐन्द्रं भूपालविरोधाक्षेमदुर्भिक्षफलम् । कौबेरं ईश्वराणामैश्वर्यविनाशनं क्षेमशस्यकृच्च । वारुणं वृष्टिशस्यक्षेमारोग्यकरम् । आग्नेयमग्निशस्त्रकृत् । अनावृष्टये याम्यं च ॥

5.9-5.12 [*Rāhu in the Adbhutasāgara*]

[These statements are almost same as in sections (5.1-5.2) of Utpala]

५.१३ वैशाखे अश्मकपौण्ड्रोड्रम्लेच्छसौराष्ट्रेषु वृक्षशस्याभावाय । ज्येष्ठे ज्येष्ठनृपनृपपत्नीगणमुख्यशस्योपद्रवाय । शाल्वनिषादवृष्टिशस्य-घ्नमाषाढे । श्रावणे च क्षेमसुभिक्षमन्यत्र चीनकाश्मीरपुलिन्दगान्धारेभ्यः। भाद्रपदे मगधदरदकलिङ्गवङ्गानपास्य शस्यक्षेमाय च । आश्वयुग्ग्रहणे सुभिक्षक्षेमाय अवन्तिबाह्लीकचीनकाम्बोजसैन्धवानामभावाय च। कार्तिके सुभिक्षक्षेमारोग्याय काशिकोशलशूरसेनाभावाय च । मार्गशीर्षे मृगपौण्ड्रसोमपभयाय वृष्टये च । पौषे भयदुर्भिक्षब्रह्मक्षत्रोपरोधाय । माघे शस्त्रप्रकोपप्रावृड्वृद्धये वङ्गाङ्गानर्त्तयवनकाशिदेशोत्सादनकृत् । फाल्गुने अन्नसम्पच्च । नटनर्तकधनुर्धरशस्यविनाशाय चैत्रे ॥

5.13 [This corresponds to section (5.8) above in Utpala's commentary. The AS text starts with *Vaiśākha* and ends with the month of *Caitra*. Bhāskarayogi quotes only one sentence from Parāśara referring to *Jyeṣṭha*.]

५.१४ अश्विन्यामश्वानश्वजीविनश्च । याम्ये कलिङ्गान् दक्षिणांश्चोपतापयति.....

5.14 [This section corresponds to (5.4) in Utpala's commentary considered above. Ballālasena in AS starts his list with star *Aśvinī*, whereas Utpala's list starts with star *Kṛttikā* which appears to be the original version of PT.]

५.१५ उदग्दक्षिणप्रत्यक् ब्राह्मणक्षत्रियविट्शूद्रोत्सादनाय आनुपूर्व्या ॥

5.15 [This is same as (5.3) above]

५.१६ [पराशरेणान्यथा दशग्रासा दर्शितास्तद्यथा ।]

5.16 [*Ballālasena: Ten types of grasping during an eclipse are shown by Parāśara, as follows.*]

५.१७ दशोपद्रवा ग्रसनारोहणोपघ्राणोन्मर्दननिरोधपरिलेहनसव्यापसव्या-न्तमध्यतम उपप्लवाश्च इति । प्रदक्षिणं सव्यं प्रजाहिताय । अप्रदक्षिणमपसव्यं प्रजाभावाय । समन्ताज्जिह्वाभिलेहनं समानफलं पूर्वेण ॥

५.१८ अर्धत्रिभागपादग्रहणं ग्रसनप्रख्यातं नृपतिप्रच्युतये । सर्वमण्डलधूमावरणं निरोधः तदारोग्यक्षेमसुभिक्षलक्षणम् । उन्मर्दनं चिरमर्केन्दुसकलमण्डला-क्रमणं प्रजाविद्रवकरम् । मण्डलमध्ये ग्रहणावर्त्तनमारोहणं नरपतिविक्षोभः प्रजानाशकरः॥ ईषद्ग्रहणमुपघ्राणं जगद्धिताय। मण्डलान्तर्मध्ययोः ग्रहण-मन्तर्मध्यनृपतिक्षोभकरम्। महातमसाऽऽवरणं तम उपप्लवः परस्परं म्लेच्छसङ्करकृत् ॥

५.१९ पाटलकुसुमसङ्काशोऽशनिभयदो भवति । बालार्कांशुकपिलो दुर्भिक्षाय । नीलः स्तेयवृद्धये चैत्यविनाशाय दूर्वाङ्कुरहरितो जनमरणाय । हरिद्रो व्याधये ॥

5.17-5.19 [Text in these sections is very similar to Utpala's text in (5.5) and (5.6) above]

५.२० [विनाशाय ग्रहणमित्यनुवृत्तौ पराशरः]
क्षत्रियबलाध्यक्षयोर्मध्याभिलाषिणः इति । श्वेतभवानां मध्यप्राप्तस्य ॥

[मध्याभिलाषी तृतीयखांशस्थः । पञ्चमषष्ठसप्तमखांशफलमाह पराशरः]

५.२१ चतुर्थात् किञ्चिदावृत्तस्य क्षत्रियस्त्रीणां व्यालम्बितस्य शूद्रतस्कराणामस्तमये । गृहीतो यद्युदागच्छेदस्तं वा यदि गच्छति । अयोगक्षेममाचष्टे त्रीणि वर्षाण्यसंशयम् ॥

५.२२ [अथार्धोदयास्तग्रहणफलम् । तत्र पराशरः]

यज्ञनैकृतिकविनाशायार्धोदितग्रहणम् । गुणाधिकगणमुख्यानामुदितस्य ॥

५.२३ [अथ मोक्षलक्षणम्। तत्र पराशरः]

षड्विधो मोक्षो वामदक्षिणच्छर्दनाभिनिर्वहणान्तमध्यो नृपक्षयाभिवर्षण-सुभिक्षशस्त्रकोपमध्यजनाक्षेमशरच्छस्यनाशकरः ॥

५.२४ [इति मोक्षषट्कस्य क्रमेणैतानि फलानि]

मोक्षागमो दिग्भ्यो राज्ञां जयपराजयौ वेदितव्यौ । गृहीत्वा ततः पूर्वनिवर्त्तनम् अभियोक्तृवधाय विपर्ययेणाभियुक्तस्य ॥

5.20-5.24 [These are portents depending on how Sun and Moon are released by the eclipse shadow.]

५.२५ [अथ ग्रहणसमयाद्ग्रहणफलम् । पराशरस्तु]

उपरक्ते यदा चन्द्रे बलवान् वाति मारुतः ।
मासे षष्ठे तदा विन्द्यात् राहोरागमनं ध्रुवम् ॥
उल्कायां द्वादशे मासि रजस्यष्टादशे तथा ।
भूमिकम्पे चतुर्विंशे त्रिंशे तमसि निर्दिशेत् ।
षट्त्रिंशे अशनिपातेऽस्मात् सर्वेषां स्यात् षडन्तरे ॥ इति ॥

5.25 [This is same as (5.7)]

५.२६ [एवं सर्वेषामुक्तनिमित्तानां सम्भवे क्रमेण भवतीत्युक्तस्यैव संक्षेपः । अथवा सर्वेषामुक्तनिमित्तानां एकस्मिन्ग्रहणे सम्भवे षडुत्तरे षट्त्रिंशे ग्रासे द्वाचत्वारिंशन्मासे पुनर्ग्रहणं भवतीत्यर्थः ।]

5.26 [This is the statement of Ballālasena. He explains that if all the portents occur together then the eclipse will repeat in the 42nd month.]

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

5.27 [This is the statement of periodicity of lunar and solar eclipses as in (5.2)]

५.२८ [अथ ग्रहणनिर्मुक्तावद्भुतफलम् । वृद्धगर्गपराशरौ तु]

अथेन्द्रग्रहनिर्मुक्ते सप्ताहान्तर्भवेद्यदि ।
पांशुवर्षोऽन्ननाशः स्यान्नीहारो रोगवृद्धये ॥

नृपनाशाय भूकम्प उल्का मन्त्रिविपत्तये ।
रोगाय परिवेषः स्याद्भयायैवाभ्रसंप्लवः ।
विद्युद्गर्भविनाशाय दिग्दाहश्चाग्निवृद्धये ।
निर्घातेन्द्रधनुर्दण्डो दुर्भिक्षाय भयाय च ॥
पवनः परुषो रूक्षः चौरोपद्रवसूचकः ।
सर्वोपद्रवनाशः स्यात् सम्यग्वृष्टिर्भवेद्यदि ॥
यद्राहुचरितं प्रोक्तं चन्द्रग्रहणहेतुकम् ।
तदेव सकलं सूर्ये वेदितव्यं शुभाशुभम् ॥

5.28 [This is about omens when the eclipse is getting released. This is attributed to both Vṛddhagarga and Parāśara. More space is devoted to lunar rather than solar eclipses. Here it is said that all statements about movement of *Rāhu* with Moon applies during a solar eclipse also.]

५.२९ [तत्रापर्वग्रहणे पराशरस्तु]

अपर्वण्युपरक्तः प्रजानाशाय ॥

5.29 [This is about an eclipse which is neither at the full Moon nor at the new Moon. See (3.4) for discussion on such possibility.]

[This chapter provides considerable insight into how eclipses were observed and understood in the early stages of Hindu astronomy. In (1. 3) a question was raised about eclipses and *Rāhu*. The present Chapter attempts to respond to the query further with details of periodicity, colour and astral-geography. Eclipse colours refer mainly to the Moon's orb during an eclipse. Similar observations about colours during a lunar eclipse are available in later *siddhāntic* astronomy books also. The ordering of the eclipses in terms of seven deities Brahma, Moon etc. mentioned by PT has been taken up further with modifications by

siddhāntic texts to make preliminary assessment of possibility of an eclipse at the syzygy as in the *Śiṣyadhīvṛddhidatantra* of Lalla.[2]

Varāhamihira in BS has more or less repeated PT except for criticizing eclipse prediction based on omens. He definitely had access to a better theory and computational tool but the statement that lunar eclipses repeat at six monthly intervals should have been of great help to the successors of Parāśara even though the details of this are not available to us. PT in line with more ancient beliefs takes *Rāhu* as the dark agent responsible for both lunar and solar eclipses. It is natural that more details are given for lunar than for solar eclipses. PT knows not only slight, partial and total but also the penumbral eclipse of Moon. Among the total eclipses of Moon with different colours PT defines *Nirodha* as an eclipse when Moon is seen to be completely covered by haze (5.5; 5.18). This clearly refers to a total penumbral eclipse which possibility is also naturally included in the six monthly periodicity statement. Varāhamihira in BS (5.43) accepts ten types of eclipses but later in BS (5.47) describes *Nirodha* as an event with concentrated darkness at the center. This does not appear to be a realistic description of a total penumbral eclipse. However contrary to the general belief of an eclipse being a bad omen, *Nirodha* is considered to be a good portent by all ancient authors.

Parāśara quite frankly says his teachers have taught him about the periodicity of eclipses. Hence through inherited tradition, Parāśara should have known that once a lunar eclipse is observed the next one can be expected after six months even though it may not always be visible. However PT makes a stronger statement that such a sequence runs for 3½ years or forty-two lunations. Since PT does not know of orbital

2 Text and Translation in two parts by Bina Chatterjee, INSA, N.Delhi, 1981.

astronomy we have to conclude that this also should have been a traditional belief based on a sequence that had been observed once or twice in the remote past.

The web site of NASA on lunar eclipses (http://eclipse.gsfc.nasa.gov/LEcat5/LEcatalog.html) has large amount of information on past, present and future eclipses. A lunar eclipse is visible from any place on the earth so long the location is on the night side. The above site has further details on the circumstances of past eclipses at select locations in India. This has been utilized here to find for the location of Jaipur (http://eclipse.gsfc.nasa.gov/JLEX/JLEX-AS.html) how the lunar eclipses in the period -1500 to -900 were spaced in time. There were several consecutive partial and/or total events spaced at six months but usually two to four and occasionally five in a row. If penumbral eclipses were to be included, the observation of which was a possibility, a few longer series were possible. An example of two rare sequences of eight eclipses that might have been observed in northern India in 15th century BCE is shown in Table 5.1. The first started on 10th November 1495 to end on 5th March 1491. The second started on 13th December 1441 to end on 7th April 1437. In the first sequence the seventh was a near total penumbral eclipse. In the second sequence, that occurred some fifty years later the seventh was again a total penumbral eclipse which would have been designated as *Nirodha* by the ancient Indian astronomers. The eighth in this series was also penumbral but being partial could have remained unrecognized and the length of a possible sequence might have been taken as seven.

Modern Astronomy has discovered many interesting patterns in the occurrence of eclipses through mathematical analysis. However for the ancient observer it is the *Tetrad* that could have given the first suspicion about six monthly repitition of lunar eclipses. The *Tetrads* have their own peculiar distribution

Table 5.1 Two sequences of seven eclipses visible at Jaipur at six monthly interval in 15th century BCE. Phases in grey were not visible due to altitude. LT: Local Time, P:Partial, T:Total, N:Penumbral

(After F.Espenak)

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										

in time and this can provide us a clue about the centuries when the probability of such observation would have been high. In the Five Millennium Catalog made available by F.Espenak at the above web site, the statistics of past and future eclipses are listed century wise. It is found that *Tetrads* are systematically absent for a period of 200 years and this pattern repeats after every 400 years. Thus the number of Tetrads per century for the period 1900-501 BCE varied as (0, 0, 3, 8, 6, 2, 0, 0, 4, 7, 7, 1, 0, 0). The occurrence of *Tetrads* is only a necessary condition for high likelihood of a six monthly sequence but not sufficient for its visibility in India. We see that 1400-1100 BCE was a lean period for *Tetrads*. One may wonder how PT could have given a realisitic description of penumbral eclipses without several possibilities for observation. Meuss[3] has demonstrated that *Tetrads* and total penumbral eclipses are positively correlated. He found the average recurrence interval of a total penumbral eclipse to be 34.3 years, that is about three in a century. It is found that in the period 1500-1400 BCE not only there were more *Tetrads* but also there were six total penumbral eclipses of which four (9.11.1440; 4.3.1436; 8.8.1407; 1.12.1404 BCE) were visible in the Indian skies. These facts also add force to the inference that Parāśara should have inherited a tradition from his teachers who had carefully observed a few series of lunar and possibly solar eclipses to form their opinion about their recurrence intervals. The mention of 13, 17 and 35 months as anomalous intervals for lunar eclipses (PT text 5.27) should have been again based on observations. A reality check on this and the solar eclipse statement is yet to be done.

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3 J. Meuss. *Total Penumbral Lunar Eclipses,* Jour. Royal Astronom. Soc. of Canada 74, 5, 1980, pp.291-295.

06

॥भौमचारः॥ Movement of Mars

६.१ [उत्पलविवृतौ]

तस्य पञ्चवक्त्राणि क्रमेणोपदिशन्ति । उष्णमश्रुमुखं व्यालं लोहिताख्यं निस्त्रिंशमुशलं चेति ॥

6.1 [*In Utpala's commentary*]

Five faces are described for Mars, in the order, Uṣṇa, Aśrumukha, Vyāla, Lohita and Nistriṃśamuśala.

६.२ तत्रोदयर्क्षात् सप्तमाष्टनवमेषु नक्षत्रेषु निवृत्तः प्रजासंक्षयं विशेषतः पचतां दहतां पीडां धत्ते । दशमैकादशद्वादशेषु प्रदुष्टवातैरद्रव्यरसान् प्रजानां धातून् कोपयन् व्याधीन् प्रवर्त्तयति। त्रयोदशचतुर्दशयोः सस्यदंष्ट्रिव्यालप्राबल्यं हिरण्यसंचयं चेति । पञ्चदशषोडशयोर्मुखरोगो नृपक्षोभः शस्त्रकोपश्चेति। सप्तदशेऽष्टादशे वा दस्युगणैः प्रजानामुपद्रवमवृष्टिं शस्त्रभयं चेति ॥

6.2 If from the star at which Mars rises, the retrograde motion takes place in the seventh, eighth, ninth star, it disturbs people especially working with fire. If the return happens in the tenth, eleventh or twelfth star it aggravates diseases. In the thirteenth and fourteenth stars vegetation, rats, snakes and acquisition of gold increase. In the fifteenth and sixteenth

stars facial diseases, disturbances to kings and weapons are indicated. In the seventeenth or eighteenth star unrest among people, reduced rainfall are indicated.

[The five face names of (6.1) probably refer to the five retrograde movement patterns mentioned above.]

६.३ उदितः श्रवणे भौमः पुष्ये वक्रं चरेद्यदि ।
मूर्द्धाभिषिक्ता राजानो विनश्येयुः परस्परम् ॥
यथा जनपदव्यूहे दिग्विभागः प्रदर्शितः ।
तस्य वै मोहितं कुर्याल्लोहिताङ्गस्तथा मुखम् ॥ इति ॥

6.3 *Mars having risen in the star Śravaṇa goes retrograde in the star Puṣya, kings fight amongst each other and destroy themselves. As described in the section on astral-geography, Mars affects different regions of the country.*

६.४ वर्णरश्मिप्रभाप्रमाणतेजोयुक्त उदग्मार्गगः स्नेहवान् सर्वलोकहितायापि च । प्रदक्षिणगतिः कान्तः स्निग्धश्च कलशोपमः। तप्तकाञ्चनसङ्काशो भवेल्लोकविवृद्धये ॥

6.4 *Mars having good colour, rays, brightness, and magnitude in the north is good for the world. Moving clockwise, being sharp like a burnished golden vessel is for progress of the world.*

६.५ [अब्दुतसागरे मङ्गलाब्दुते । तत्र शुभसूचकमङ्गललक्षणमाह पराशरः]

वर्णरश्मिप्रमाणतेजोयुक्त उदग्मार्गगः .. .. ..तप्तकाञ्चनसङ्काशो भवेल्लोकस्य वृद्धये ॥

6.5 [In AS. This is almost same as (6.4) above]

६.६ [प्रदक्षिणगतिः ग्रहाणाम् उदग्गामी]

6.6 [*Ballālasena: Clockwise motion means going north of other planets.*]

६.७ उदयर्क्षात् सप्ताष्टनवमेषु नक्षत्रेषु निवृत्तः... ...॥ उदितः श्रवणे भौमः पुष्ये वक्रमियाद्यदि ।... ...

6.7 [This is same as (6.2; 6.3) above]

[Mars is the first planet considered by PT. Mars being red in colour is easily recognized in the sky but its retrograde movement makes it more difficult to describe. PT does not give any numbers for its visibility or periods of retrograde motion. The description is verbal. The five faces named in (6.1) refer to the type of figure described by the planet in its path as seen from earth. The planet apparently moving in zig zag fashion and in a loop has given rise to these names. Among these the zig zag is like the doubly bent face of a serpent named by PT as *Vyāla-mukha*. The retrograde motion of Mars in the year 2005 (Fig.6.1a) would be an example of this geometrical shape. *Nistrimśa-musala* is the name given to the self intersecting loop making the figure of a short sword-like pounder. An example of this figure as in the year 2003, is shown in Fig. (6.1b). Both these figures demonstrate the necessity of observing the movement of the planet over long periods of time repititively to recognize the retrograde spatial patterns and name them appropriately.]

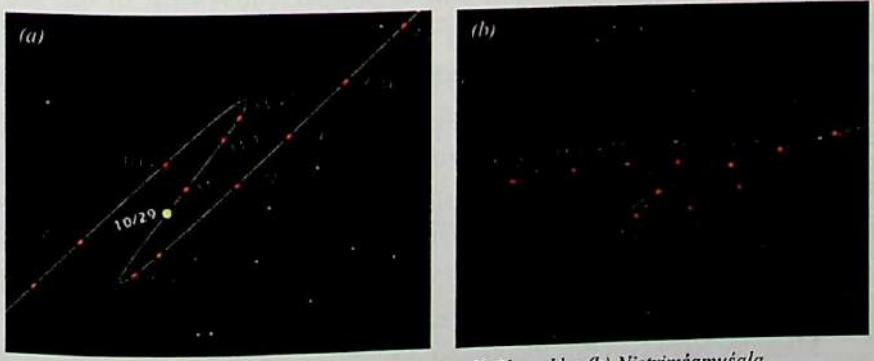

Fig. 6.1 Retrograde motion of Mars (a) Vyālamukha (b) Nistrimśamuśala (Courtesy: http://mars.nasa.gov/allaboutmars/nightsky/nightsky04/)

07

॥ बुधचारः॥ Movement of Mercury

७.१ [उत्पलविवृतौ]

अथास्य गतयः सप्त च । प्राकृता विमिश्रा संक्षिप्ता तीक्ष्णा घोरा पापा योगान्तिका च । तत्र प्राकृता याम्याग्नेयरोहिणीवायव्यानि । मिश्रा सौम्यार्द्रामघाश्लेषा च । संक्षिप्ता पुष्यार्यम्णभाग्यादित्यानि । तीक्ष्णा अजपादतश्चत्वारि ज्येष्ठा च । घोरा त्रीणि श्रवणादीनि त्वाष्ट्रं च । पापा सावित्रेन्द्राग्निमैत्राणि । योगान्तिका मूलमाषाढे॥

7.1 [*In Utpala's commentrary*]

Mercury has seven types of movements. These are Prākṛtā, Vimiśrā, Sankṣiptā, Tīkṣṇā, Ghorā, Pāpā, and Yogāntikā. Movement in the stars Bharaṇi, Kṛttikā, Rohinī and Svāti is Prākṛtā. Miśrā is movement in Mṛgaśirā, Ārdrā, Maghā and Āśleṣā. Sankṣiptā is in Punarvasu, Puṣya, Pūrva and Uttara-phalgunī. Tīkṣṇā is in the four stars starting with Pūrvābhādra and in Jyeṣṭhā. Ghorā is in the three stars starting with Śravaṇa and in Citrā. Pāpā is in Hasta, Viśākhā and Anūrādhā. Yogāntikā is in Mūla, and the two Āṣāḍhās.

[Varāhamihira in BS (7.8-7.13) mentions that he is writing about Mercury based on the *Parāsaratantra*.

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 the 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.]

७.३ तासां प्रथमा गतिः क्षेमारोग्याम्बुसस्यवती । इतरे द्वे व्यामिश्रफले शेषाश्चतस्रो दुर्भिक्षाक्षेमाय । विशेषतस्तु सौम्यादिषड्नक्षत्रचारी सुवृष्टये। श्रविष्ठावारुण्ययोश्च । दक्षिणतो नैर्ऋतेन्द्रपूर्वासु भयकृत् । अश्विन्यां वणिग्विनाशाय । त्वाष्ट्रे शरत्सस्यानाम् । रोहिणीश्रवणाग्नेयब्रह्मराशिष्वम्भोद-विनाशः । हस्तोदितः मैत्रमनुचरन् पशुगोकोशलानभिहन्ति । विशाखामध्यगश्च शस्यमिति ॥

7.3 *Among the paths, the first portends good health, abundant water and*

food production. The other two indicate mixed results. The remaining four paths are for droughts and diseases. Mercury moving among the six stars starting with Mṛgaśirā is especially good for rains. So also along Dhaniṣṭhā and Śatabhiṣak rain is indicated. Movement in the south of Mūla, Jyeṣṭhā and Pūrvās (P.Phalgunī, P.Āṣāḍhā, P.Bhādrā) induces fear. In star Aśvini traders are affected. In star Citrā autumn crops are affected. In Rohiṇī, Śravaṇa, Kṛttikā, and Brahmarāśi, clouds are destroyed. Having risen in Hasta and approaching Anūrādhā, Mercury hurts domestic animals, cows and people of Kosala. Similarly station in the middle of Visākhā affects crops.

७.४ वैशाखाषाढयोर्माघे पौषश्रावणयोस्तथा ।
बुधो न दृश्यते जातु दृश्येत भयमादिशेत् ॥
पौषे करोति मरकं माघे वातं तथा च सोमसुतः ।
वैशाखे जनमरकमाषाढे श्रावणे च दुर्भिक्षम् ॥ इति ॥

7.4 *In the months of Vaiśākha, Āṣāḍhā, Māgha, Pauṣa and Śrāvaṇa, Mercury is normally not visible. In case it is seen it presages fear. Mercury causes deaths in Pauṣa, wind in Māgha, and death of people in Vaiśākha, drought in Āṣāḍha and Śrāvaṇa months.*

७.५ [अद्भुतसागरे बुधाद्भुते । तत्र शुभसूचकलक्षणमाह पराशरः]

विमलजलरजतस्फटिकाभः प्रशस्यते ॥

7.5 [*In AS. Parāśara has said the good omens*]

Mercury is benevolent when clear in colour like liquid silver.

७.६ विशेषस्तु सौम्यादिषड्.....विनाशाय ।

7.6 [This is partly contained in (7.3) above]

७.७ अथास्य गतिः सप्त.....एताश्चतस्रो दुर्भिक्षाक्षेमाय ॥

7.7 [This is almost same as (7.1) combined with (7.4)]

७.८ [अथोदयास्तफलं तत्र पराशरः]

हस्तोदितो मैत्रमनुचरन्....शस्यम् ॥

7.8 [This is partly contained in (7.3) above]

७.९ अथ चत्वारिंशत्त्रिंशद् द्वाविंशत्यष्टादशपञ्चदशैकादशनवरात्राणि गतिक्रमात् उदितोऽभिदृश्यते तान्येव अस्तमितो भवति । उष्णशीतवाय्वभ्रसूर्येन्दुग्रहणायोदयते सस्यविघाताय च॥

7.9 [This is same as (7.2)]

[PT presents an observational effort from a remote period. Mercury is always very close to Sun and hence observation is difficult. Quite interestingly visibility numbers are given which can be verified at least for their possibility if not for their accuracy. Even though Varāhamihira quotes Parāśara, he like his commentator Utpala, perhaps implies that the visibility numbers given in PT are not correct since they do not tally with theoretical results. However seen from an observational perspective PT is quite realistic. The seven paths proposed for Mercury passes through all the 27 stars and hence the period covered is nearly one full year. In a year Mercury will be visible either in the morning before Sunrise or in the evening after Sunset. In a year Mercury with its orbital period of 88 days makes 4.15 revolutions around the Sun. In any year for a naked eye observer Mercury would be visible for four (or three) seasons in the morning and for three (or four) seasons in the evening. In all there will be seven viewing possibilities. It is easy to see that PT is describing such visibility windows as the

seven paths of Mercury. The lengths of these visibility phases depend on the place and month of observation. No information is available in PT about the location but we can presume it to have been around the Kurukṣetra region. As a demonstration of the PT model for Mercury, the accompanying Fig. 7.1 shows the visibility of the planet in the year -1200 for the Kurukṣetra region.

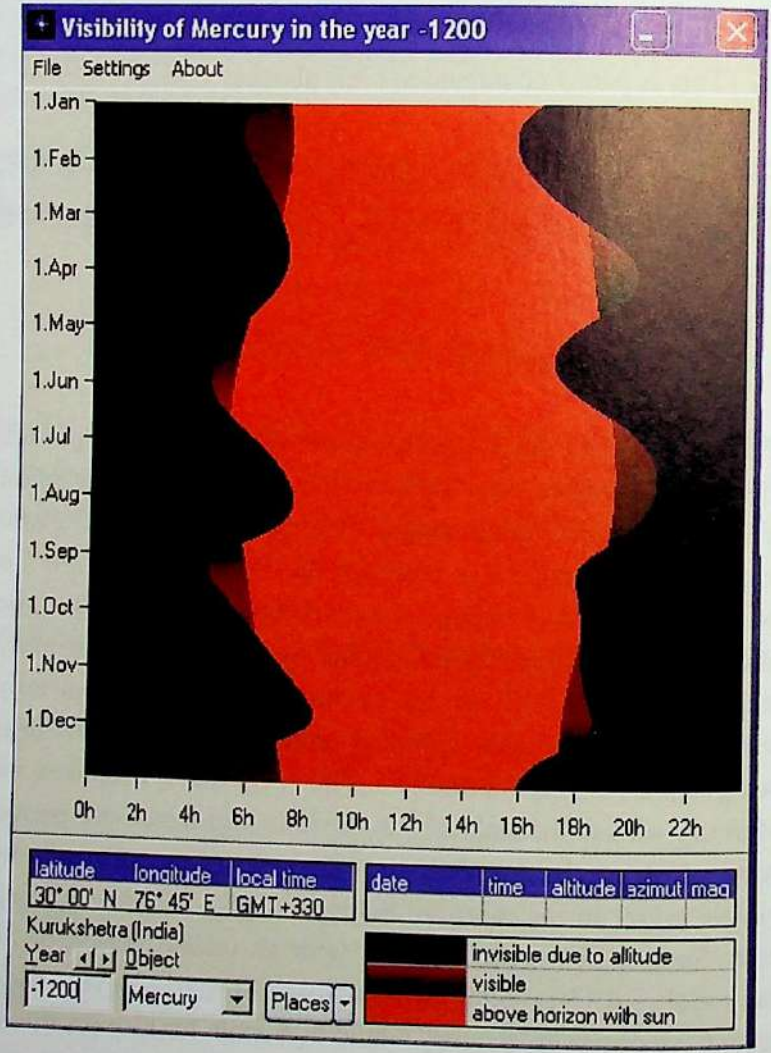

Figure 7.1 Visibility Pattern of Mercury at Kurukṣetra in the year -1200 (1199 BCE)

This result is obtained using the planetarium software PLVS available at the website *www.alcyone.de* where details of the method of calculation and accuracy of the data base are available. This software can be used to find the duration of visibility and invisibility after allowing for the *arcus visionis* and critical altitude required above the horizon for the planet to be visible. For the year -1400 and -1200 the visibility and invisibility numbers in days are shown in the accompanying table. These years are selected here arbitrarily to verify the possibility of the correctness of the ancient observation.

Table 7.1 Visibility Pattern of Mercury

Year	Morning Visibility Days	Morning Invisibility Days	Evening Visibility Days	Evening Invisibility Days
	-	-	21	18
-1400	34	28	42	28
	16	38	9	24
	34	37	-	-
-1200	-	25	30	44
	2	28	42	25
	23	47	15	16

The order of magnitude of these numbers does not change too much with the years. The visibility number given by PT is in the interval 9 to 40. Considering the advantages of a modern calculation to ancient naked eye observations of Mercury, an object known to be difficult to observe, Parāsara's figures are accurate. What is intriguing is why PT does not explicitly state the difference between east (morning) and west (evening) observations. In (7.2) the numbers are stated as so many nights. This would mean the observations were done either after Sunset or before Sunrise. PT observes that Mercury has seven visibility and invisibility phases of unequal lengths in a year. This amounts to 3 to 3½ cycles giving the synodic period of Mercury to be between 122 and 104 days, which average to 114 days quite close to the modern value of 116 days.]

08

॥ बृहस्पतिचारः॥ Movement of Jupiter

८.१ [उत्पलविवृतौ]

कृत्तिकारोहिणीषूदिते क्षुच्छस्त्राग्निना वृष्टिव्याधिप्राबल्यं गोशाकटिकपीडा च । सौम्यरौद्रयोरेतदेव गवादिवर्ज्जम् । तिष्यपुनर्वस्वोः उक्तविपर्ययः । पुष्यवन्मघाश्लेषासु राज्ञामुपतापश्च । फल्गुनीसावित्रेषु क्वचित्क्षेमसुभिक्षं नारीदौर्भाग्यं च । चित्रास्वात्योरुदितो नृपसस्यवर्षक्षेमारोग्यकरः । एवमेव मैत्रेन्द्राग्न्योरैन्द्रनैर्ऋतयोःवनस्पतिसस्यवर्षश्रेष्ठनृपतिप्रधानजनविनाशाय इतरवृद्धये। आषाढयोः प्राक्परसस्यानां वृद्धये मध्यमक्षेमवर्षणमन्योन्यभेदश्च। श्रवणधनिष्ठावारुणेषु यज्ञनृपसस्यवर्षारोग्यवृद्धये । अजाहिर्बुध्न्यपौष्णेषु आषाढवत्फलं प्राक्परसस्यविपर्ययः । प्रभूतजलसस्यर्द्धिजलक्षेमाणि अश्वयुग्भरण्योरिति ॥

8.1 [*In Utpala's commentary*]

> [These are portents depending on the star under which Jupiter rises. The list starts with star *Kṛttikā* and ends with star *Bharaṇi*. These *nakṣatras* are the stars near which the planet becomes visible after it comes out of Sun's glare.]

८.२ मध्यदक्षिणोत्तरमार्गप्रविचारी मध्यदारुणोत्तमप्रजाभावकरः। श्वेतरक्तपीतकृष्णवर्णो ब्राह्मणादिवर्णजयाय ॥

8.2 *Jupiter moving in the middle, south and north lane respectively portends medium, harsh and benevolent effects on people. White, red, yellow and dark colour of Jupiter is good for Brāhmaṇa and other communities respectively.*

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.*

८.४ [अद्भुतसागरे बृहस्पत्यद्भुते । अथ वर्णफलम् । तत्र पराशरः]

श्वेतरक्तपीतकृष्णवर्णो ब्राह्मणादिवर्णजयाय । मध्यदक्षिण.....करः। सपादमृक्ष..... तस्मिन् कृत्तिकारोहिणीषूदिते....अश्वयुग्भरण्योः ॥

8.4 [In AS. This is similar to (8.1, 8.2 and 8.3)]

८.५ प्रच्छादनेऽवरोहिण्याः प्रजापीडां विनिर्दिशेत् । शकटारोहणे विद्याज्जगतः संभ्रमं बुधः ॥

8.5 *Occultation of the star below Rohiṇī (by Jupiter) portends difficulty to people. If the cart of Rohiṇī is split by Jupiter a scholar should understand that this causes excitement in the world.*

[Jupiter is a well recognized planet since ancient times. The movement of the planet is described as two and quarter nakṣatra per year which is quite accurate. This amounts to twelve years for a full round of the 27 stars.]

८.६ [भास्करयोगिनः उत्पलपरिमलव्याख्यायाम्। अत्र पराशरः]
कदाचिद् दृश्यते यत्र दिवा देवपुरोहितः। राजा वा म्रियते तत्र सदेशो वा विनश्यति॥

8.6 [*In the commentary on BS by Bhāskarayogi. Parāśara says*]

If by chance Jupiter is seen in day time, either the King of the country dies or the country is destroyed.

[This refers to anomalous day time visibility of Jupiter as a bad omen.]

09

॥ शुक्रचारः॥ Movement of Venus

९.१ [उत्पलविवृतौ]

अथ मार्गास्त्रयो भवन्ति उत्तरमध्यमदक्षिणाः । पुनरेकैकशस्त्रिधा नव वीथय इत्याचक्षते । तत्रोत्तरे नागगजैरावत्यः । मध्ये वृषभगोजारद्गव्यः । दक्षिणे मृगाजदहनाः । तासां नागाऽग्नेययाम्यवायव्यानि । गजवीथी रोहिण्यादीनि त्रीणि । चत्वारि परमैरावती । वृषभा फल्गुन्यौ । गोवीथी प्राक्प्रोष्ठपदादीनि चत्वारि । श्रवणधनिष्ठावारुणानि जारद्गवी। मृगवीथी त्वाष्ट्रहस्तम् । आजी-मैत्रमिन्द्राग्न्यधिपमैन्द्रम् । मूलमाषाढाद्वयं च वैश्वानरीमितीच्छन्ति ॥

9.1 [*In Utpala's commentary*]

Venus has three routes north, central and south as prescribed. These are each further divided into three to get nine routes. In the north are Nāga, Gaja, Airāvata paths. In the centre are Vṛṣabha, Go and Jāradgavya paths. In the south are Mṛga, Aja and Dahana paths. Among these Kṛttikā, Bharaṇi and Svāti are the Nāga-vīthi. The three stars Rohiṇī, Mṛgaśirā, Ārdrā are the Gaja-vīthi. The next four stars (Punarvasu, Puṣya, Āśleṣā, Maghā) are the Airāvatī. The two Phalgunis are the Vṛṣabha-(vīthi). The four stars Pūrvābhādra, Uttarābhādra, Revatī, Aśvini are the Govīthi. Śravaṇa, Dhaniṣṭhā, Śatabhiṣaj are Jāradgava. Citrā and Hasta are the Mṛgavīthi. Ajavīthi is Anūrādhā, Viśākha, and Jyeṣṭhā. Mūla, Pūrvāṣāḍha and Uttarāṣāḍhā are the Vaiśvanara-vīthī.

९.२ तत्र नागवीथीगतो नागाश्रितांश्च पीडयति गजकुलानि गजवीथ्याम्। ऐरावत्यां नृपतिबलविरोधः । आर्षभ्यां वयोवित्तज्ञानबलाधिकसस्य-पीडा श्लेष्मव्याधिप्रादुर्भावश्च । गोवीथ्यां सस्यगोमतां हानिर्जरद्गवीथ्यां शास्त्रविदाम् । मृगवीथ्यां मृगव्याधिः सस्यतपस्विनामपि रोगोद्भवश्च । अजवीथ्यां सस्यवर्षब्रह्मचारिणामाधिक्यम् । दहनवीथ्यां सस्यविलयनमग्नि-पित्तव्याधिसम्भवश्च ॥

9.2 [These are portents depending on the position of Venus among the previous nine routes. This text appears in the commentary of Bhāskarayogī also.]

९.३ आद्यरोहितदारुणविरोचनोर्ध्वदण्डतीक्ष्णान्येतानि षण्मण्डलानि । तत्र भरण्यादीनि चत्वारि चतुर्नक्षत्राणि । ज्येष्ठाद्ये द्वे पञ्चनक्षत्रे । आद्यमेव मण्डलचतुष्टयं वातमाहुस्तीक्ष्णं व्याडमार्गम् । ऊर्ध्वदण्डं वैश्वानरमृते श्रवणात् ॥

9.3 Ādya, Rohita, Dāruṇa, Virocana, Ūrdhva daṇḍa, Tīkṣṇa are the six maṇḍalas (spatial circular regions). The first four are formed of four stars each, starting with Bharaṇī. The other two (maṇḍalas) are formed with five stars each, starting with Jyeṣṭhā. The first four are also called Vāta. Tīkṣṇa is also known as Vyāḍamārga. The Ūrdhvadaṇḍa without star Śravaṇa is called Vaiśvānara.

९.४ अथ मण्डलेषु विचरन् क्रमाद् गोब्रह्मचारिनृपतनयसुहृद्भूपाल-प्रजानां उपतापयति। तेष्वेवोदयास्तमयौ कुर्वन् प्रथमेऽतीव सुभिक्षायाङ्ग-वङ्गशबरकलिङ्गाननयैः स्पृशति । अत्रैवान्यग्रहारूढोऽसौ माञ्जिष्ठ-पुरुषादशूरसेनपटच्चरपण्यागाराभावाय। द्वितीयेऽन्नसम्पत्प्रदः अवन्त्यश्मकमालवपाण्ड्यकैकयोपद्रवाय च । तृतीये शकसौराष्ट्रनृपानयाय अन्यग्रहारूढः काश्मीरयवनक्षुद्रमालवकिरातशकाननयेन स्पृशति । चतुर्थे सुवर्षसस्यक्षेमाणि विधत्तेऽन्यग्रहारूढः सुभगांश्चित्रांश्चोपतापयति । पञ्चमे मगधान् शूद्रान् जनाननयैः स्पृशति । अत्रैवान्यग्रहारूढो व्याधिभयशस्त्र-

दुर्भिक्षावर्षाणि सृजति । विशेषतस्तु कुरुपाञ्चालशाल्वेयशूरसेनपटच्चरा-हारभूतयोऽभिपीड्यन्ते । षष्ठे बालगर्भान् बालान् शूद्रांश्च हिनस्ति । यद्यारोहेत तदा काम्बोजैः सैन्धवो नृपतिः पराजयेत आवन्त्याश्मकाधिपती चोपसृज्येते ॥

9.4 [These are the portents depending on the station of Venus in the six circles.]

९.५ अहः सर्वं यदा शुक्रो दृश्यतेऽथ महाग्रहः ।
तदाऽन्वागन्तुभिर्ग्रामा बाध्यन्ते नगराणि च ॥ इति ॥

9.5 *If the planet Venus is seen throughout the day then villages and cities get troubled by invaders.*

९.६ भाग्यार्यमानिलेन्द्राग्निप्रोष्ठपदरौद्र्याम्यतिष्यगतः स्निग्धो रश्मिवान् वर्षकरः । तत्र प्राजापत्यत्वाष्ट्रेन्द्राग्निमैत्राणामुदग्मध्यदक्षिणेन व्रजेत् क्षेमसस्यवृष्टीनां प्रकृष्टमध्यान्तफलो भवति । पित्र्याग्नेयोरुदग्मध्यगतः प्रजाहिताय । एवमेवाषाढादित्यरोहिणीषु मध्यगः पुररोधाय च ॥

9.6 *Venus sharp, with bright rays, stationed in the nine stars – Uttaraphalgunī, Pūrvaphalgunī, Svātī, Viśākhā, Pūrvābhādra, Uttarābhādrā, Ārdrā, Bharanī and Puṣya produces rain. Venus portends good, medium and low health; food crops and rainfall respectively, if it passes in the north, middle and south of Rohiṇī, Citrā, Viśākhā, Anūrādhā stars. Passage north and middle of Maghā and Kṛttikā stars is good for people. Passage in the middle of Āṣāḍha, Hasta, and Rohiṇī portends attack on cities.*

[This text of PT is quoted by Bhāskarayogī also.]

९.७ हिमकनकरजतशङ्खस्फटिकवैडूर्यमुक्तामधुघृतमण्डकुमुद-शशाङ्कच्छविस्निग्धदीप्तप्रकान्तिप्रकाशः प्रसन्नार्चिः अवनिपतिहितकरः प्रशान्तवैरो दुर्भिक्षारोगवृष्टिकरश्च । श्यावनीलरूक्षकपिलरक्तध्वस्तदीनाल्प-

लोष्टसन्निभः शस्त्रवैरव्याधिवर्षान्नक्षयकरः ॥

9.7 *Venus of the colour of snow, gold, silver, conch, crystal, beryl, pearl, honey, ghee, lily and Moon with clear rays does good to the kings.*

[Bhāskarayogī quotes the following verse attributed to Parāśara]

कूटागारनिभः स्निग्धो मार्गस्थो रजतप्रभः ।
भार्गवोऽविकृताभश्च प्रजाभावकृतः स्मृतः॥

९.८ [अद्भुतसागरे भार्गवाद्भुते । तत्र शुभसूचकभार्गवलक्षणमाह पराशरः]

हिमकनकरजतशङ्खस्फटिकवैडूर्य.. .. .. .. । .. .. .. शस्त्रवैरव्याधिवर्षान्नक्षयकरः॥

9.8 [This is same as (9.7)]

९.९ अनलमभिव्रजन् पुरविरोधाय.. .. .. ..। इन्दोर्दक्षिणतः सुवृष्टये सूर्यादुत्तरतः ॥

9.9 [This is very similar to (9.6). Additionally Venus to the south of Moon or north of Sun is said to portend good rainfall.]

९.१० [भास्करयोगिनः उत्पलपरिमलव्याख्यायाम्। अत्र पराशरोक्तो विशेषः]

कार्तिके तु यदा मासे कुरुतेऽस्तमयोदयौ।
तदाह्नां नवतिं पूर्णां भुवि देवो न वर्षति॥
वर्तमाने यदा शुक्रे कृत्तिकासु बृहस्पतिः।
उदेति तु तदा देवस्तां समां वर्षते समम्॥
अस्तोदये तु शुक्रस्य यदि चन्द्रदिवाकरौ।
आवृत्तिमार्गं कुर्वाते तदा वर्षति वासवः॥
अवर्षके भे विचरन् यदि वर्षति भार्गवः ।
वर्षकक्षगतो वर्षं षोडशार्चिर्न वर्षति ॥

9.10 [*In the commentary on BS by Bhāskarayogī. Here are Parāśara's special statements.*]

If in the month of Kārtika, Venus rises and sets then for ninety days there will be no rains. If when Venus is visible, Jupiter rises in the Kṛttikā asterism (Pleiades) in such an year rainfall will be normal. If during the set and rise of Venus, Sun and Moon are having circular motion then there will be rainfall. If it rains when Venus is seen in non-rainy season, then combined with the rainy star Full Venus produces no rains.

[Venus is also known as *ṣoḍaśarci* that is one with sixteen lights. This nomenclature refers to the variation in the brightness of the planet due to its phases, like with Moon.]

९.११ [षोडशार्चिरिति संपूर्णरश्मिरपि न वर्षतीत्यर्थः। अथास्य वीथीमार्गनिर्णयः पराशरेण त्वस्य वीथयो न कथिताः । सामान्यग्रहवीथय एवास्य वीथय इति तत्सुरसः । ताश्च मार्गनिर्णये लिखिष्यामः । वीथीफलानितो लिख्यन्ते तद्यथा]

9.11 [*Ballālasena: Here Ṣoḍaśārci means even if Venus is Full there will be no rainfall. Parāśara has not said about the lanes of Venus. The common lanes of planets are valid here also. They will be described later. Here the results of Venus in the different lanes are written*]

९.१२ तत्र नागवीथिगतो नागाजमाश्रितांश्च पीडयति । गजकुलानि गज-वीथ्याम् एरावत्यां नृपतिबलविरोधः । आर्षभ्यां वयोवित्तज्ञानबलाधिकशस्य-पीडा श्लेष्मव्याधिप्रादुर्भावश्च । गोवीथ्यां शस्यगोमतां हानिः । जरद्गववीथ्यां शास्त्रविदाम्। मृगवीथ्यां मृगव्याधिः शस्यतपस्विनां पित्तरोगोद्भवश्च । अजायां शस्यवर्षब्रह्मचारिणामाधिक्यम् । दहनवीथ्यां सस्यविलयनमग्नि-पित्तव्याधिसम्भवश्च । दीप्तिमदृक्षमपि चरन् सुभिक्षक्षेमाय निष्प्रभं विपरीतः ॥

9.12 [This is similar to (9.2) with some differences. In (9.11)

Ballālasena says that Parāśara has not mentioned the lanes of Venus. But Utpala's commentary has this text as in (9.1) above.]

९.१३ आद्यरोहितदारुणवैरोचनोर्ध्वदण्डतीक्ष्णानि षण्मण्डलानि ।.. .. ..आद्यमेव मण्डलं .. .. ..वैश्वानरमृते श्रवणात् । वातमार्गगोऽतिरूक्षो वातरिक्ताम्भोदाशनिदः । व्यालेन विषाग्निचौरप्राबल्यम् वैश्वानरेण तीव्रवर्णनिग्रहकर्त्ता च ॥

9.13 [This is Similar to (9.3) and (9.4)]

९.१४ [अथास्यायनक्रमेण पञ्चमार्गानाह पराशरः । तद्यथा ।]

9.14 [*Ballālasena: Based on the lateral movement of Venus Parāśara has described five paths, as follows:]*

९.१५ प्राक्प्रतीच्योः उदयास्तमयात् उदञ्चध्यदक्षिणाः त्रयो मार्गाः तेषां दक्षिणोत्तरमध्यमोत्तरमध्यममध्यमदक्षिणा गत्यन्तरालदेशं पञ्चधा विभज्य पञ्चमार्गाः कल्पनीयाः ॥

9.15 *In the east and in the west from the rise and setting three paths namely north, central and south exist for Venus. The inbetween space of these three has to be divided as north-central and south-central to get five paths for Venus.*

९.१६ प्रागस्तमित उत्तरोत्तरमध्यममध्यमानुत्तरदक्षिणेषु मार्गेषु पञ्चपञ्चाशत् षष्टिपञ्चसप्तत्येकाशीतिनवतिभिर्दिवसैः पश्चाद्दर्शनमुपैति । प्रतीच्यां अस्तमितः षडष्टद्वादशपञ्चदशचतुर्विंशतिभिरहोभिः प्रागुदयते । प्रागुदितो नवभिर्मासैः एकविंशति नक्षत्राणि चरति । प्रतीच्यां अष्टाभिरेकोनविंशति नक्षत्राण्याप्तः शुभाशुभफलः ॥

9.16 *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.

[The visibility numbers for Venus are not stated in the commentary by Utpala. This may be because Varāhamihira did not refer to Parāśara in BS chapter on *Śukracāra*. However AS has this important text which somehow has remained unknown. It is but natural Venus should have attracted the attention of sky watchers in ancient India. PT text as it has come down represents three different models to describe the movement of Venus. In PT (9.1) nine paths are described for Venus with specific names. For Jupiter only three paths were given as Central, North and South. These were found insufficient to explain the position of Venus and hence (9.1) recommends dividing the above three into nine lanes. Venus can be seen early morning before Sunrise and in the evening after Sunset. If observed over a long period the spatial positions seem to make a closed figure which looks like an extended flat region in the east and also in the west. To model this (9.2) locates Venus in six *maṇḍalas* in the background of fixed stars. After the above two efforts comes the most important one in (9.15) to divide the original three lanes into five paths in the east when the planet rises and five paths in the west when it sets. This statement preserved in the AS is clear that it is the same object seen in the east and also in the west. Ballālasena explains this as accounting for the lateral movement which is due to change in declination and increase and decrease in the elongation from Sun. This development would have happened over a long observation period as the visibility statement separately for east and west and the related numbers in (9.16) clearly demonstrate.

As per PT the visibility of Venus in 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 average. Thus, the Venus cycle according to Parāśara is of 591 days. As per modern astronomy, it is known that Venus as morning star is seen for some 263 days and afterwards it remains invisible for nearly 50 days. Then it rises in the west to be seen for another 263 days and to be invisible for about 8 days before rising in the east. The average synodic period of Venus is 584 days (solar). Since in ancient India counting in terms of *tithi* was common PT might have reported Venus numbers in terms of *tithis*. In such a case 591 *tithis* are actually equal to 582 (solar) days which is a very accurate number. The visibility of a planet depends sensitively on several parameters and hence the synodic period as derived from PT, even if it were to be 591 days, is a remarkable observational result. This may not be so surprising if we recognize that for Mercury, which is more difficult to watch, the numbers of Parāśara are very realistic. The mention of five paths after the trials with nine and six would have been possible only after an observational exercise. Venus after five rounds that is after eight years comes back to nearly the same position in the sky. For example, starting with a particular constellation early in the morning after each period of 584 days it will be seen in the eastern sky with its position shifting to form a five cornered pentagram as pictured over a period of eight years. The five paths and the five sets of invisibility numbers mentioned in PT quite clearly refer to this fivefold pattern. The East and West invisibility numbers depend not only on the latitude but also on the critical altitude above the local horizon at which the observations were possible. This of course is not available to us. Hence the two sets of five invisibility numbers can only be verified for their admissibility as being realistic naked eye observation results spread over a period of time of at least eight years. This has been verified for Kurukṣetra, as in the case of Mercury, using the PLVS software. With a critical altitude of 2^0 the invisibility of Venus after setting in the West produces a sequence of numbers (7, 21, 15, 9, 18) which repeat with minor fluctuations of one day on either side.

Similarly the other set of invisibility numbers are on average (82, 65, 76, 71, 75). If the PT observations are taken to have been done at slightly higher latitude the above figures would vary by a few more days. In any case this demonstrates that the PT statements have to be accepted as realistic observational results.]

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॥ शनैश्चरचारः॥ Movement of Saturn

१०.१ [उत्पलविवृतौ]

आग्नेये प्रविचरन् अग्निस्थूलशूरसेनाहिताग्निलोहकारधातुकाराङ्गनाशौण्डिकानि उपजीविन उपतापयति । प्राजापत्ये मद्रकपाञ्चालकाशिकोशल-अङ्गशाकटिकाकन्यकाश्चोपतप्यन्ते । सौम्ये यजमानयाजकार्यजनमध्यदेश-वत्सजनपदाः । रौद्रे पारतरमठतैलिकरजकदस्यवः। आदित्ये सुराष्ट्रसिन्धुसौवीरपञ्चनदप्रत्यन्ता विधवाश्च। पुष्ये पुष्यमानकघाण्टिकघौषिकपोत-यात्रिकयवनवणिग्दूताः । आश्लेषासु सर्पाः सलिलजाश्च। मघासु शूलिकबाह्लिकतैलिकगान्धारवैद्यपारददरदशिल्पिकोष्ठागाराणि। भाग्ये रसविक्रयिपण्यस्त्रीकन्यामहाराष्ट्राः। आर्यम्णे नृपनृपपत्नी-सुततिललवणगुडभिक्षुककूपकूर्चधरतक्षशिलादर्शनिवासिनः । हस्ते हस्तिहस्तिग्राहकस्तेनभिषग्रजकसूचिकनापितमालाकारबन्धकीकोशलाः । त्वाष्ट्रे प्रमदालेखकचित्रकरचित्रभाण्डानि । स्वातौ दूतचरसूतमागधप्लवक-नटनर्तकगायकवादकपोतयात्रिकाः । ऐन्द्राग्ने त्रैगर्तचीनकौलूतलाक्षाकुङ्कुम-कुसुम्भमाञ्जिष्ठपीतकुसुमसस्यानि विग्रहकामाश्च । अनुराधासु खसतङ्गण-कुलूतकाश्मीरचक्रचरमन्त्रिघाण्टिकाः । अस्मिन् मित्रभेदं च विन्द्यात् ॥

ऐन्द्रे जातिगणकुलश्रेणीश्रेष्ठनृपनृपतिसत्कृतपुरोहितान् । मूले काशिकोशल-पाञ्चालमूलफलौषधियोधान् । पूर्वाषाढासु अङ्गमगधवङ्गपुण्ड्रकौशल-

मिथिलागिरिव्रजताम्रलिप्तिनिवासिनः। उत्तराषाढास्ववन्तिशबरकुन्तिभोज-दाशार्णेयपारियात्रिकान्। वैष्णवे अग्निदेशकलिङ्गेशविद्वद्विप्राश्रमभिषग्रा-जाधिकृतपुरोहितान् । श्रविष्ठासु मगधाधिपतिविजयाय विविधवसुनिचयाय तदधिकृतानामर्थेशांश्च पीडयति । शतभिषजि भिषञ्चद्यसुरासवक्रयविक्रय-वनितोपजीविदस्युपाखण्डिनिवासिनः । प्राक्प्रोष्ठपदायां द्रविडकर्णाटवर्ति-चोलपाण्ड्यसिंहलमहेन्द्रनगरनिवासिनः। उत्तरभाद्रपदायां स्त्रीहिरण्यनिचय-तक्षकशमीधान्यनददीपान् युग्यकरान् । रेवत्यां शरत्सस्यराजभृतशबरवन-वासिक्रौञ्चद्वीपनिवासिनः।अश्विन्यामश्वारोहाश्वपालवैद्यामात्यकविनायकान्। भरणीषु वादकगायकनर्तकक्षुद्रनैकृतिकान् पीडयति ॥

10.1 [This describes the beneficial and ill effects of Saturn's station among the 27 stars on people of different professions and in different regions. The list starts with star *Kṛttikā* and ends with *Bharaṇī*. The geographical regions affected by the portents are mentioned in several places of PT. However not all of them are uniform in the place names. For example, here Draviḍa, Karṇāṭa, Cola, Pāṇḍya are mentioned together indicating their mutual closeness and also their southern location. However in other places Draviḍa is clubbed with regions in present day Gujarat and Rajasthan.]

१०.२ कृत्तिकासु शनैश्चारी विशाखासु बृहस्पतिः।
तिष्ठेद्यदा तदा घोरः प्रजानामनयो भवेत् ॥
एकं नक्षत्रमासाद्य दृश्यते युगपद्यदि ।
अन्योन्यभेदं जानीयात्तदा पुरनिवासिनाम् ॥

10.2 *If Saturn is stationed in Kṛttikā and Jupiter is in Viśākhā there will be a major disturbance among people. If the above two planets are seen in the same star it indicates differences among people in the cities.*

१०.३ अथ वर्णस्वरूपमाह –

नीलपीतः क्षुधे । रक्तभस्मचित्रवर्णः शस्त्रवैरकरोऽण्डजाभिहन्ता । यद्वर्णः तद्वर्णविनाशी भवति ॥

पाण्डुः स्निग्धोऽमलः श्यामो विस्तृतार्चिः शनैश्चरः ।
मार्गस्थश्च प्रसव्यश्च नक्षत्राब्धित इष्यते ॥ इति ॥

10.3 [These are portents based on the colour of Saturn. The last verse above is quoted by Bhāskarayogī also.]

१०.४ [अद्भुतसागरे शनैश्चराद्भुते । तत्र शुभसूचकशनैश्चरलक्षणमाह पराशरः]

पाण्डुः स्निग्धोऽमलः..... ..... शस्त्रवैरदोऽण्डजनिहन्ता इति ।

10.4 [This is same as (10.3) but in a slightly different order.]

१०.५ [मार्गस्थश्चापि सव्यश्चेति । उत्तरमार्गस्थ इत्यर्थः]

10.5 [*Ballālasena: mārgastha means placed in the north of the concerned star.*]

१०.६ अश्विन्यां अश्वारोहाश्वपाल.....रेवत्यां शरच्छस्य.....वासिनः ॥

10.6 [This is same as (10.1) starting with *Aśvinī* instead of *Kṛttikā*]

१०.७ [अथ मार्गफलम् । पराशरस्तु]

सममन्यैर्मार्गफलमन्यत्रार्द्रासावित्रश्रवणयाम्यानिलभाग्येभ्यः ।

१०.८ तस्याष्टाविंशतिवार्षिकः सप्तविंशतिनक्षत्रचारः । त्रिमार्गस्तत्र ।

प्रवासक्रमात् सप्तविंशतित्रिंशदधिकोना चाह्नामन्यथा त्वहितः ॥

10.8 *Saturn's movement among 27 stars takes 28 years. Three paths are prescribed there. The invisibility is for twenty seven to thirty days. It may be more or less by one day.*

१०.९ [प्रवासोऽस्तमयः । तत्समयोऽह्नां त्रिंशत् । अधिकोना एकेनाधिका ऊना वेति]

10.9 [*Ballālasena: pravāsa means setting. This is usually for 30 days. It may increase or decrease by one day.*]

11

॥ केतुचारः॥

On Comets

[बृहत्संहितायाः केतुचाराध्यायोऽपि भट्टोत्पलेन विवृतः । तद्विवृतौ पराशरतन्त्रवाक्यानि बहूनि वर्तन्ते । तथापि पराशरवराहाभ्यां कथितकेतूनां आनुपूर्व्यां प्रभूततरभेदः दृश्यते । वराहेण पराशरतन्त्रे विद्यमानवार्षिकसंख्याः कुत्रापि न उद्धृताः । प्रायः अनेनैव कारणेन उत्पलविवृतौ केतूनां आनुपूर्वी दोषपूर्णा संवृत्ता। दिष्ट्या बल्लालसेनेन यल्लिखितं तत्साधु दोषरहितं च इति प्रतिभाति । अतः अत्र पराशरतन्त्रस्य केतुचारः अद्भुतसागर-ग्रन्थस्थः प्रस्तूयते ॥]

[Utpala has commented on Ketucāra in the *Bṛhatsamhitā*. This commentary has many statements due to Parāśara. Even then there is considerable difference in the sequencing of the comets as said by Parāśara and Varāhamihira. Varāha nowhere refers to the year number mentioned in the *Parāśaratantra*. Due to this reason in the commentary, the comet sequencing has become inconsistent. Fortunately, the list provided by Ballālasena in the AS reads consistent and realistic.]

११.१ [अद्भुतसागरे । तत्र शुभसूचककेतुलक्षणमाह पराशरः]

स्निग्धः प्रसन्नो विमलः प्रदक्षिणगतिस्तथा ।
दृश्यते येषु देशेषु शिवं तेषां विनिर्दिशेत् ॥

11.1 [*In AS: Signs of a comet portending good results as per Parāśara*]

In such countries where a comet is seen to be tender (lovely) clear, pleasant and moving clockwise; one should indicate beneficial effects.

११.२ [अथैकादशजातय एकोत्तरशतकेतवो भवन्तीति पराशरादीनां मतम् । तथा च पराशरः]

11.2 [*Ballālasena: In the opinion of Parāśara and others there are 11 classes making a total of 101 comets.*]

११.३ शतमेकोत्तरं केतूनां भवति तेषां षोडश मृत्युनिःश्वासजाः। द्वादशादित्यसम्भवाः। (एका)दश दक्षयज्ञविलयने रुद्रक्रोधजाः। षट् पैतामहाः। पञ्चदश क्रुद्धोद्दालकसुताः। पञ्च प्रजापतेर्हासजाः। सप्तदश मारीचिकश्यपललाटजाः। त्रयो विभावसुजाः। चतुर्दश मथ्यमाने समुद्रे सोमेन सह संभूताः। धूमोद्भव एकः। एकस्तु ब्रह्मकोपजः इति॥ एभ्यः षड्विंशतिरुदयैः फलमावेदयन्ति। तन्नामतो रूपतः फलतस्तत्कालतो अभिधास्यामः॥

11.3 *There are 101 comets. Among them 16 are born out of the exhaling of Mṛtyu, 12 are from Āditya, 11 are due to anger of Rudra, 6 are out of Pitāmaha, 15 are children of angry Uddālaka, 5 are from the laughter of Prajāpati, 17 are from the forehead of Mārīci Kaśyapa, 3 are from Vibhāvasu, 14 are coeval with Moon when the ocean was churned. One is born of Dhūma and one is from the anger of Brahma. From the rising of twenty-six of these results are expressed. We shall describe them by their name, form, effect and time.*

[This describes the eleven classes and their membership. The numbers associated with *Āditya* and *Rudra* are interesting since these are in harmony with the Vedic tradition of *12-āditya* and 11-*rudra*. The printed texts show the word *daśa* for the *Rudra* group. This could be a scribal error, since traditionally *Rudrā*

are counted to be eleven in number. Utpala's text reads very similar except it counts 10 comets due to *Rudra* but 7 due to *Pitāmaha*. All texts mention specifically that only 26 of these were observed. Bhāskarayogi quotes PT as: *ekādhikam ketuśatamiti*]

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

11.4 *Therein rise three related to Death. Vasāketu, Asthiketu (and) Śastraketu rise one after another. There Vasāketu elapsing 130 years in the era of Floods, thick and big, with its crown bent towards north having risen in the west, causes immediate destruction. Harsh Asthiketu has same invisibility period and causes famine. Śastraketu rising sharply in the east results in destruction of weapon handling kings.*

[The alternate reading for *samplaveṣu* is *samplave yuge*. This would mean *in the Era of the Floods*. The text of Utpala reads *bhārgavāḥ* in place of *mārtyavāḥ*. Further the second sentence reads *ekaikaśaḥ vasā-asthi-śastra-ketavaḥ*, which is a better reading. *Asthiketu* (Bone-comet) and *Vasāketu* (Marrow-comet) are said to have the same period. Here the technical words *proṣya* and *pravāsa* are to be noted. These refer to the celestial object becoming invisible for a period. In understanding PT in some places statements of Vṛddhagarga as quoted in AS are helpful. Firstly, he names the sixteen comets of the *Mṛtyu* group as

दरस्तब्धः श्रमो मोहः श्यावः शरोऽत्ययस्तथा ।
पराशरस्तमो वृष्टिः शोषणोऽतिप्रभञ्जकः॥
अस्थिकेतुः वसाकेतुः शस्त्रकेतुरदर्शनः।
एते निःश्वासजा मृत्योः नामतः परिकीर्तिताः॥

The seventh comet in the above list is called Parāśara. Even if Vṛddhagarga named the first sixteen comets artificially one of them being *Parāśara* indicates he should have been later than Parāśara the author of PT. Vṛddhagarga clearly states

मृत्युनिःश्वासजा ये ते पूर्वमेवानुकीर्तिताः ।
तेषां दृश्यास्त्रयः प्रोक्ता विज्ञेया नभसि स्थिताः ॥
तेषां त्रयाणां एकैकं त्रिंशद्वर्षशते गते ।
केतूनामुदयो व्योम्नि दृश्यते तु गभस्तिमान् ॥
प्रथमस्तु वसाकेतुः अस्थिकेतुरनन्तरम् ।
शस्त्रकेतुरिति ख्यातः तृतीयो ज्ञानकोविदैः ॥

This means the first three comets of PT have to be taken sequentially one after another at intervals of 130 years. Varāhamihira writes about the same comets, borrowed from the same source, but never refers to the year number and the Flood. The word denoting the year number needs attention. The year number of *Vasāketu* is stated as *trimśat-varṣa-śatam*. In current Sanskrit use, this would be taken to mean 3000 years. This is how Dikshit and Bhat have translated such number words[1,2]. However, ancient evidence indicates the meaning to be different. This is seen in the explanation offered for a similar compound word. Utpala and Ballālasena quote Garga about *Viśvarūpā,* which are celestial objects causing fire. Garga describes them as:

तेऽग्निपुत्रा ग्रहा ज्ञेया लोकेऽग्निभयवेदिनः।
विंशद्ग्रहशतं घोरं विश्वरूपेति नामतः॥

The count is here given as *vimśat-graha-śatam.* Ballāḷasena explains this as: *vimśatyadhikham śatam ityarthaḥ.*

1 S.B.Dikshit, *Bhāratīya Jyotiṣa Śāstra* (Vol.II) Govt. of India Press, Calcutta 1969.

2 M.R.Bhat, *Bṛhatsamhitā of Varāhamihira* (English Transl.) Motilal Banarsidas, N.Delhi, 1981.

Varāhamihira in *BS (11.23)* and Utpala in his commentary on the above verse give the number of *Viśvarūpā* as 120 without ambiguity. Thus, in ancient India, twenty-above-hundred (not twenty-times-hundred) was the accepted meaning of the above number word. Hence *trimśat-varṣa-śatam* should be taken to mean 130 years. The first named comet *Vasāketu* is said to have appeared being away for 130 years in the era of Floods. There is some ambiguity about whether this has to be treated as a second appearance of the comet after 130 years during the Floods or 130 years are to be counted from the year of the Flood. Similarly, *Asthiketu* is said to have the same *pravāsakāla* or period of invisibility. This would mean that *Asthiketu* was visible after 130 years from the setting of *Vasāketu*. As per Vṛddhagarga the third comet was seen after another 130 years.]

११.५ तत्र कुमुदकेतुः वसादिकेतुचारसमाप्तौ वारुण्यां दर्शनमुपैति। गोक्षीरविमलस्निग्धप्रभां पूर्वेणाभिनतां शिखां कृत्वैकरात्रं चरन् स दृष्ट एव सुभिक्षमुत्पादयति दशवर्षाणि प्रजानामविरोधम्। प्रतीच्यां च मुखरोगावरोधकप्रतिश्यायपाण्डुरोगज्वरैः प्रजां बाधते इति॥

11.5 *There Kumudaketu is seen in the west at the end of the transit of Vasā and other comets.It is seen for one night like a bright spray of cow's milk, with its head bent eastwards. This causes good food production and friendly relation among people for a period of ten years. In the western region it causes various diseases to the people.*

[*Kumuda* refers to the flower night-lily. No year number is available for this comet other than the mention that it raises at the end of the visibility of the previous three comets. Vṛddhagarga refers to *Kumuda* almost in the same way, with its visibility limited to just one night. Utpala's text of Parāśara is same. But before stating *kumudaketu* the following list of names is given:

atha amṛtajāḥ kumudo maṇiḥ| jalodbhavaḥ padmaḥ| āvartaḥ|

ūrmiḥ| śankhaḥ| himaḥ| raktaḥ| kukṣiḥ| kāmaḥ visarpiṇaḥ| śītaśceti||

Some of these objects appear later in the PT.]

११.६ आदित्यजानां कपालकेतुरुदयते। अमावास्यायां पूर्वस्यां दिशि सधूमार्चिःशिखो नभोविषयार्धे चरन् दृश्यते। पञ्चविंशतिवर्षशतं प्रोष्य त्रींश्च पक्षानमृतजस्य कुमुदकेतोश्चारान्ते स दृष्ट एव दुर्भिक्षानावृष्टिव्याधि-भयमृत्यूपद्रवान् जनयति । यावतो मासान् (दिवसान्) दृश्यते तावतो मासान् मासैर्वत्सरान् सप्तपञ्चप्रस्थं च शारदधान्यस्यार्धं कृत्वा प्रजानामर्धमुपयुङ्क्ते॥

11.6 *Kapālaketu among the offspring of Ādityas, rises in the east. It is seen on a New Moon evening with a smoky flaming crown, moving in the center of the sky. Seen 125 years and three fortnights after Kumudaketu, it generates drought, famine, disease and fear of death. For months equal to days and years equal to the months of visibility, it reduces the autumn grain yield by half and also uses away (destroys) half the population.*

[Utpala's text is same including the year number which Varāhamihira does not state in his text. Utpala's commentary has *divasān*, shown above in parenthesis instead of *māsān*. Vṛddhagarga's description of the rise of this comet is

ततः कुमुदकेतोस्तु व्यतीतेऽमलदर्शने।
द्वादशादित्यसंभूतः केतुरन्यः प्रदृश्यते ॥
एकादश तु ये प्रोक्ताः द्वादशादित्यसंभवाः ।
तेषामप्युत्तरः केतुः सधूमार्चिः प्रदृश्यते ॥
पञ्चभिः पञ्चदशभिः वर्षाणां पञ्चभिः शतैः ।
पुरस्तात् त्रिषु पक्षेषु गतेषु प्रतिदृश्यते ॥
निर्घातपांसुवर्षाद्यैः पूर्वरूपैः सुदारुणैः ।
कपालकेतुरूपेण कालो दर्शयते दिवि ॥

The year number is stated additively, in the third verse above, as *five then fifteen and further hundred and five* that adds to 125 years.]

११.७ मणिकेतुरपि कपालकेतोश्चारावसाने प्रतीच्यामुदयन्नुपतापयति। प्रसूक्ष्मो अरुन्धतीतारकमात्रः क्षीरप्रतीकाशया पूर्वाभिनतया स्तब्धया स्निग्धया शिखया शर्वर्यामेकमदृश्यः। स उदयात्प्रभृति अर्धपञ्चमान् मासान् क्षेमसुभिक्षमुत्पादयति । क्षुद्रजन्तुप्रादुर्भावं करोत्यतिमात्रकालदृष्टः इति॥

11.7 *At the end of Kapālaketu's transit, Maṇiketu is seen in the west for a night, subtle like the star Arundhatī (Alcor in U.Major), with its milky white oily and stationary crown bent towards east. Starting from its rise, for a period of four-and-half months it produces good health and abundant food for people. If seen for a longer period it increases generation of inferior life forms (insects and worms).*

[Vṛddhagarga describes this comet in the same way.

अस्य च प्रतिषेधार्थं कपालस्योपहिंसतः ।
केतुर्मणिशिखः श्रीमान् पश्चिमेनोदयिष्यति ॥
यातेषु त्रिषु यामेषु दर्शयत्यनिमित्ततः ।
अरुन्धतीसमश्चापि सूक्ष्मत्वात् रूपतः स्मृतः ॥

No time interval is mentioned for this comet called *Maṇi* meaning Crystal. Its crown was bent eastwards and was seen in the west for a few nights. Again, this is said to have appeared at the end of the visibility of *Kapālaketu* seen in the eastern sky. It is likely the two were same seen first in the east and later after a few months in the western sky.]

११.८ अथ दक्षयज्ञे रुद्रक्रोधोद्भवः कलिकेतुः त्रीणि वर्षशतानि नवमासान् प्रोष्योदयते । पूर्वेण वैश्वानरपथे अमृतजस्य मणिकेतोश्चारान्ते

श्यावरूक्षताम्रारुणां शूलाग्रकारसदृशीं शिखां कृत्वा नभसस्त्रिभागचारी शस्त्रभयरोगदुर्भिक्षानावृष्टिमरकैर्विद्रावयन् दिशान्ते दृश्यते । यावन्मासान् दृश्यते तावद्वर्षाणि त्रिभागशेषां प्रजां कृत्वा अर्घं च शारदधान्यस्याष्टाढकं व्रजति इति॥

11.8 *Kaliketu, born out of Rudra's anger during the sacrifice of Dakṣa, rises after 300 years and 9 months. From the east, in the Vaiśvānara path, with a harsh copper-red colour head like the tip of a trident, it travels one-third (or three parts) of the sky to be seen at the horizon. For years, equal to the number of months seen, the comet having reduced the population to one-third, leaves the autumn grain yield to be worth eight measures.*

[Vṛddhagarga describes this comet in great detail. A part of the description is:

अष्टादशेषु पक्षेषु शतैश्चान्यैस्त्रिभिर्गतः ।
वर्षाणां दारुणाकारः कलिकेतुः प्रदृश्यते ॥
ज्येष्ठामूलानुराधासु या वीथी संप्रकीर्तिता ।
तां वीथीं समुपारुह्य केतुः सङ्क्रीडते भृशम् ॥
दक्षिणाभिनतां कृत्वा शिखां घोरां भयङ्करीम् ।
शूलाग्रसदृशीं तीक्ष्णां श्यावताम्रारुणप्रभाम् ॥
पूर्वेणोदयते चैव नक्षत्राण्युपधूपयन् ।
त्रिभागं नभसो गत्वा ततो गच्छत्यदर्शनम् ॥

This states that the comet rises from the east stationed in the region of stars *Jyeṣṭhā, Mūla and Anurādhā.* This corresponds to the constellations Scorpio and Sagittarius when they rise early in the morning. The comet has its head bent to the south, dreadful like a spear, dark coppery red in colour. It masks the *nakṣatras* and sets after traveling one-third of the sky.]

११.९ अथ पैतामहः चलकेतुः। पञ्चदशवर्षशतं प्रोष्योदितः

पश्चिमेनांगुलिपर्वमात्रां शिखां दक्षिणाभिनतां कृत्वा कलिकेतोश्चारान्ते नभस्त्रिभागमनुचरन् यथा यथा चोत्तरेण व्रजति तथा तथा शूलाग्रकारां शिखां दर्शयन् ब्राह्मनक्षत्रमुपसृज्यात्मना ध्रुवं ब्रह्मराशिं सप्तर्षीन् स्पृशन् नभसः अर्धमात्रं दक्षिणमनुक्रम्यास्तं व्रजति। यः स्ववर्गे दारुणकर्मा स्ववर्गप्राप्तत्वादेवं कृत्स्नमभिहिनस्ति । लोकमपि वा भूमिं कंपयित्वा दशमासान् मध्यदेशे भूयिष्ठं जनपदमवशेषं कुरुते । अन्येष्वपि च क्वचिच्छत्रुदुर्भिक्षव्याधिमरकभयैः क्लिश्नात्यष्टादशमासान् इति ॥

11.9 *Then (appears) Calaketu related to Pitāmaha. Having risen 115 years after Kaliketu in the west, with a crown of the size of a finger joint, bent southwards, following one-third of the sky, as it travels north exhibiting a head like the tip of a trident, it moves close to the star of Brahma (Abhijit), touches Dhruva (Pole Star), Brahmarāśi, Saptaṛṣi (U.Major) and returns half the sky to set in the south. It does horrible deeds in the sky, shakes the universe and the earth for a period of ten months and destroys a populous province in madhya-deśa (Central country). It troubles other places also for 18 months by occasional fear of enemies, drought, disease and death.*

[The text of Utpala is almost same except *jalaketoścārānte* appears in place of *kaliketoścarānte*. This is an error as PT is clear that *Jalaketu* appeared after *Calaketu*. *Kaliketu* and *Calaketu* are described as producing ill effects on earth. The word *Kali* may imply *difficulty or evil*, as in the word *Kali-yuga*. *Calaketu* means Moving-comet. Aptly its movement to north and then sudden turn southwards before setting is described. This is one among the few cases where our ancients have left records on the transit of the comet with respect to stars. The extent of both the comets is described by the word *nabhas-tri-bhāga*. This would mean one-third of the visible sky, approximately 60^0 in extent. The comet trail should have been spectacularly long. Calaketu is said to have risen in the west, that is after Sun set. We may speculate that this could have been so because of the nearness of the comet to Sun and consequent

invisibility in daylight. This implies Calaketu would have traversed between Sun and Earth. Among the background stars mentioned, *Saptarsi* refers to U.Major, without much confusion. *Dhruva* cannot be taken as α-U.Minor, since before *c*1500 BCE the pole star was α-Draconis (Thuban). After this period till about 500 BCE there was no recognizable pole star. Mention of both *Brāhma-nakṣatram* and *Brhama-rāśi* brings in difficulties in interpretation. From the context, these should be indicating two different stations of the comet. *Brahmarāśi* most probably refers to constellation Lyra. Presently, following medieval Indian Astronomy, *Abhijit* is identified with star Vega which is far north of the ecliptic. But, in more ancient times, perhaps *Abhijit* was recognized to have been near the ecliptic, between stars *Uttarāṣāḍhā and Śravaṇa.* Mahābhārata metaphorically records the vanishing of *Abhijit* from the sky. *Madhyadeśa*, means middle country with its boundaries changing over time. As per Varāhamihira this includes Prayāga (Allahabad), Avanti, Ujjayini and Puṣkara forest in present day Rajasthan. In the north this region was up to the River Devikā. What constituted the middle-land before Varāha's time? Bharadwaj identifies the *Madhyadeśa* of Vedic times to have been between Rivers Sarasvatī and Dṛṣadvatī, including Kurukṣetra[3]. This matches with the description of *madhyadeśa* as per PT (13.2) given in a later section on astral-geography.

The description of *Calaketu* by Vṛddhagarga is more explicit.

पश्चिमेनाङ्गुलीमात्रां शिखां परमदारुणाम् ।
दक्षिणाभिनतां कृत्वा चलकेतुः प्रदृश्यते॥
यथायथा दर्शयति त्रिभागं नभसश्चरन् ।
तथातथा शिखा चास्य सुदीर्घाऽत्युपजायते ॥

3 O.P.Bharadwaj, *Studies in the Historical Geography of Ancient India.* Sundeep Prakashan, Delhi, 1986

सुदीर्घां शूलसदृशीं शिखां कृत्वा सुदारुणाम्।
धूपयेदथ नक्षत्रं ब्राह्मं पैतामहं शिखी ॥
धूपयेदथ नक्षत्रमेकं द्वे त्रीणि वा पुनः ।
स ब्रह्महृदयं स्पृष्ट्वा ध्रुवं सप्तर्षिभिः सह॥
दिशं वैश्रवणाक्रान्तमेवं विपरिवर्त्तते ।
स चार्धमेव नभसः परिक्रम्य प्रदक्षिणम् ॥
सप्तर्षिभिः प्रतिहतस्तथोऽस्तमुपगच्छति ।
स्ववर्गे दारुणं कर्म कुरुते स महाग्रहः ॥

The comet is stated to be starting from west and proceeding along stars *Brāhmam* (near Vega), *Brahma-hṛdayam* (Aurige), *Dhruva* the Polestar and then *Saptarṣi* or U.Major to turn south before setting.]

११.१० अथ जलकेतुः पैतामहस्य चलकेतोर्नवमासावशिष्टे कर्मणि कृतं प्रवर्तयति । पश्चिमेनोदितः स्निग्धः सुजाततारः पश्चिमाभिनतशिखः स नवमासाभ्यन्तरे क्षेमसुभिक्षारोग्याणि प्रजाभ्यो धत्ते । अन्यग्रहकृतानां चाशुभानां व्याघाताय इति॥

11.10 *Jalaketu (Water-comet) having appeared when nine months of work of Calaketu is still remaining initiates Kṛta. Rising in the west with its head bent to the west, with a well-formed star it gives within nine months health and plenty of food to the people. It compensates for the bad effects of other celestial objects.*

११.११ अथ जलकेतोश्चारसमाप्तौ ऊर्म्यादयः शीतान्ता अन्ये प्रादुर्भवन्ति। ते त्रयोदशचतुर्दशाष्टादशवर्षान्तरिता दृश्यन्ते । स्निग्धाः सुभिक्षक्षेमाय विपर्ययाय विपरीताः। क्षुद्रजन्तूनां वधाय च इति॥

11.11 *Comets Ūrmī and others ending with Śīta appear at intervals of 13, 14 and 18 years. If they are pleasant they produce good effects, otherwise*

the opposite (effects are indicated). They destroy inferior life forms.

[Eight out of the twenty-six comets of Parasara are covered in the above paragraph. The word *Kṛta*, here means good period in contrast with the word *Kali*. Utpala also quotes *PT* giving the names of comets between *Ūrmi* and *Śīta* already stated above under (11.5). No year number is given for *Jalaketu* and *Bhavaketu*. But indirectly the eight comets starting with *Ūrmi* account for an interval of nearly 120 years between the above two comets. Vṛddhagarga includes the comet *Śankha* eighteen and half years after *Kaliketu*. About *Ūrmiketu* he says it seen on the seventh part of Moon as a dark object like *Rāhu* for seven nights.]

११.१२ तेषामष्टानां कर्मण्यतीते भवकेतुर्दृश्यते पूर्वेणैकरात्रम् । या कृत्तिकानामुत्तरतारा तत्प्रमाणया स्निग्धया प्रभया सिंहलांगूलसंस्थानया प्रदक्षिणनताग्रया शिखयोदितः स यावन्मुहूर्तान् दृश्यते तावन्मासान् भवत्यतीव सुभिक्षम् । रूक्षः प्राणहराणां रोगाणां प्रादुर्भावाय च इति॥

11.12 *After the work of eight of these, Bhavaketu is seen in the east for a night. It is of the size of the north star of the Kṛttikā cluster (Pleiades) with the crown bent clockwise, like the tail of a lion. It produces plenty of food for months equal to the muhūrtas it is seen. If it looks harsh it initiates fatal diseases.*

[The description by Vṛddhagarga is very similar. Bhāskarayogi quotes PT text partly.]

११.१३ अथ उद्दालिकी श्वेतकेतुः दशोत्तरं वर्षशतं प्रोष्य भवकेतोः चारान्ते पूर्वस्यां दिशि दक्षिणाभिनतशिखो अर्धरात्राकाले दृश्यः। तेनैव सह द्वितीयः प्रजापतिसुतः पश्चिमेन कनाम ग्रहः केतुः युग(यूप)संस्थायी युगपदेव दृश्यते। तावुभौ सप्तरात्रदृश्यौ दशवर्षाणि प्रजाः पीडयतः। कः प्रजापतिपुत्रो यदा द्व्यधिकं दृश्येत तदा दारुणं प्रजानां शस्त्रकोपं कुर्यात्।

तावेव स्नेहवर्णयुक्तौ क्षेमारोग्यसुभिक्षदौ भवतः॥

11.13 *Then, Śvetaketu offspring of Uddālaka is seen, 110 years after Bhavaketu's transit, in the east at midnight, with its crown bent southwards. Along with it is seen, in the west, a comet named Ka, the second offspring of Prajāpati, staying like a yoke or a pole. Both the objects, visible for seven nights, trouble people for ten years. If Ka is seen for twice the duration (14 nights) it will cause horrible effects of weapon on people. The two turning to oily colour give good health and plentiful food.*

[Utpala's text of Parāśara is similar, except *Bhaṭaketu* appears in the place of *Bhavaketu*. In the place of *yugasamsthāyī* it has the better reading *yūpasamsthāyī*. *Śvetaketu* or White-comet is the nineteenth member in the PT list. It is said to have been seen with another comet in the west denoted by the single syllable *Ka*. *PT* describes *Ka* as *yūpa-samsthāyī*. *Yūpa* is a technical word indicating, in Vedic parlance, a column in front of the sacrificial altar. Varāhamihira describes the comet *Ka* as *yugākṛti*. The intended meaning appears to be that *Ka* looked straight like a yoke or a column. It is qualified as being both a *graha* (seizer) and a *ketu* (comet). The names of the two comets are equally intriguing. Śvetaketu the son of Uddālaka is a famous name in Vedic literature, particularly the Upaniṣads. His name appears in the Mahābhārata also as a social reformer living before the time of the Pāṇḍavas. His relation with his eponymous comet is not known. The word *kaḥ* is usually used as a pronoun meaning *who*. However in the Vedas *Kaḥ* appears as the name of a celestial deity also. This indicates the possibility of some PT comets being linked with Ṛgvedic deities. Vṛddhagarga also says the two comets *Śvetaketu* and *Ka* appear at the same time.]

११.१४ अथातः पद्मकेतुः श्वेतकेतुफलसमाप्तौ पश्चिमेनाह्लादयन्निव मृणालकुमुदाभया शिखयैकरात्रं चरन् सप्तवर्षाण्युच्छ्रितं हर्षमावहति॥

11.14 *At the end of the effects of Śvetaketu (that is after 10 years) Padmaketu rises in the west with its crown coloured like a lotus stalk. Moving one night, it brings immense happiness for a period of seven years.*

११.१५ अथ काश्यपः स्वधिकेतुः पञ्चदशवर्षशतं प्रोष्य ऐन्द्र्यां सोमसहजस्य पद्मकेतोश्चारान्ते श्यावरूक्षो नभसस्त्रिभागमाक्रम्य अपसव्यनिवृत्तो ऊर्ध्वप्रदक्षिणाकारशिखः। स यावतो मासान् दृश्यते तावन्ति वर्षाणि दुर्भिक्षमावहन्ति। मध्यदेश आर्यगणानामादानं औदीच्यैश्च भूयिष्ठां सत्रिभागशेषां प्रजामवशेषयति इति॥

11.15 *Kāśyapa Svadhiketu is seen, 115 years after the transit of Padmaketu, in star Jyeṣṭhā. It is dark and harsh occupying one-third of the sky. It recedes anti-clockwise, with a crown rotating clockwise above, like a lock of hairs. For years equal to the number of months seen, it reduces the population of the noble groups in the middle region and north to one-third.*

> [Utpala's text mentions this comet again as *śvetaketu* instead of as *svadhiketu*. This obviously is a scribal mistake in the Vārāṇasi BS edition by Dwivedi. Vṛddhagarga says that this comet rises in the star *Śravaṇa*.]

११.१६ अथावर्तकेतुः स्वधिकेतोः कर्मण्यतीते अपरस्यामर्धरात्रेण शंखोदरारुणाभया प्रदक्षिणनताग्रया शिखयोदितः स यावन्मुहूर्तान् निशि दृश्यते तावन्मासान् भवत्यतीव सुभिक्षं नित्यं यज्ञोत्सवश्च जगतः॥

11.16 *Āvartaketu rises in the latter half of the night, after the work of Svadhiketu, with a head like the trunk of a conch, bent clockwise, portending happiness to the world. For months equal to the muhūrtas seen, it produces happiness and daily celebration in the world.*

११.१७ अथ रश्मिकेतुः विभावसुजः प्रोष्य वर्षशतम् आवर्तकेतोश्चारान्ते कृत्तिकासु धूम्रशिखः श्वेतकेतोः सदृशफलः॥

11.17 *Raśmiketu born of Vibhāvasu, 100 years after Āvartaketu, appears in the star cluster Kṛttikā (Pleiades) with a smoky head. Its effects are similar to that of Śvetaketu.*

११.१८ अथ संवर्तको वर्षशतमष्टोत्तरं प्रोष्य पश्चिमेनास्तंगते सवितरि सन्ध्यायां दृश्यते । तन्वीं ताम्ररूक्षशूलाभां धूमं विमुञ्चन्तीं सुदारुणां शिखां कृत्वा नभसस्त्रिभागमाक्रम्य स यावन्मुहूर्तान् निशि तिष्ठति तावद्वर्षाणि परस्परं शस्त्रैर्घ्नन्ति पार्थिवाः। यानि नक्षत्राणि धूपायति यत्र चोदेति तानि दारुणतरं पीडयति तदाश्रितांश्च देशान् इति॥

11.18 *Samvartaka is seen, after a lapse of 108 years, in the evening after the Sun has set in the west. It occupies one-third of the sky, with a thin dreadful copper coloured spear-like head, ejecting a jet of smoke. For years equal to the muhūrtas of its stay, kings fight among themselves. Whichever star it covers with its smoke, the countries associated with those stars are troubled.*

[Utpala's text is same with *varṣa-śatam* replaced by *varṣa-sahasram*.Bhāskarayogī commenting on BS (11.51 and 11.52) quotes Parāśara

येषां नक्षत्रविषये रूक्षः सज्वाललोहितः।
दृश्यते तन्मुहूर्ते च तेषां विद्यान्महाभयम्॥

Explaining this further he says that if the comet is seen stationed in the natal star of a person it is a bad omen for the concerned individual.]

११.१९ धूमकेतोः प्रागुदयनिमित्तानि । अवनेर्विचलनं अग्नेः प्रभामान्द्यं प्रधूमनं दिशां शीतोष्णविपर्यासः अतिरूक्षवायुसम्भवश्च॥ अथ अनियतकालरूपवर्णसंस्थानो धूमकेतुः पराभविष्यतां देशानां राज्ञां जनपदानां च वृक्षपुरपर्वतवेश्मध्वजपताकाशस्त्रवर्मायुधावरणरथनागोष्ट्रपुरुषशय्या-

भाण्डेषु वा दृश्यते । स एव च दिवि स्निग्धो विमलः प्रदक्षिणजटाकारशिखः गोगजनागवीथीं चोत्तरेण व्रजन् सुभिक्षं क्षेमारोग्यं चावहति ॥

11.19 *The precursors of Dhūmaketu are, earthquake, dullness of fire, dust veils, exchange of heat and cold (seasons), and very harsh wind. Dhūmaketu having no fixed colour, shape, location and time, appears on trees, towns, mountains, houses, flags, chariots, elephants, camels, men, bedstead and vessels of the loosing countries and their kings. It portends good when it is clear, pleasant, with a clockwise shaped crown moving on the north side of Go, Gaja and Nāga paths.*

[The paths called *Go, Gaja* and *Nāga* are specific regions in the night sky defined in relation to the stars. For example the region to the north of stars *Krttikā, Bharaṇi and Svāti* is called *Nāga-vīthī* (Vide 9.1).]

११.२० [उत्पलविवृतौ भास्करयोगिनः व्याख्यायां च पराशरस्य विशेषोक्तिः]

दशैकविंशतिद्विषष्टिशतधा दर्शनमिच्छन्ति मुनयः धूमकेतोः ॥

यस्यां दिशि समुत्तिष्ठेत् तां दिशं नाभियोजयेत्।
यतः शिखा यतो धूम्रस्ततो यायान्नराधिपः॥
प्रतिलोमे तु यः केतौ जयार्थी याति पार्थिवः।
सामात्यवाहनबलः स नाशमधिगच्छति॥

[*Dhūmaketu* or the smoky-comet is the last in the list of Parāśara. Vṛddhagarga also names the last in the sequence as *Dhūmaketu.* Varāhamihira calls this *Dhruvaketu.* Utpala's text of Parāśara gives the same name. However, considering the popularity of the word *Dhūmaketu* in the sense of a comet, the text of *AS* is more acceptable. Utpala's text has an extra sentence that *Dhruvaketu* is said to be seen in 10, 21, 62 and 100 ways or forms. Bhāskarayogi's commentary also attributes

such a statement to Paraśara. It is possible Parāśara held a view that the same comet comes back in different forms at varying intervals.]

11.21 Discussion

The above celestial objects described by Parāśara are unambiguously comets. Varāhamihira in BS, has only repeated in verse form whatever Parāśara had already said about comets. He has omitted the year numbers, even if he knew them. Utpala, some four hundred years later commenting on BS, quotes PT at length including the chronology starting with the Flood, pin pointing the original source of Varāha. However, since Varāha wrote about comets in an arbitrary order, Utpala's PT text does not read in the correct sequence. For example, Utpala mentions *Kapālaketu,* which is supposed to be seen after *Kumudaketu*, in verse (11.31) of BS. But BS presents *Kumuda* after several other comets in verse (11.43). Fortunately, Ballālasena has preserved PT in the correct sequential order. Thus, while Parāśara's comet list in AS is internally consistent, BS list is not consistent. The mentioned year numbers are perhaps approximate time intervals between two sightings, expressed as elapsed time. How was Parāśara able to obtain this list? It should have been a tradition directly available to him which started its initial point with the Flood.

As discussed in the Introduction and in (3.12), the *Tantra* of Parāśara as an oral knowledge tradition should have originated around 1400 BCE. The statement about the twenty-six comets and the interval between some of them would be a chronological artifice to link the initial time of PT with the *Samplava* or the Flood. The total number of years in the list adds to about 1300 years. This dates the Flood (inundation or deluge) to before 2500-2700 BCE. These figures can easily be in error by a few centuries. The oldest evidence to the Flood appears in the *Śatapatha Brāhmaṇa*, which is later than the Ṛgveda but belongs properly to the Vedic literature. The contents of this ritualistic text have been dated to *circa* 3000 BCE based on the statement that *Kṛttikā* (Pleiades) were not moving from the east. The comet tradition preserved in PT supports this dating. Atharvaṇa Veda mentions about the breaking of a boat, which may also be an indirect

reference to the above Flood[4]. The Flood story connected with Manu's escape from the deluge and a boat being tied to a peak in the Himalayas is recounted in the Mahābhārata also, but as belonging to a bygone era[5]. Hence, the Flood of PT should be taken to have occurred several centuries before the inundation of Dvārakā, the capital city of Kṛṣṇa.

Among the various Garga related authors quoted by Utpala and Ballālasena, Vṛddhagarga stands out as being different and interesting. He recounts almost all of PT, in verse form, but with additional information based on observations. He accepts the same grouping as in PT, but lists all the sixteen comets of the *Mṛtyu* group, naming one of them as *Parāśara*. This indicates that his composition belongs to a date later than that of PT. He does not state the initial era of the observations, but mentions that *Asthiketu,* as soon as it is sighted, inundates earth with water. He adds here and there more details to the descriptions in PT. For example, the interval between *Kaliketu* and *Śankha* is given as eighteen years and six months. Similarly, *Agniketu* was seen three-and-half years after *Āvartaketu* near star *Jyeṣṭhā* (Antares) remaining visible for one-and-half months. Vṛddhagarga mentions about a comet which he calls *Gadāketu* (Mace comet).

मार्गशीर्ष्यां अमावास्यां गदाकेतुः प्रदृश्यते।
आदित्यरौद्रसार्पाणि बार्हस्पत्यं तथैव च॥
कोष्ठागारं च शिखया धूपयन्नरुणाभया।
गदानिभो गदाकेतुः हन्यात् दृश्यो नभोगतः॥

This was seen on *Mārgaśira Amāvāsya* (November-December) in the region of stars *Ārdrā* (Betelgeuse), *Punarvasu* (Pollux), *Puṣya* (Asellus), *Āśleṣā* (Minhar) and *Maghā* (Regulus) but gives no year number. Probably this was seen during his lifetime, after the close of the list of PT. The

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4 *yatra nāvaprabhramśanam yatra himavataḥ śiraḥ*|| (Atharva-veda-samhitā. XIX 39.8)

5 *tacca naubandhanam nāma śṛngam himavataḥ param*| *khyātam adyāpi kaunteya tadviddhi bharatarṣabha* || (MB Vana Parvan. 185.47)

total years as per Vṛddhagarga also add up to nearly 1300 years, but he specifically mentions thousand years as the elapsed period before the last two comets namely, *Samvartaka* and *Dhūma* were seen. The descriptions of these two are also somewhat different from that given in PT.

नक्षत्रचक्रमाकाशे यथैव परिवर्तते ।
केतुचक्रं तथैवेदमाकाशात् परिवर्तते॥
ततो वर्षसहस्रान्ते दृश्येते चोदितौ दिवि ।
केतुमालाग्रहस्यान्ते धूमसंवर्तकौ ग्रहौ॥

Like the nakṣatra-wheel repeats (rotates) in the sky, so also the comet-circle repeats itself out in the sky. At the end of 1000 years, at the end of the comet strand, two seizers (comets) Dhūma and Samvartaka appear together.

Vṛddhagarga gives in detail, the tragedy that these two bring on earth. These lead to fall of meteorites, with the ten directions becoming airless. Earthquakes occur with oceans and mountains getting disturbed. He should have been a keen observer, as he says *Dhūmaketu,* before setting, sends a jet of smoke away from Sun (*astamanakāle tu raveḥ dhūmam vimuñcati*). He seems to be wary of myths and folklore when he states 'those with ignorant eyes do not see the starry nature of this object' *(nāsya tārāmayam rūpam paśyanti ajñāna-cakṣuṣaḥ)*. He describes the other comet *Samvartaka* as the one famous for reducing the world *(samvartaka iti khyātaḥ kṣayāya jagatām iti*).

The others quoted in the *Adbhutasāgara* namely Garga, Gārgya, Gārgīya, Atharva-muni, Devala, Bhārgava and Varāhamihira have nothing original to add to the comets of Parāśara and Vṛddhagarga. They increase the total number of objects to 1000 and add new groups such as Jupiterian with 65 members, Saturnian with 60 members. Whether these objects were comets is not clear. For example, *Guru-sutāḥ* (Jupiter's offspring) are described as white stars without hair (*Vikacāh)* seen in the south. Similarly, the Venus group is a cluster of 84 white-stars called *Visarpaka*, seen in the

northeast direction. *Āṅgiras* is a form seen on Sun, like a person sitting in a chariot. This could be referring to the transit of Venus across the orb of Sun. Comet *Aruṇa* is not starry, but dark red in colour and dust like, with diffused light. *Kaṅka* is a comet shining like Moon but clustered like a clump of bamboos. None of these authors gives the era of appearance or the time interval between any two of the comets. Their main contribution lies in preserving for posterity an ancient set of celestial objects, other than *naksatra*s and planets, known as *Aruṇa, Āṅgirasa, Ka, Kaṅka, Kabandha, Kiraṇa, Viśvarūpā, Brahmadaṇḍa, Taskara, Tvaṣṭā, Triśiras, Triśikha, and Vibhāvasu.*

It is seen from the above that Parāśara and Vṛddhagarga were preoccupied with comets rather than planets. This is in contrast to later astronomers Āryabhaṭa, Varāhamihira, Brahmagupta and others who remained silent about even a few comets they must have observed in their own lifetime. We may surmise that in ancient India comets should have been observed with some care, much before the systematic observation of planets including *Rāhu*, started. The rudimentary nature of planet data given in PT supports this inference. However, the only way we can discuss this issue further is with reference to Vedic literature, which is not astronomical in the modern sense, but would have had a strong correlation with the then visible sky. Sun, Moon and *Svarbhānu* causing solar eclipses find place in the Ṛgveda (RV). Even though the name *Rāhu* is absent, quite interestingly, the word *Ketu* and its derivatives appear more than seventy times in the Ṛgveda, with conspicuous absence in the second *Maṇḍala.* All the transient celestial objects named previously, such as *Ka, Tvaṣṭā, Viśvarūpā, Triśikhā, Taskara, Āṅgirasa, Vibhāvasu* are in fact deities sung in the Vedas. The popular word for comet in Sanskrit is *Ketu* often referred as *Dhūmaketu*. Currently, this word is used in almost all Indian languages in the sense of comet. *Ketu* originally could have meant a hairy flag like object, synonymous with words such as *śikhī* and *keśī*. Amarakośa a standard reference on ancient meanings provides two meanings; namely *agni* (fire) and *utpāta* (anomalous phenomenon) for the word *dhūmaketu*. The first meaning is obtained by interpreting fire as smoke-bannered. It is obvious the latter meaning of *utpāta* refers to a comet. In what sense

the word *Dhūmaketu* could have been used in RV? Since *Fire* is only a derived meaning, the word *Dhūmaketu* appearing in some places of RV has clear comet imagery in the background[6]. Atharvaṇa Veda has a famous prayer for peace to the shaking earth hit by meteorites and to Sun, Moon, planets, *Rāhu* and death named *Dhūmaketu*[7].

The Kauśika Sūtra a ritualistic text belonging to the Atharvaṇa Veda has an interesting reference to *dhūmaketu*

अथ यत्रैतद्धूमकेतुः सप्तर्षीन् उपधूपयति तदयोगक्षेमाशङ्कमित्युक्तम् ॥
(कौ सू १२७.१)

If this dhūmaketu masks the Seven Sages (U.Major) it portends ill; it is said so. *(Kau.Sū.127.1)*

Since this is about a celestial object covering up the constellation U. Major, the *dhūmaketu* named here is a comet. Moreover, there is stress on the word *this* (*etat*) meaning perhaps this was an observation of a real comet recalling the memory of an ancient event such as the appearance of *Calaketu* which touched U.Major and also caused distress on earth.

Still more detailed reference to the planets, comets and their worship is available in *Atharva-veda-pariśista* (AVP), which is an appendix to the Atharvaṇa Veda. It is a guidebook for Vedic religious observances which were perhaps popular in the centuries before the beginning of CE. It includes topics like earthquakes, eclipses and comets, the purported ill effects of which were to be mitigated through prescribed rituals. This text appears to have been compiled over a long period of time. Some parts of AVP may be later than Pāṇini and Garga, who are cited with reverence. There is a popular opinion that *Ketu* in the *Nava-graha-pūja* (worship of nine planets), which is still in vogue widely, is the descending lunar

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6 R.N.Iyengar, *Comets and Meteoritic Showers in the Ṛgveda and their Significance.* IJHS, 45.1, 2010, pp.1-32.

7 *Śam no mṛtyurdhūmaketuḥ* || (Atharva-veda-samhitā XIX 9.10)

node. This is a misunderstanding based on wrongly equating medieval astrological myths with the more ancient Vedic practices of Hinduism founded on astronomical concepts. AVP (52.12.1) clearly states the ninth *graha* as:

नवमश्चैव विज्ञेयो धूमकेतुर्महाग्रहः॥

The ninth should be understood as Dhūmaketu the mahāgraha.

Further, the *Śāntikalpa* of Atharvaṇa Veda has the following canonical hymn for invoking *Ketu* during religious worship.

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

I invoke here, Ketu son of Brahma, who has a long lock of hair and whose face is circular.

In contemporary worship following RV, the prayer for *Ketu* is in plural as[8]

पालाशधूम्रसंकाशान् तारकाग्रहमस्तकान् ।
रौद्रान् रुद्रात्मकान् घोरान् तान् केतून् प्रणमाम्यहम् ॥

I bow to Ketū who are of the colour of palāśa smoke, who have starry heads, are ferocious, awesome and are born of Rudra.

There is a tradition of worship which uses the above in singular number, without affecting the meter. In any case, it should be clear that the most ancient practice of *navagrahapūja,* included in its fold the visible *Ketu* the Comet and not the lunar node which is just an imaginary point in the sky.

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8 *Ṛgvedīya Navagraha Pūjā (Japa) Vidhi,* Śrīmanmadhva-siddhānta-granthālaya, Udupi. 11th edn., 2004

PT in its classification mentions about a comet born out of the anger of Brahmā. In the description, this is the *Calaketu* said to have had a trident like (*śūla-sadṛśī*) head. The trident also called *triśūla* is a weapon with three piercing head-like protrusions at the end of a long rod. Garga, quoted by Utpala and Ballālasena describes comet *Brahmadaṇḍa* as

एको ब्रह्मसुतः क्रूरः त्रिवर्णस्त्रिशिखान्वितः ।
सर्वास्वाशासु दृश्येत ब्रह्मदण्डो भयावहः ॥

There is one cruel offspring of Brahma with three heads and three colours. This Brahmadaṇḍa is seen in all directions inducing fear.

Triśikhā and *Triśirā,* both meaning *three-headed* is a celestial object listed by all the ancient authors. In the *Taittirīya Samhitā,* we read that *Viśvarūpā* son of Tvaṣṭra had three heads hinting at a synchronism with the above comet images[9]. The word *Viśvarūpā* may also refer to one who could be seen everywhere or in all directions, matching with the *Brahmadaṇḍa* described by Garga. Among the artifacts unearthed from the Indus-Sarasvati Valley sites (~2000BCE) are seals depicting a three-headed animal with several variants (Fig. 11.1). These are found in different sites spread over a large area of North West India[10]. One wonders whether this could have been the anthropomorphic representation of a triply split, that is a three-headed comet. There are other interesting archaeological objects belonging to much later periods unearthed from the Mahābhārata sites, such as Hastināpura[11]. These are the painted grey ware (PGW) pottery dated to 1000-1200 BCE. These show designs of circles and whorls with tail like extensions resembling comets. A selection of these objects is shown in Fig 11.2.

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9 *viśvarūpā vai tvāṣṭraḥ ....tasya trīṇi śīrṣāṇi*|| (Tai. Sam. 2.5.1)

10 A. Parpola *et al* (Ed.) *Corpus of Indus Seals and Inscriptions* (vol.1 & 2) Suomalainen Tiedeakatemia, Helsinki, 1987, 1991

11 B.B.Lal. *Excavation at Hastināpura and other Explorations in the Upper Gangā and Sutlej Basins. 1950-52.* Ancient India, Bull. Arch. Survey of Ind. No.10 &11, pp5-151.

Fig 11.1 Seal numbers, M1171 and M297 (After: J.Marshall)

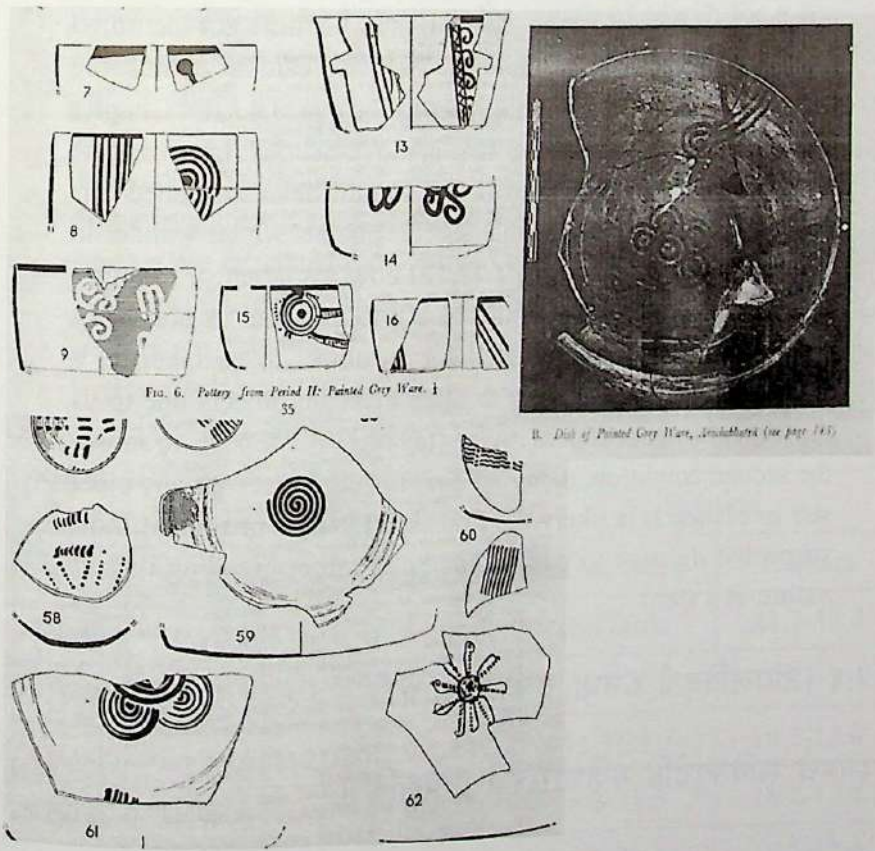

FIG. 6. *Pottery from Period II: Painted Grey Ware.* ½

55

B. *Dish of Painted Grey Ware, Ahichhatra* (see page 143)

Fig. 11.2 PGW pottery excavated at Hastināpura and Ahichhatra exhibiting Comet like images (After B.B.Lal)

12

॥ अगस्त्यचारः॥ On Canopus

[*Agastya* or the star Canopus has received considerable attention in India since Vedic times. *Agastya* was originally a sage known from the Ṛgveda, who after his time got identified with the southern star, Canopus. Here we cannot go into the analysis of Vedic hymns that refer to the star. The 12th Chapter in BS is titled *Agastya-cāra* that is movement of *Agastya*. One wonders why Varāhamihira in BS should have captioned this chapter like his previous chapters on planets which wander in the sky. We have seen in PT (1.10) how a student of Parāśara doubts whether *Agastya* could be a *graha* (seizer or planet). A recognizable character needed for an object to be taken as a *graha* was its conjuction with other celestial objects due to its movement and occasional invisibility. *Agastya* appears to satisfy the second condition, though it does not conjunct with any other star or planet. It is likely the first sky watchers in ancient India suspected *Agastya* to be a planet before understanding its true nature as a star.]

१२.१ [उत्पलविवृतौ । तथा च पराशरः ॥]

हस्तस्थे सवितर्युदेति रोहिणीसंस्थे प्रविशति ॥

12.1 [*In Utpala's commentary; Parāśara said.*]
(Agastya) rises when Sun is in Hasta, it sets when (Sun) is in Rohiṇī.

[The above statement gives the naked eye conditions for the rise and set of Canopus during the time of Parāśara. *Udaya* refers to the annual first visibility in the early morning sky. Similarly, *pravāsa* is the last visibility in the evening after Sunset. With no other lateral evidence available for this text, it has to be treated as a result based on long years of observation. *Agastya* or Canopus is a southern star not visible in the higher latitudes of the northern hemisphere. If we assume that about four degrees altitude is necessary to recognize a new celestial visitor in the southern horizon, *Agastya* would have been visible to early morning viewers in Kurukṣetra from around 2900 BCE, in the month of October, but only for a few days. It would have been visible again in the evening in the month of March for a few days before going below the horizon, to be seen to be rising in the south again in October. The star lore associated with *Agastya* is all indigenous since the star is invisible in places beyond 37°N, matching with the northern border of greater India in ancient times. To make the text clear the dates of rise and set are tabulated for a period of 2000 years as applicable to the latitudes of Kurukṣetra (30N, 76.75E) and Puṣkara (26.5N 74.55E) in Table 12.1.

Table 12.1 Visibility dates of Canopus at critical altitude of 4°

	Early Morning		Evening	
Year	Kurukṣetra	Puṣkara	Kurukṣetra	Puṣkara
-3000	Invisible	14.9-31.10	Invisible	21.2-12.4
-2900	6.10-10.10	13.9-1.11	15.3-20.3	20.2-12.4
-2800	2.10-13.10	12.9-1.11	11.3-23.3	19.2-12.4
-2700	30.9-15.10	12.9-1.11	8.3-25.3	18.2-12.4
-2600	28.9-16.10	11.9-2.11	6.3-26.3	17.2-13.4
-2500	26.9-17.10	10.9-2.11	4.3-27.3	17.2-13.4

12

॥ अगस्त्यचारः॥

On Canopus

[*Agastya* or the star Canopus has received considerable attention in India since Vedic times. *Agastya* was originally a sage known from the Ṛgveda, who after his time got identified with the southern star, Canopus. Here we cannot go into the analysis of Vedic hymns that refer to the star. The 12th Chapter in BS is titled *Agastya-cāra* that is movement of *Agastya*. One wonders why Varāhamihira in BS should have captioned this chapter like his previous chapters on planets which wander in the sky. We have seen in PT (1.10) how a student of Parāśara doubts whether *Agastya* could be a *graha* (seizer or planet). A recognizable character needed for an object to be taken as a *graha* was its conjuction with other celestial objects due to its movement and occasional invisibility. *Agastya* appears to satisfy the second condition, though it does not conjunct with any other star or planet. It is likely the first sky watchers in ancient India suspected *Agastya* to be a planet before understanding its true nature as a star.]

१२.१ [उत्पलविवृतौ । तथा च पराशरः ॥]

हस्तस्थे सवितर्युदेति रोहिणीसंस्थे प्रविशति ॥

12.1 [*In Utpala's commentary; Parāśara said.*]
(Agastya) rises when Sun is in Hasta, it sets when (Sun) is in Rohiṇī.

[The above statement gives the naked eye conditions for the rise and set of Canopus during the time of Parāśara. *Udaya* refers to the annual first visibility in the early morning sky. Similarly, *pravāsa* is the last visibility in the evening after Sunset. With no other lateral evidence available for this text, it has to be treated as a result based on long years of observation. *Agastya* or Canopus is a southern star not visible in the higher latitudes of the northern hemisphere. If we assume that about four degrees altitude is necessary to recognize a new celestial visitor in the southern horizon, *Agastya* would have been visible to early morning viewers in Kurukṣetra from around 2900 BCE, in the month of October, but only for a few days. It would have been visible again in the evening in the month of March for a few days before going below the horizon, to be seen to be rising in the south again in October. The star lore associated with *Agastya* is all indigenous since the star is invisible in places beyond 37°N, matching with the northern border of greater India in ancient times. To make the text clear the dates of rise and set are tabulated for a period of 2000 years as applicable to the latitudes of Kurukṣetra (30N, 76.75E) and Puṣkara (26.5N 74.55E) in Table 12.1.

Table 12.1 Visibility dates of Canopus at critical altitude of 4°

	Early Morning		Evening	
Year	Kurukṣetra	Puṣkara	Kurukṣetra	Puṣkara
-3000	Invisible	14.9-31.10	Invisible	21.2-12.4
-2900	6.10-10.10	13.9-1.11	15.3-20.3	20.2-12.4
-2800	2.10-13.10	12.9-1.11	11.3-23.3	19.2-12.4
-2700	30.9-15.10	12.9-1.11	8.3-25.3	18.2-12.4
-2600	28.9-16.10	11.9-2.11	6.3-26.3	17.2-13.4
-2500	26.9-17.10	10.9-2.11	4.3-27.3	17.2-13.4

-2000	20.9-21.10	6.9-3.11	27.2-31.3	13.2-14.4
-1500	16.9-23.10	3.9-4.11	22.2-1.4	9.2-14.4
-1000	12.9-24.10	31.8-4.11	18.2-2.4	7.2-14.4

Canopus exhibits special visibility phenomena associated with stars namely; heliacal rise, cosmic set, acronychal rise and heliacal set. In Figure 12.1 a typical visibility diagram is shown for the latitude of Kurukṣetra for the year -1500. The star rises above the horizon (0° altitude) on 2nd September but may not be visible till it attains some altitude which is set here

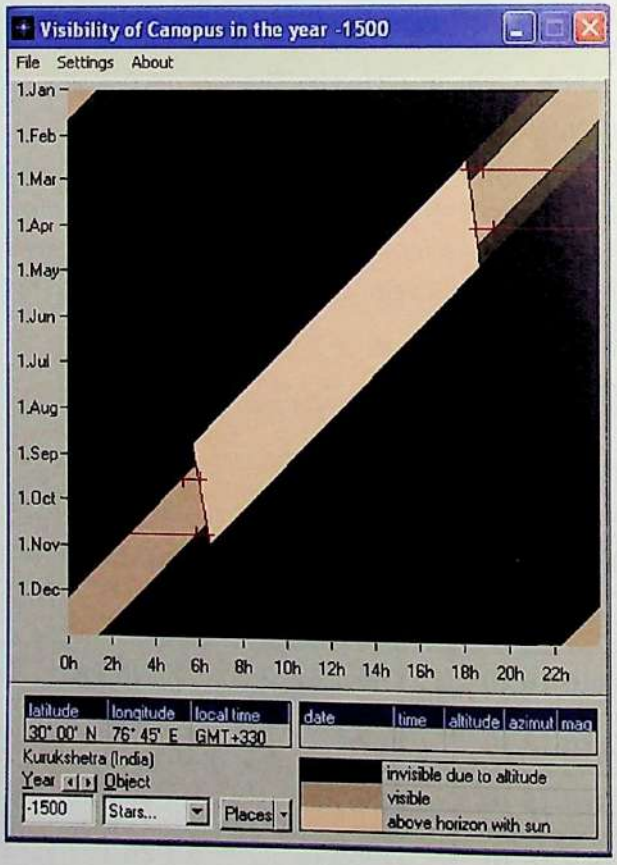

Fig.12.1 Visibility pattern of Agastya for critical altitude of 4°

as 4°. This happens on 16th September by 5.15 AM but as soon as Sun rises at 6AM the star becomes invisible in day light. On each subsequent morning, the rise time recedes by 4 minutes making *Agastya* to be seen rising in the night by 3 AM on 23rd October. However, by 5.45 AM the star would be going below the horizon even as Sun rises at 6.30 AM. This is known in modern astronomy as cosmic setting. From Fig. 12.1 it is easy to see that after cosmic set, the rise and set of *Agastya* would happen in the night and a casual observer would miss this star till it rises in the evening of 22nd February around 6.45 PM after Sun sets by 6.10 PM. This is the acronychal rise. From this date, the southern star would be visible for a few hours each evening till 1st April when the star will be seen for a few minutes before setting at 7.15 PM, almost following Sun setting at 6.30 PM. This is the last visibility and one has to wait till September for the star to be seen in the morning sky.

With the help of Table (12.1) we can see why in (1.10) Kauśika the student of Parāśara says that *Agastya* becomes invisible within a few days (*katipaya ahānyadṛśyam bhavati*). In -2700 it would have been visible in the morning only for 15 days. Again, when he says that it is seen at the *end of rainy season or at the end of autumn,* the reference might be to different opinions in the early history of *Agastya*. Some might have recognized it only in the month of October-November while others were seeing it much before. Utpala in PT (1.1) says that the discourse by Parāśara was held at *Puṣkara-sthāna*, but the text further quoted by him refers to the Himalayas. Thus we do not know from where exactly the observations were done. Puṣkara is in Rajasthan (26.5 N 74.55 E) with average elevation of 500 m. In the Himalayas, the place famous as *Parāśara-āśrama* is Gaganāni (30.92 N 78.67 E) a mountainous region with elevation around 2700 m. As one goes to higher latitudes the date of first visibility gets delayed. Canopus would have been visible clearly from Gaganāni only by 1800 BCE

where as people at Puṣkara could have seen *Agastya* as early as 3000 BCE. But it is reasonable to hold that the impetus for observing the southern sky and *Agastya* should have arisen after the equation of the Ṛgvedic seer Agastya Ṛṣi with the star. We have no idea when this happened except for a confirmation that at least by the Taittirīya Āraṇyaka period Vedic people had accepted sage Agastya to be stationed as a star[1]. This Vedic text not only connects the *Saptaṛṣi* (U.Major) with *Agastya* (Canopus), but also knows the situation near the north celestial pole as being defined by the constellation *Śiśumāra* consisting of fourteen stars with *Abhaya-Dhruva* (Thuban) at the tail end on the Pole. The epoch of *Dhruva* being the Pole Star has been previously discussed at length by the present writer and shown to be 3200-2400 BCE[2]. Many of the legends connected with *Agastya* are about balancing the earth and rectification of the north-south direction. The most interesting astral legend is the one about King Nahuṣa in the heavens being carried on by the Seven Sages and Agastya, when the latter was kicked by Nahuṣa for being too slow[3]. Agastya curses the heavenly Nahuṣa to lose his exalted position to become an ordinary *ajagara* (Python). This is clearly an allegory for precession being felt in the form of *Dhruva* in the *Śiśumāra* (Draco) constellation shifting his position as mentioned in the MAU[4] and in the Mahābhārata[5]. Since the astronomical statements in the Mahābhārata are compatible with the period 1493-1443 BCE[6], systematic observation of *Agastya* might have started around the middle of

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1 *ṛṣayah saptātriśca yaṭ| sarve'trayo agastyaśca| nakṣatraiḥ śaṃkṛto'vasan||* (Tai.Ara. 1.11.2)

2 R.N.Iyengar, *Dhruva the Ancient Indian Pole Star: Fixity, Rotation and Movement*, IJHS 46.1, 2011 pp.23-39.

3 Mahābhārata, Udyoga Parvan , Ch.17, v. 14-18.

4 *kim ....dhruvasya pracalanam; vātarajjūnām nimajjanam....*(MAU 1.4)

5 *Dhruvaḥ prajvalito ghoraḥ apasavyam pravartate* (MB Bhīṣma Parvan Ch.3, v. 17b)

6 R.N.Iyengar, *Internal Consistency of Eclipses and Planetary Positions in the Mahābhārata*; IJHS, 38.2, 2003, pp 77-115.

the second millennium BCE. Thus, the introductory text of PT in (1.10) reflects wide spread legendary traditions which were nonetheless fairly realistic for different places in different times. There are several ancient texts that equate Sage Agastya with the star of the same name and describe his southward emigration across the Vindhyas. Hence the visibility study of star *Agastya* is important for understanding the chronology of ancient India. There is no scientific study on this topic except for a broad visibility calculation carried out by Abhyankar[7]. As one proceeds towards south Canopus due to its southern declination appears to rise early and set late in any year. Further discussion on visibility of Agastya as per (12.1) is presented in section (12.6)]

१२.२ अथास्य त्रिविधचारोदयकालो दृष्टः आश्वयुग्बहुलाष्टमीपञ्चदश्योः कार्तिकाष्टम्यां वा ॥

12.2 *Three types of rising times are seen for Agastya; namely, the aṣṭamī tithi (eighth) or the fifteenth night of the bright fortnight in the month of Āśvayuja or the aṣṭamī of the Kārtika month.*

[This gives three dates for first visibility. However, this is not of much use since the method of fixing the months is not available in PT. The month names *Āśvayuja* and *Kārtika* being lunar, the corresponding visibility *tithi* mentioned are not exactly repetitive, due to the solar and lunar years being unequal. We can only say that the first visibility of Canopus was towards the end of the rainy season. Bhāskarayogi also states the PT text as above.]

१२.३ तत्राश्वयुग्बहुलोदितः सुवृष्टिक्षेमान्नसम्पत्करः । वर्णेश्चावेदयति । अग्निपरुषरूक्षाभो रोगाय कपिलो वृष्टिनिग्रहाय । धूमाभो गवामभावाय।

7 K.D.Abhyankar, *Folklore and Astronomy: Agastya a sage and a star.* Current Science, 89, 12, 2005, pp.2174-76.

माञ्जिष्ठः कुङ्कुमच्छविः क्षुच्छस्त्र(भय)दः। नीलः अतिवर्षाय । संवृतः पुररोधाय । स्पन्दनो भयाय ॥

12.3 *Agastya rising in the bright fortnight of the Āśvayuja month produces abundant rainfall and food security. (Agastya) informs by the colours also. Fiery harsh colour is for diseases; black colour is for obstruction of rains. Smoky colour indicates dearth of cows. Yellowish redness is for fear due to minor weapons. Blue colour is for excess rainfall. Small size (of Agastya) is for attack on cities. Shaking causes fear (among people).*

१२.४ [अद्भुतसागरे ध्रुवाद्यद्भुते । संवृतः स्वल्पः । अथ वर्णफलम् । तत्र पराशरः]

सुस्निग्धवर्णः श्वेतश्च शातकुम्भसमप्रभः ।
मुनिः क्षेमसुभिक्षाय प्रजानामभयाय च ॥

12.4 *[In the Adbhuta Sāgara: samvṛta means small in size. The colours of Agastya are explained by Parāśara]*

The Sage, when coloured oily white with golden hue portends health, plentiful food and safety to people.

१२.५ हन्यादुल्का यदाऽगस्त्यं केतुर्वाऽप्युपधूपयेत् ।
दुर्भिक्षं जनमारश्च तदा जगति जायते ॥

12.5 *When Agastya is hit by a meteor or covered up by a comet, drought and death of people happen in the world.*

12.6 Visibility of *Agastya* as per Parāśara

Varāhamihira in BS (12.14) mentions that at Ujjain *Agastya* rose when Sun was short by seven degrees of the sign of *Kanyā*. This means as per Varāha's observation during his time (c 530 CE) *Agastya's* first visibility was when Sun's longitude was 143 degrees. A little later in verse (12.21)

he mentions that *Agastya was said to rise* when Sun was in *Hasta* and set when Sun was in *Rohiṇī*. Utpala in his commentary quotes PT, but quite clearly informs that this condition is not as per astronomical analysis and that BS only recorded this as the ancient opinion of Parāśara. In any case BS understands *Hasta* and *Rohiṇī* to be star divisions of that name.

Here, for further discussion we need to know the place of observation for PT. As we have seen previously, PT has some tenuous connections with Yajurvedic texts about early morning rise of stars. Hence, Kurukṣetra as a reference place for PT appears reasonable. To be on the safer side, we include Puṣkara and Gaganāni also as possible alternates for further analysis. As a preliminary interpretation of (12.1), the early morning sky picture for Kurukṣetra on 21th September -1300 when Agastya would be visible on the southern horizon is shown in Fig 12.2. It can be observed that Sun was still 10° below the horizon and the constellation *Hasta* was clearly visible in the eastern sky. The predominant star γ-Corvi was more than 8° above the horizon at Kurukṣetra. Within a few minutes, it would be day light making the star invisible. Thus any naked eye observer would remember the position of Sun as that patch below or very near to the constellation *Hasta*. Hence for the epoch of PT, a relation between the first visibility of *Hasta* and the heliacal rise of *Agastya* was natural.

On similar lines, the evening sky view for Puṣkara on 16th April -1200 is shown in Fig.12.3. Canopus was approaching its last visibility which was on 24thApril. Star *Rohiṇī* (Aldebaran) would have been visible in the western sky almost near its last visibility. Again, it may be noted that the setting of Canopus is coeval with the western visibility of Aldebaran. Like with the rise, the setting of *Agastya* got observationally associated with Sun being near to *Rohiṇī*. These pictures are produced using the planetarium software openly available on the internet (www.stellarium.org). The two figures are indicative of the motivation Parāśara must have had to bring in his solar zodiac of (3.1) in stating the visibility condition for *Agastya*.

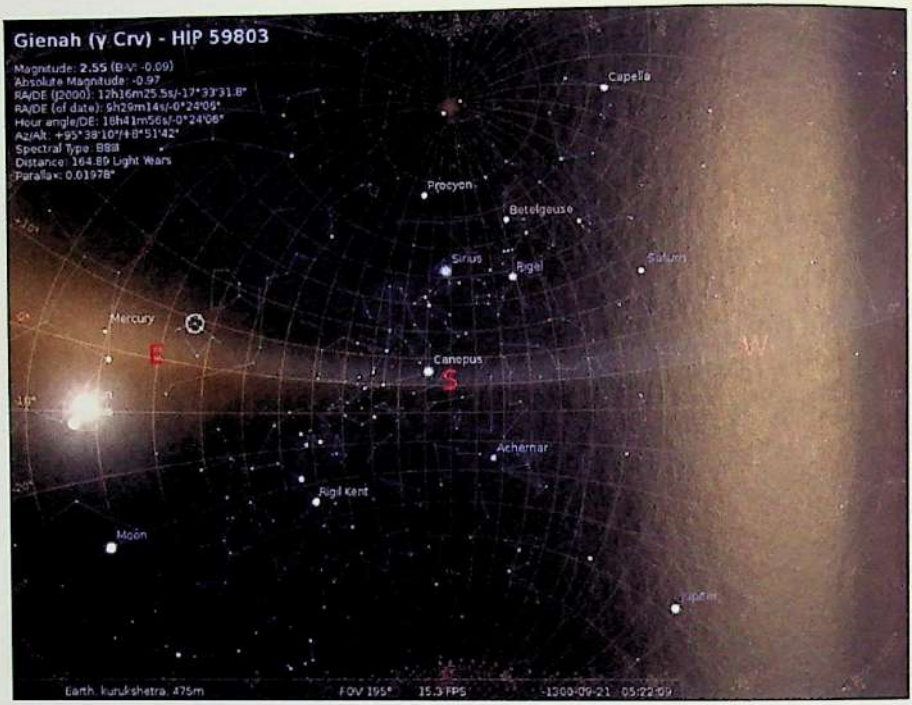

Fig.12.2 Early morning sky picture at Kurukṣetra for (21-09-1299 BCE) with star Agastya rising in the southern sky and constellation Hasta (Corvus) rising in the eastern sky.

Now, we can also get a feeling to the difference in the epochs of Varāhamihira and Parāśara by simulating the early morning rise of *Agastya* at Ujjain for 530 CE. Such a picture is shown in Fig.12.4 for 15th August 530 CE the central date of Varāhamihira. The constellation of *Hasta* was well below the horizon and naturally PT statement would not have been valid as an observational condition for this epoch. The star that was rising can be easily identified as Regulus. As per BS, Sun was seven degrees behind the beginning of sign Virgo, that is Sun was in *Simha Rāśi* (Leo) and this was of course correct for Varāhamihira's time as per the zodiac followed by him.

The above discussion helps us to understand that *nakṣatra* statements about Sun cannot be simply equated to *being with a star* like Moon seen near a *nakṣatra*. No star will be visible when it is close to Sun, which

Fig.12.3 Evening sky picture at Puṣkara for (16-04-1199 BCE) with star Agastya in the southern sky near its last visibility for the year. Rohiṇī was visible in the vicinity of the date in the western sky after Sun set.

is a fact PT knew too well as in the case of planets. Hence, the phrase *hastasthe savitari* should not be literally taken as *Sun staying at/in/near star Hasta.* It is the star division of that name as defined by the season zodiac of PT (3.1) in which Sun is said to be stationed. This does not mean that the bright star Aldebaran and γ-Corvi (Gienah) should not have been visible within a few days interval. It is the near simultaneity of the first rise and last set of *Agastya* with the respective rising and setting of the above two *nakṣatras* that has lead to the concept of referring to Sun being in those star divisions.

Here, we need, for further analysis more accurate visibility dates and Sun's position for the ancient epoch. These are presented in Tables 12.2 and 12.3 as obtained using the PLVS software[8]. This software has provision for

8 Ref: http://www.alcyone.de

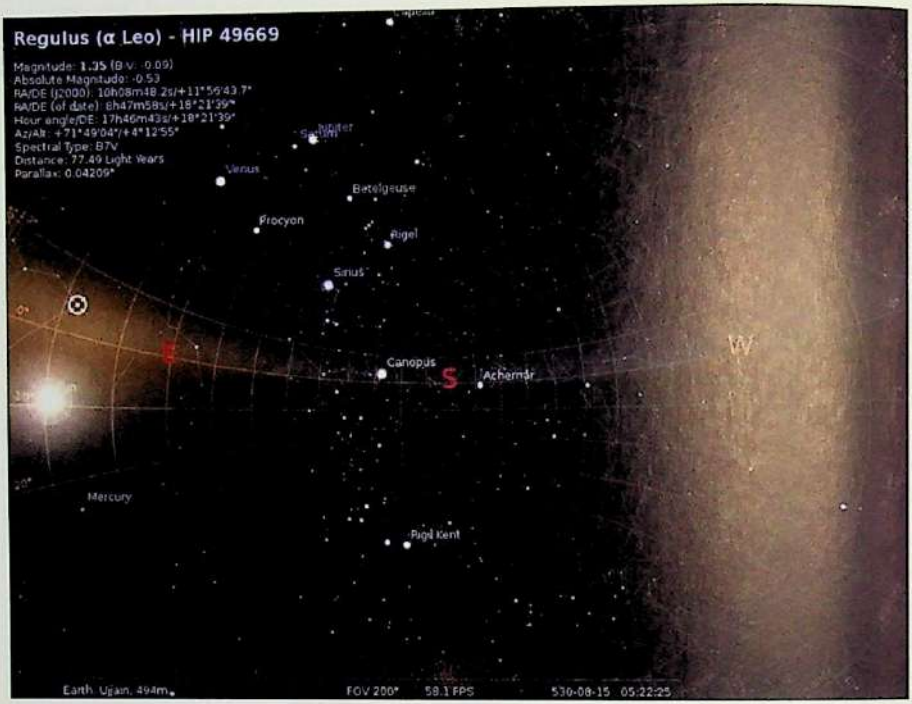

Fig.12.4 First Visibility of Agastya (Canopus) at Ujjain on 15th August 530 CE. Constellation Hasta was well below the horizon. Star Maghā (Regulus) was above the horizon.

arcus visionis that is, the vertical separation required between the Sun and the star for the latter to be visible on the same horizon. The critical altitude of the star for visibility can also be adjusted in the program, but this is an unknown value for ancient star observations. We can however reason out that for naked eye visibility of Canopus emerging from below the horizon, for the first time near the end of the rainy season, on a yet unknown date, some altitude would have been essential. On the other hand, once it was visible in the evening sky nearer to the spring equinox, the observer had to only follow it and hence could see it vanish almost at zero altitude. Table 12.2 provides us a rational basis for understanding the statements of PT. The *Hasta-division* in the season zodiac extends from 136°40' to 150°00' (Fig.3.1).

Table 12.2 First visibility condition for Agastya (Canopus) in the period 1400-950 BCE

Star Agastya	Puṣkara 26°30'N76°33'E		Kurukṣetra 30°N76°45'E		Gaganāni 30°55'N 78°40'E	
Critical altitude	F.V Date	Sun's Longitude	F.V Date	Sun's Longi-tude	F.V. Date	Sun's Longi-tude
0°	23.8-22.8	136°55'-138°44'	1.9-30.8	145°50'-146°37'	4.9-2.9	148°48'-149°35'
4°	3.9-1.9	147°49'-148°36'	15.9-12.9	159°47'-159°31'	19.9-16.9	163°48'-163°30'

As per the first visibility shown in Table 12.2 for critical altitude values of 0°- 4° *Agastya* would have been visible at Puṣkara when Sun was in the *Hasta-division*. At other places, this would be valid if the critical altitude for observing *Agastya* were to be reduced to zero degree which is highly unlikely. This result indicates that the most likely place of observation was Puṣkara the place of Parāśara's discourse. Now, we can analyze the last visibility condition shown in Table 12.3.

Table 12.3 Last visibility condition for Agastya (Canopus) in the period 1400-950 BCE

Star Agastya	Puṣkara 26°30'N76°33'E		Kurukṣetra 30°N76°45'E		Gaganāni 30°55'N 78°40'E	
Critical altitude	L.V. Date	Sun's Longi-tude	L.V. Date	Sun's Longi-tude	L.V. Date	Sun's Longi-tude
0°	25.4-25.4	22°06'-25°01'	16.4-16.4	13°30'-16°24'	13.4-14.4	10°37'-14°29'
4°	14.4-14.4	11°35'-14°29'	1.4-2.4	359°07'-2°57'	28.3-29.3	355°15'-3°59'

The *Rohinī-division* of Parāśra as seen from Fig (3.1) is from 16°40' to 30°00'. Again the condition of Sun in the *Rohiṇī-division* gets satisfied at Puṣkara for altitudes between 0° and 4°. But at the other two places the condition is not satisfactory. We have previously argued that for last visibility zero altitude should be sufficient. Under this argument at Kurukṣetra, Sun in *Rohiṇī-division* is acceptable but the observation slides towards c 950 BCE. The overall picture is that the PT tradition should have originated in the region between Puṣkara and Kurukṣetra. The PT solar *nakṣatra* division condition on naked eye visibility of *Agastya* was correct for its epoch of 1350-1130 BCE and the observations were in all probability carried out at latitudes between 26°N and 30° N in North India.

Dikshit in his classical work on History of Indian Astronomy says that in the Vedas there is no unambiguous reference to solar months or the division of the year and the zodiac into twelve equal parts. While this may be so, we have shown in Chapter 3 that efforts were on in the Taittirīya Brāhmaṇa to observe *nakṣatras* in the early morning twilight zone. The MAU had already proposed two equal *ayana* divisions to mark the path of Sun among the *nakṣatras*. The lunar month and the *tithi* mentioned in (12.2) were possible in some years but would not have satisfied the Vedic people to know in advance the annual first visibility of *Agastya* in the southern sky. These cumulative factors should have helped astronomers in the observation of *Agastya*, given its importance, leading the school of Parāśara from initially doubting it to be a planet as in (1.10) but eventually synchronizing the heliacal visibility of *Hasta* in the eastern horizon with the first visibility of *Agastya* in the southern sky. Similarly, the last visibility was also observed to be correlated with the bright star *Rohiṇī* about to become invisible in the evening sky after Sun set. The effort on the part of Parāśara in (12.1) to bring in solar reckoning into the visibility of *Agastya*, in consonance with his solar zodiac scheme of (3.1), was an important milestone in Vedic Hindu Astronomy long before the advent of the *siddhāntic* period.

We conclude that the efforts of Parāśara culminated in proposing a zodiac with six equal seasons, which were not strictly experiential, but

each of four and half *nakṣatra*-length along the path of Sun, that is the ecliptic, harmonizing with the heliacal visibility of some of the prominent *nakṣatras* and the star *Agastya*. The twelve division solar zodiac was only one step away from here. PT did not do this perhaps for want of more accurate mathematical or observational aids. Fixing the solstice precisely would not have been possible, but this as the starting point was the best naked eye observational option. Some of the Vedic *nakṣatras* could not have been observed before Sunrise in their assigned month simply because they were at unequal distances. But taking an astronomical definition of 4½ equal nakṣatra divisions of the zodiac at least some of the stars could be seen in the putative seasons. The concept of the equinoctial day and of the point in the sky must have been available to PT, but this is not strongly reflected in the available text portions. We can speculate, the idea of the ecliptic and the celestial equator intersecting at the equinoctial point had to wait for some more years so that the zero point of the Vedic solar zodiac could be shifted from the winter solstice to the spring equinox for which Parāśara had already laid the foundation.]

१२.७ [अथ सप्तर्षीणामद्भुतानि । एतेषां वर्गानाह पराशरः॥]

देवदानवगन्धर्वाः सिद्धपन्नगराक्षसाः ।
नागा विद्याधराः सर्वे मरीचेः परिकीर्त्तिताः ॥
यवनाः पारदाश्चैव काम्बोजा दरदा शकाः ।
वसिष्ठस्य विनिर्दिष्टास्तापसा वनमाश्रिताः ॥
धीमन्तो ब्राह्मणा ये च ज्ञानविज्ञानपारगाः ।
रूपलावण्यसंयुक्ता मुनेरङ्गिरसः स्मृताः ॥
कान्तारजास्तथाऽम्भोजान्यत्रेर्नद्यः ससागराः ।
पिशाचा दानवा दैत्या भुजङ्गा राक्षसा तथा ।
पुलस्त्यस्य विनिर्दिष्टाः पुष्पमूलफलं च यत् ।
तत्सर्वं पुलहस्योक्तं यज्ञा यज्ञकृतश्च ये ।
क्रतोरेव विनिर्दिष्टा वेदज्ञा ब्राह्मणास्तथा ॥

12.7 [*Now the anomalies of U.Major; Parāśara has classified the regency of these stars.*]

The gods, demons, angels, siddhas, vidyādharas and other fairies are all assigned to star Marīci. Yavanas, Pāradas, Kāmbojas, Daradas and Śakas and forest dwelling sages are assigned to Vasiṣtha. Brāhmaṇas handsome and proficient in physical and esoteric sciences belong to seer Āṅgiras. To Atri belong forest born (men, animals), water born (animals, plants etc) and rivers including the oceans. Piśācas, Dānavas, Daityas, Serpents and Demons are attributed to Pulastya. All that belonging to the family of flowers, roots and fruits are assigned to Pulaha. Sacrifices, Priests and Vedic Brāhmaṇas are assigned to Kratu.

[The constellation U.Major is known as *Saptaṛṣi-maṇḍala* in Indian literature. The seven stars here carry the names of seven sages Marīci, Vasiṣtha, Āṅgiras, Atri, Pulastya, Pulaha and Kratu. As per available statements of Parāśara, we have to conclude that PT did not contain statements about the movement of *Saptaṛṣi* as mentioned by Vṛddhagarga and Purāṇas such as the *Bhāgavatam*. The reason for Ballālasena to caption this chapter as *Dhruvādyadbhuta* should have been due to tradition about the ancient legendary Pole Star *Dhruva*; but which was not available at the North Pole at his time.

The 13th Chapter in BS is *Saptaṛṣicāra* or movement of U.Major. The question of how U.Major could be said to move has attracted considerable attention in the ancient literature and continues to interest even now[9]. For our purpose we note that BS does not cite Parāśara on this topic. Utpala also does not quote Parāśara. It is unanimously held that the movement of the *Saptaṛṣi* constellation and its relation to star *Maghā* during the time of Yudhiṣthira is attributed to Vṛddhagarga. This is one

9 A.Sule, M. Vahia, H.Joglekar, S.Bhujle, *Saptarshi's visit to different Nakshatras: Subtle effect of Earth's precession.* IJHS, 42.2, 2007 pp.133-147.

more reason to infer that Vṛddhagarga should have lived after the period of Parāśara. Movement of celestial objects can be understood with respect to some fixed reference. What could have been such a reference for Vṛddhagarga? There is no direct answer for this question, but from the writings of Varāhamihira, Utpala and Ballālasena we get an indirect answer. BS (13.2) attributes the motion to *Dhruva* the Master, even though Varāhamihira does not explain the meaning of the word *Dhruva*. It is notable he uses this word in singular and he explicitly says that he is repeating the views of Vṛddhagarga. However Utpala in his commentary cites Brahmagupta to explain that the celestial globe is circulating tied to the two *dhruvas*, (*dhruvayoh nibaddham*) which evidently meant the north and south celestial poles. But this does not clarify the motion of U.Major over centuries as implied by the statement of Vṛddhagarga unless the concept of precession is brought in and more importantly the original *Dhruva* with respect to whom the motion might have been recognized is identified. In the AS the chapter is titled *Dhruvādyadbhuta* but nothing is mentioned about *Dhruva*. Instead, *Agastya* and *Saptaṛṣi* are discussed. Vaguely these two celestials map onto the south and north sky regions during the period of Ballālasena, but the word *Dhruva* meaning a fixed star would be a misnomer, unless there was at least a popular tradition about the north star *Dhruva* which had some anomaly.

During the times of Āryabhaṭa, Varāhamihira, Brahmagupta, Utpala, Ballālasena there was no prominent star to mark the north celestial pole. It was natural for them to have been somewhat reluctant to write about movement of stars in the same style as movement of planets except as a concession to some long inherited tradition. Quite realistically BS attributes *Agastyacāra* to Parāśara and *Saptaṛṣicāra* to Vṛddhagarga. It is apparent all the above writers had inherited the tradition of a north star *Dhruva*, stationed at the tip of Mount Meru, being the master driver for the observed motion of the stars and planets including the Sun. This model is preserved quite vividly in the

Brahmāṇḍa and the *Viṣṇu Purāṇa* texts. The *Ekāgni-kāṇḍa* of the Kṛṣṇa Yajurveda contains the hymns for showing the fixed star *Dhruva* to the bride during the Vedic marriage ceremony. Going further back in time, the *Taittirīya Āraṇyaka*, describes the constellation *Śiśumāra* consisting of fourteen stars, which can be easily recognized as the modern constellation Draco. This Vedic text names all the fourteen stars with the last one at the tip of the tail of the celestial figure being *Dhruva*. The clear description of the *Śiśumāra* constellation with *Dhruva* as the last star unequivocally refers to the period 3200-2400 BCE. It is interesting to note that Alberuni (11th century) in his book *India* comments on the belief of Hindus that their Pole Star resides in a constellation that looks like a four legged aquatic animal[10]. Further, he notes that this animal is called *susmar* in Persian, which obviously refers to the *Śiśumāra* constellation. Some more details are available in an article on Al-beruni's Persian translation of Patañjali's Yogasūtra by Pines and Gelblum[11]. Movement of *Dhruva* in the MAU, the Mahābhārata and the different Purāṇa texts refer to progressively later dates. In India the first modern astronomer to refer unequivocally to a star at the North Celestial Pole was Padmanābha in the 15th century CE[12]. This was natural as α-U.Minor had occupied the Pole space by that time.]

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10 E.C. Sachau, *Alberuni's India* Vol.I, 1910, London.

11 S.Pines and T.Gelblum, *Al-Biruni's Arabic Verion of Patanjali's Yogasutra: A Translation of the Third Chapter and a Comparison with Related Texts.* Bulletin of School of Oriental & African Studies, Univ. of London., 46, 2, 1983, pp. 258-304.

12 S.R.Sarma, *The Dhruvabhrama-yantra of Padmanābha,* J.of. Rashtriya Sanskrit Sansthan, N.Delhi, vol.6, 2012, pp. 321-343.

13

॥ नक्षत्रकूर्माध्यायः॥ Astral-geography

१३.१ [उत्पलविवृतौ । तथा च भगवान् पराशरः]

चत्वारिंशोत्तरं योजनसहस्रं जम्बूद्वीपः तत्र पूर्वादापश्चिमार्णवं अवगाढाः षण्महागिरयः। हिमवान् हेमकूटो निषधो नीलः श्वेतः शृङ्गवांश्च । शतं सहस्राणामितरेषां षष्टिसहस्राणि काञ्चनमयानां गिरीणां चत्वारिंशन्महानद्यः चत्वार उदधयः । कुनदीनां षष्टिसहस्राणि या महार्णवमनुप्रविशन्ति । एकनवती राज्यानां एकोनशतं कुराज्यानां दश जाङ्गलानि मरवः अष्टौ अशीतिः (विंशतिः) कच्छाः तावन्त एव द्वीपाः । पञ्चजनपदसहस्राणि । तत्र कृत्तिकादीनि त्रीणि मध्यदेशेऽस्मिन् वर्षे भवत्यार्द्रादीनि त्रीणि त्रीण्युक्तवर्जं क्रमात् पूर्वादिष्वष्टासु दिक्षु । दिङ्नक्षत्रेषूपसृष्टेषु दिग्जनपदानामेवोपतापो भवति । विशेषतस्तु शूरसेनमगधकलिङ्गावन्तिसौवीरसैन्धवहारभूतिमन्द-कुणिन्दाधिपतीनाम् ॥

13.1 [*In Utpala's commentary. Parāśara:*]

Jambūdvīpa is 1040 yojanas (in extent). There, from east to the western ocean, are six deep great mountains; Himavān, Hemakūṭa, Niṣadha, Nīla, Śveta and Śṛṅgavān. There are hundred thousand others (hillocks), sixty thousand golden hills; forty large rivers, four seas. There are sixty thousand rivulets which get into the great oceans. There are ninety-one big countries and ninety-nine small states. There are ten jungles, eight deserts, eighty (twenty) marshes and same number of islands. There are

one thousand five habitats. There, in this land three stars starting from Kṛttikā are in the central country. Similarly further groups of three stars starting with Ārdrā sequentially belong to the eight directions beginning with East. Whenever the directional stars get occulted (afflicted) the corresponding provinces suffer. Especially this happens for the Kings of Śūrasena, Magadha, Kaliṅga, Avanti, Sauvīra, Saindhava, Hārabhūti, Manda and Kuṇinda countries.

[A Part of the above text is quoted by Bhāskarayogī under BS (14.33)]

१३.२ अतः परं दिग्जनपदान् व्याख्यास्यामः । अथ मध्यदेश आर्यावर्त इति य आख्यायते तत्र जनपदाः। शूरसेनोद्दैहिकमद्राश्वत्थनीपकाञ्चनककौरवोत्तमज्यौतिषभद्रारिमेदमाध्यमिकसाल्वसाकेतमत्स्यकपिष्ठलदौलेयमाण्डव्याः। पाण्डुनगरगौरग्रीवपारियात्र (मरु) कुकुरौदुम्बरयामुनगजाह्वयोज्जिहानकालकोटिमथुरोत्तरदक्षिणपाञ्चालकुरुक्षेत्रधर्मारण्यसारस्वताः॥

13.2 *Now we describe the countries in the various directions. The central region is also known as Āryāvarta. There, the countries are: Śūrasena, Uddaihika, Madra, Aśvattha, Nīpa, Kāñcanaka, Kaurava, Uttama, Jyautiṣa, Bhadra, Arimeda, Mādhyamika, Śālva, Sāketa, Matsya, Kapiṣthala, Dauleya, Māṇḍavya, Pāṇḍunagara, Gauragrīva, Pāriyātra, (Maru), Kukuru, Audumbara, Yāmuna, Gajāhvaya, Ujjihāna, Kālakoṭi, Mathurā, Uttara-pāñcāla, Dakṣiṇa-pāñcāla, Kurukṣetra, Dharmāraṇya and Sārasvata.*

[The important physical features of *Madhyadeśa* are enumerated here. Astrally, these are connected with the *nakṣatras Kṛttikā, Rohiṇī* and *Mṛgaśirā*. There are some differences in the names given by Varāhamihira in his versified text.]

१३.३ अथ पूर्वस्यां माल्यवच्छिबिराञ्जनपद्मवृषभध्वज–उदयशिखरिदन्तुरकाः काशिकोशलमिथिलमेकलोत्कलपुण्ड्रकर्वटसमतटोड्रगौडभद्रद्रविडसुह्म–

ताम्रलिप्तप्राग्ज्योतिषवर्धमानवाजिमुखाम्बष्टपुरुषादकर्णिकोष्ठाधिश्रोत्र-व्याघ्रमुखलौहित्यार्णवक्षीरोदार्णवमीनाशनकिरातसौवीरमहीधराविवसनैक-पादोदयानुवासिनश्चेति॥

13.3 *In the East are Mālyavat, Śibira, Añjana, Padma, Vṛṣabhadhvaja, Udayaśikhari, Danturaka, Kāśi, Kosala, Mithila, Mekala, Utkala, Puṇḍra, Karvaṭa, Samataṭa, Gauḍa, Bhadra, Draviḍa, Suhma, Tāmralipta, Prāgjautiṣa, Vardhamāna, Vājimukha, Ambaṣṭa, Puruṣāda, Karṇikoṣṭha, Vyāghramukha, Lauhitya, Arṇava, Kṣīrodārṇava, Mīnāśana, Kirāta, Sauvīra, Mahīdhara, Vivasana, Ekapāda, Udaya, and Anuvāsina.*

> [As per Utpala Añjana, Padma, Vṛṣabhadhvaja, Śibira, Udaya-giri and Mālyavān are hills. Lauhitya is a river. Kṣīroda is the sea of that name. BS adds Candrapura and deletes Kosala and Draviḍa from the above names.]

१३.४ अथ प्राग्दक्षिणस्यां विन्ध्यान्तवासिनः चेदिवत्सदशार्णाङ्ग-वङ्गोपवङ्गकलिङ्गजठरपुण्ड्रशूलिकविदर्भनग्नपर्णशबरविन्ध्यक्षेत्रपुर-पुरिककण्टकस्थलवृषद्वीपकौशलौर्ध्विककाम्बोजवर्मलूतकाककाचहेम-कुङ्ख्व्यालग्रीवमहाग्रीवश्मश्रुधरनालिकेरद्वीपकिष्किन्धाधिवासिनः॥

13.4 *In the South-east are Vindhya-dwellers, Cedi, Vatsa, Dāśārṇa, Aṅga, Vaṅga, Upavaṅga, Kaliṅga, Jaṭhara, Puṇḍra, Śūlika, Vidarbha, Nagnaparṇa, Śabara, Vindhya, Kṣetrapura, Purika, Kaṇṭakasthala, Vṛṣadvīpa, Kauśala, Ūrdhvika, Kāmboja, Varma, Lūta, Kāka, Kāca, Hemakuḍya, Vyālagrīva, Mahāgrīva, Śmaśrudhara, Nālikeradvīpa, and Kiṣkindha-dwellers.*

१३.५ अथ दक्षिणस्यां विन्ध्यकुसुमापीडदर्दुरमहेन्द्रशूर्पवत्समल्यमालिन्द्या-वन्तिसाम्बवति दशपुरैरकच्छभरुकच्छर्धिवनवासोपगिरिभद्रगिरिनगर-दण्डकगणराज्यत्रिराजककोटकाञ्चनतिमिङ्गिलाहाररिष्यमूकतापसाश्रम-शङ्खमुक्ताप्रवालवैडूर्याकरोद्वक्त्रात्रिवारिचरार्णवचोलककौवेरकावेरिक-

पशिकधर्मपट्टणपट्टिकाशकृष्णवेल्लूरताम्रपर्णनार्मदगोनर्दकाञ्चीपट्ट-नतालिकटसौरिकीर्णसहकारिवेणातटतुम्बवनकालाजिनद्वीपकर्णिकारशिबिकोङ्कण-चित्रकूटकर्णाटमहाटविकान्ध्रकोल्लगिरिनासिक्यकार्मणेयकावेर्वारुकवेदिनिक-बलदेवपट्टनक्रौञ्चद्वीपसिंहलाः परमतदर्दुरमलयगिरिचित्रकूटशिखरालङ्कृता-लङ्कारशूर्पपर्वतकुञ्जरदरीसंभोगवतिनृणां गिरिसाराश्रमाः॥

13.5 *In the South are Vindhya, Kusumāpīḍa, Dardura, Mahendra, Śūrpa, Vatsa, Mālya, Mālindya, Avanti, Sāmbavati, Daśapura, Eka, Kaccha, Bharukaccha, Ardhivana, Vāsopagiri, Bhadragiri, Nagara, Daṇḍaka, Gaṇarājya, Trirāja, Karkoṭa, Kāñcana, Timiṅgilāhāra, Riṣyamūka, Tāpasāśrama, Śaṅkha-muktā-pravāla-vaiḍhūryākara, Udvaktra, Trivāricarārṇava, Cola, Kauvera, Kāveri, Kapaśika, Dharmapattaṇa, Paṭṭikāśa, Kṛṣṇa, Vellūra, Tāmraparṇa, Narmadā, Gonarda, Kāñcīpaṭṭaṇa, Tālikaṭa, Saurikīrṇa, Sahakāri, Veṇātaṭa, Tumbavana, Kālājina-dvīpa, Karṇikāra, Śibi, Koṅkaṇa, Citrakūṭa, Karṇāṭa, Mahāṭavika, Āndhra, Kollagiri, Nāsikya, Kārmaṇeyaka, Vāruka, Vedinika, Baladevapaṭṭana, Krauñca-dvīpa, Simhala, Paramata, Dardura, Malaya, Citrakūṭa, Śikharālaṅkṛta, Alaṅkāra, Śūrpa-parvata, Kuñjaradarī, Sambhogavatī, Girisāra and Āśrama.*

१३.६ अथ प्रत्यग्दक्षिणस्यां सुराष्ट्रमहाराष्ट्रसिन्धुसौवीरशूद्राभीरद्रविडकनक-खण्डसिन्धुकालकफेणगिरिरैवतकानर्तकबाह्लीकयवनपह्लवमार्गारारवरथकारा-म्बष्ठकालाजकर्णप्रवरगिरिवासिनः अतःपरं महार्णवः अर्वकोपजः अग्निः वडवामुखम् इति॥

13.6 *In the South-west direction are Surāṣṭra, Mahārāṣṭra, Sindhu, Sauvīra, Śūdra, Ābhīra, Draviḍa, Kanakakhaṇḍa, Sindhu-kālaka, Phenagiri, Raivataka, Ānartaka, Bāhlīka, Yavana, Pahlava, Mārgara, Arava, Rathakāra, Ambaṣṭha, Kālājakarṇa, Pravara, and Hill-dwellers. Beyond these is the Great Ocean and the fire born out of the anger of Arva known as Vaḍavāmukha that is Horse-face.*

[It is interesting to note *Draviḍa* being stated side by side with

Ābhīra which was located in the Southern Rajastan region nearer the Arbuda Mountains.]

१३.७ अथ पश्चिमायां दिशि मणिमान् क्षुरार्पणो मेघवान् वनौघः। चक्रवद-स्तगिरिप्रशस्तमण्डितारःपञ्चनदकाशिब्रह्मवसतितारक्षितिपारतशान्तिक-शिबिरमठजृङ्गिवायव्यगुडवासिजहैहयसत्कङ्गताजिकहूणपार्श्ववेतक-वोक्काणाः । अन्ये च गिरिवनवासिनः त्यक्तधर्मदण्डमर्यादा म्लेच्छजातयः ॥

13.7 *In the West direction are Maṇimān, Kṣurārpaṇa, Meghavān, Vanaugha, and the Astagiri (Sun Set Hill) laid out widely like a circle. Pañcanada, Kāśi, Brahmavasati, Tārakṣiti, Pārata, Śāntika, Ramaṭha, Jṛṅgi, Vāyavya, Guḍavāsi, Haihaya, Satkaṅga, Tājika, Hūṇa, Pārśva, Irvetaka, Vokkāṇa. Others are hilly and forest tribes and Mleccha groups who have renounced the moral code.*

१३.८ अथ पश्चिमोत्तरस्यां दिशि गिरिमतिवेणुमतिरलमतिफल्गुलुक-माण्डव्यैकनेत्रमरुकुच्चतुषारताल मल्लहलडहलातवर्दिलीनविलीनदीर्घकेश-ग्रीवान्याङ्गशरगविषवेषशूलिकगुलूहाः । परमतः स्त्रीराज्यमिति ॥

13.8 *In the northwest are Girimati,Veṇumati, Ralamati, Phalguluka, Māṇḍavya, Ekanetra, Marukucca, Tuṣāra, Tāla, Mallaha, Laḍaha, Lātavardi, Līna, Vilīna, Dīrghakeśa, Dīrghagrīva, Dīrghāsya, Śaraga, Viṣveṣa, Śūlika, and Gulūha. Beyond this is the Strīrājyam.*

[Varāhamihira in his BS excludes some of the above and adds a few others. The first three names are of rivers. The last named is the Kingdom of Women. Some others such as Ekanetra (one-eyed), Dīrgha-keśa (Long haired) are ethnic groups.]

१३.९ अथोत्तरस्यां हिमवान् क्रौञ्चो मधुमान् कैलासो वसुमानुत्तरोत्तरस्यां मद्रपौरवयौधेयमालवशूरसेनराजन्यार्जुनायनत्रैगर्तकैकयक्षुद्रमाचेलूकमत्स्य-वसातिदर्भफलाफलप्रस्तलक्षेमधूर्त्ताशाकलदाशधानहव्यमुरदण्डगव्यशरधान-

दासेरकवाटधानान्तर्द्वीपिगान्धारववन्धिषुवास्तुतक्षशिललवणवतिपुष्कला-
वतियशोवतिमणिवतिश्यामाकखचरकोहलकनगरशरभूतपुरकैरातका-
दर्शकान्तारदण्डपिङ्गलमाण्डव्यायामुनेयमाणहलहूणहेमतालाश्वमुखा
हिमवद्वसुमत्कैलासक्रौञ्चात् परं अभिजना इति ॥

13.9 *In the northern direction are (Mountains) Himavān, Krauñca, Madhumān, Kailāsa, and Vasumān each north of the other. (The provinces are) Madra, Paurava, Yaudheya, Mālava, Śūrasena, Rājanya, Arjunāyana, Traigarta, Kaikaya, Kṣudra, Mācelūka, Matsya, Vasati, Darbha, Phalāphala, Prastala, Kṣema, Dhūrta, Śākala, Dāśadhāna, Havya, Mura, Daṇḍa, Gavya, Śaradhāna, Dāseraka, Vāṭadhāna, Antardvīpi, Gāndhāra, Vavandhi, Suvāstu, Takṣaśila, Lavaṇāvati, Puṣkalāvati, Yaśovati, Maṇivati, Śyāmāka, Khecara, Kohalaka, Nagara, Śara, Bhūtapura, Kairātaka, Adarśa, Kāntāra, Daṇḍapiṅgala, Māṇḍavya, Yāmuneya, Māṇahala, Hūṇa, Hematāla, Aśvamukha. Beyond Himavat, Vasumat, Kailāsa and Krauñca are Abhijana (people).*

१३.१० अथ प्रागुत्तरस्यां कौलूतब्रह्मपुरकुणिन्ददिवादिनपारतनष्टराज्यवनराष्ट्र-
वैमकैणभल्लसिंहपुरचामरतङ्गणसार्यकपर्वतककाश्मीरदरददर्वाभिमुखजटा-
सुरपटोलसैरिन्ध्रकुचिन्तनकिरातपशुपालचीनसुवर्णभूमिदेवस्थलदेवोद्या-
नानि ॥

13.10 *In the northeast direction are Kaulūta, Brahmapura, Kuṇinda, Divādina, Pārata, Naṣṭarājya, Vanarāṣṭra, Vaimaka, Eṇa, Bhalla, Simhapura, Cāmara, Taṅgaṇa, Sāryaka, Parvataka, Kāśmīra, Darada, Darvābhimukha, Jaṭāsura, Paṭola, Sairindhra, Kucintana, Kirāta, Paśupāla, Cīna, Suvarṇa-bhūmi, Devasthala, Devodyāna.*

[These places in NE are controlled by asterisms *Revatī, Aśvinī* and *Bharaṇi*. This Chapter of PT corresponds to Chapter 14 of BS. Chapters 15 and 16 of BS are *Nakshatra-vyūha;* and *Graha-bhakti,* which do not contain statements attributed to Parāśara either by Varāha or by Utpala. It is only in Chapter 17 of BS

titled *Grahayuddha* Parāśara is quoted again.

In AS there is a long chapter called *Ṛkṣādyadbhuta*, which roughly translates as *wonders-of-stars*. This contains astral-geography and much more, including affliction of stars by other bodies. The statements on dividing India into nine directional groups controlled by three stars each are almost same as the ones quoted by Utpala. Hence we are not repeating them here. However, AS under *Ṛkṣādyadbhuta* contains detailed description of the 27 *nakṣatras*, each as a group of one or more stars. Portents associated with their individual and group (occultation) afflictions are also stated. Since recognition of the canonical *nava-grahas* (nine-graspers) was due to their capacity to afflict or cover up the stars, we give this text as the next chapter of PT.]

14

॥ नक्षत्रोपसर्गम् ॥ Nakṣatra Afflictions

१४.१ [अद्भुतसागरे ऋक्षाद्यद्भुते पराशरः]

अथ दश ऋक्षाणि रहस्यभूतानि भवन्ति । तद्यथा कृत्तिका रोहिणी मघा प्रौष्ठपदं सार्पमैन्द्रं वारुणं याम्यमाप्यं वैश्वदेवं च । तेषूपसृष्टेषु शुभग्रहाणां वक्रचारोदयास्तमयैः अशुभानामप्यथ यथोक्तचारैः भूकम्पोल्कापात-निर्घताशनिराहुकेतुविकृतैः वर्षासु वर्षं विद्यात् । समग्रैरुपसृष्टैःफलसामग्र्यं असमग्रैरसामग्र्यम् । रोहिणीज्येष्ठाप्रौष्ठपदानामुपघाते तीव्रतरं फलम् ॥

14.1 [*In AS on stars. Parāśara says*]

Ten stars happen to be mystical (secretive). These are Kṛttikā, Rohiṇī, Maghā, Prouṣthapada (Pūrvābhādra & Uttarābhādra), Āśleṣā, Jyeṣṭhā, Śatabhiṣak, Pūrvāṣāḍhā, Uttarāṣāḍhā, and Bharaṇi. In case any of these are afflicted, one should prognosticate rainfall in the rainy season by the movement, rise and setting of auspicious and inauspicious planets, by the occurrence of earthquakes, meteor fall, thunder and anomalies in eclipses and comets. If the full group of a star is affected, the result (good or bad) will also be full; otherwise it will be partial. Affliction of Rohiṇī, Jyeṣṭhā, Prouṣthapada produces serious results.

[Chapter 97 of BS is titled *Nakṣatrakarmaguṇa* in which Utpala quotes PT, some of which are same as those quoted by Ballālasena under *Ṛkṣādyadbhuta* in his AS. However it is

found AS has details of star groups describing their orientation and numbers. This is missing in BS and in the commentary by Utpala.]

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

अथ ऋक्षोपसर्गाः। अयथावद्योगश्चन्द्रमसः सूर्यानुप्रवेशो ग्रहोदयास्तमयरश्मिसंसर्गः । स्थानचारः परिवेष उल्काभियातो रश्मिहानिर्विवर्ण्यमिति । तेषां तारावयवशः पृथक्पृथक् फलमुपदेश्यामः ॥

14.2 [*Ballālasena : Now follows the ill effects of individual and combined afflictions of stars, as per Parāśara.*]

Now (we describe) afflictions of stars. Unnatural combination with Moon, entering of Sun (invisibility due to Sun following the star), mixing of the rays at rise and set of planets, shifting from its (regular) place, halos, contact with meteors, loss of rays (brightness) and change in colour; are the afflictions. We explain for each star individually the effects of such affliction.

[The word *upasarga* means something getting too close or created near a particular object. Hence if a star is found to be in close association with Moon or a planet or a comet it would be called *upasarga*. The unnatural combination with Moon refers to occultation. *Sūryānupraveśa* refers to Sun entering the sky as if following the star; that is invisibility following Sunrise. We have seen previously in (3.12) that the Yajurvedic people estimated the time of morning visibility of a star in the eastern sky for conducting some auspicious rites.This would have over a period of time lead to the concept of first visibility as with *Hasta* and *Agastya*. The other afflictions are due to occasional closeness of the star to other moving objects such as meteors, comets, and planets.

Sthāna-cāra or place-shift is an interesting anomaly since stars do not move when observed over short periods of time. However, on long time scales stars do have proper motion. The movement of star Arcturus has been well noted in Vedic texts. The original name of this star was *Niṣṭyā* and the Tai. Br. (1.5.2) recommends marriage under this asterism so that the bride remains dear to her parents and also does not renounce her husband's house. Very aptly the meaning of this word is *'kept out, staying away'*. Indeed *Niṣṭyā*, far away in the north identified well with α-Bootes (Arcturus) was noted to be a special star by Vedic people. As is known to modern astronomy this has large proper motion and is continuously moving southwards. This fact had been noted by Vedic seers and very appropriately Tai. Br. (3.1.4.13) celebrating this star offers:

vāyave svāhā, niṣṭyā́yai svāhā, kāmacārā́ya svāhā ||

The celestial Wind is the regent deity of *Niṣṭyā* and the star could move as it desired. The later more popular name *Svāti* directly alludes to the motion of this star across the sky. This word is traced to the root *ata-sātatya-gamane;* meaning *continuous-motion.* The word is derived as *svenaiva atati iti svātiḥ,* 'one that moves on its own'.[1]

The bad effects purportedly produced due to the afflictions of the 27 *nakṣatras* may not be of current interest except for astrologers who like to trace their present beliefs backwards. Even then this chapter of PT should be of interest from the historical perspective. Firstly the detailed description upholds the traditional view that Indian astronomy has had its origin in the observation of 27 or 28 Vedic nakṣatras considered as the abode of various deities. These were observed closely to gain knowledge of their temporary vanishing and *upasarga* which in

1 Radhakanta Deva, *Śabdakalpadrumam*, vol.5, Jain Publ. 1822, Calcutta.

turn has lead to the discovery of existence of planets and in course of time to the visibility and invisibility numbers for the inferior planets. The names of the geographical regions mentioned in this chapter are somewhat different from the regions mentioned in the previous chapter. It is likely the present chapter is the more ancient astral-geography later edited by newer additions and dividing the 27 stars into nine groups. Significantly the names of southern regions, mentioned in Chapter 13 are absent here. Some entirely new names are also present. Here, we present the star distributions and their probable modern identities. We do not go into full translation and discussion on the geographical regions and the portents. How the boundaries of the *nakṣatras* were marked is not mentioned in the text. But the number of stars making up the individual *nakṣatra* set is stated. Each *nakṣatra* is named with the approximate positions of the constituent stars. The described figures seem to be based on observation of the asterisms in the early morning eastern sky. The number of stars given in some cases is different from the number stated by Varāhamihira in BS. Atharva-veda-pariśiṣṭa (AVP) is an ancient text having close connection with Atharvaṇa Veda even though it is not accented as Vedic texts are. AVP contains interesting astronomical information that cannot be discussed here. It is later than PT but earlier than the Bṛhatsamhitā. AVP has a list of *nakṣatras* with their numbers and their effects on different habitats of ancient India. The number of stars under each *nakṣatra* as mentioned in the three texts PT, AVP and BS are listed in the notes below. Identification of the ancient *nakṣatra* with their modern equivalents is not easy except in a few cases such as *Kṛttikā*, *Rohiṇī*, *Svāti* as discussed in (3.12). A list of equivalent modern names is available in a publication by the Indian National Science Academy. Scientists investigating history of Indian astronomy have found this list unsatisfactory for several stars[2,3]. The modern names indicated in the notes

2 K.D. Abhyankar, *Misidentification of some Indian nakṣatras*, IJHS, 26.1, 1991, pp. 1-10.

3 P. Gondhalekar, *The Vedic Naksatras-A Reappraisal*, IJHS, 44.4, 2009, pp. 479-496.

below may not be the final ones except in cases where there has been an unbroken tradition of identification. The present chapter of PT along with the solar season zodiac of (3.1 and 3.12) may help identify the canonical vedic *nakṣatras* known to Parāśara.]

१४.३ तत्र कृत्तिकानामाद्या तारोपसृष्टा कलिङ्गानां दुर्भिक्षमुत्पादयति । प्रादक्षिण्येन द्वितीया दस्युगणवैद्यकपीडनी । तृतीया नृपशस्यविनाशिनी। चतुर्थी मगधकोशलानामुपतापाय । पञ्चमी विप्रान् पीडयति । षष्ठी दक्षिणपश्चिमान् जनवरान् निषादांश्च । युगपदुपसृष्टाः शूरसूक्ष्ममत्स्यपुण्ड्र–ताम्रलिप्तगौरेयहाटकपाण्ड्यकामरूपवङ्गाङ्गवेणुबन्धनसत्यारण्याहिताग्निब्रह्म–चारिणो धान्येषु यवानुपहन्ति । यश्चैकैकस्यां तारायामुक्तम् ॥

14.3 Affliction of the first star among the Kṛttikās induces famine in the Kaliṅga region. Proceeding clockwise the second star……

[This refers to the star group *Kṛttikā* or Pleiades consisting of six stars. The text identifies the first star to be affecting the Kaliṅga (Eastern) region unlike in the previous chapter (13.2) where *Kṛttikā* was correlated with the Central Country. If we take the first star to be the brightest, namely Alcyone, the other five are to be reckoned clockwise from this star. Almost every Vedic text refers to *Kṛttikā* as being the Head of the nakṣatras. In the early Vedic periods this star group was considered to have had seven stars. Ṛgveda knows this group as *Bahula*, meaning 'abundant'. Tai. Br. (3.1.4) names the individual seven stars of this group as *Ambā, Dulā, Nitatnī, Abhrayantī; Meghayantī; Varṣayantī,* and *Cupuṇikā*. Several of the Vedic texts identify *Kṛttikā* as defining the eastern direction and also count the stars as seven in number[4]. But later texts like the AVP count only six stars in the group[5].

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4 *tata etām agnaye prācīm diśamarocayanyat kṛttikāḥ|.....sapta vai kṛttikāḥ|....* (K.K.S. 6.6; Kā.S.8.1-3. M.S. 1.6.9)

5 *ṣaṭ kṛttikā ekā rohiṇī tisro mṛgaśira ekārdrā...* (AVP 1.2.1)

Modern names not necessarily in the above order are: Alcyone (η-Tauri), Taygeta (19-Tauri), Maia (20-Tauri), Atlas (27-Tauri), Merope (23-Tauri), Electra (17-Tauri). Whenever the single star *Kṛttikā* is referred it is taken as represented by η-Tauri. The variable star Pleione (28-Tauri) might have been the seventh star reckoned in the older Vedic texts. Star count: PT:6, AVP:6; BS:6.]

१४.४ रोहिणीनां प्रागुत्तरेणाद्या तारोपसृष्टा मगधेशान् भुजगांश्च पीडयति। उत्तरेण द्वितीया शस्यं सलिलं चोपतापयति । उत्तर एव तृतीया सा भूपान् महान्ति च कुलानि । दक्षिणपूर्वा चोपतप्ता बीजोपतापिनी । दक्षिणतः पञ्चमी प्रजानामुपतापाय । युगपदुपसृष्टाः सर्वा मौञ्जिपुरुषादगौडकपाञ्चाल-बन्धुधुर्यमहिषकुरुजाङ्गलशूरसेनानाम् । अन्नानां शालयः पीड्यन्ते । अस्यां पार्थिवानां शस्त्रप्रादुर्भावश्च । यच्च एकैकशः उक्तम् ॥

[*Rohiṇī* is made up of five stars. *Rohiṇī* is usually identified with star Aldebaran (α-Tauri). The first star of the group is stated to be in the northeast. If this is taken as the prominent star α-Tauri, the second and the third members are said to be in the north only. We can identify these as ε-Tau and δ_1-Tau. The fourth is located in the southeast of the figure. This corresponds to γ-Tau and the fifth one mentioned at the south would be θ_2-Tau. The description given by PT with five stars fits well with an early morning view of the eastern sky as shown in Fig.14.1 corresponding to (30-5-1350 BCE). Ill effects specific to affliction of each star are mentioned. Also it is said that all the stars can get afflicted together. *Rohiṇī-śakaṭa-bheda* or splitting of the cart of *Rohiṇī*, by Saturn, has been considered to be an extremely disastrous portent in Indian literature. Modern names: α, ε, δ, γ & θ-Tauri. Star count: PT:5; AVP:1; BS:5]

Fig.14.1 Early Morning View of Rohiṇī.

१४.५ मृगशिरस्युत्तरेण या तारोपसृष्टा यतिमुनिब्राह्मणान् पीडयति । पूर्वेण द्वितीया तङ्गणोशीनरान् । तृतीया सर्वशस्यानि । युगपत् सर्वाः शाल्व-निषादगान्धारौदीच्याम्बष्ठविदेहान् । बीजेष्वलावुककारुक्षोर्वारुकषाष्टिकान्। यच्चैकैकस्यामुक्तं शाल्वानां चाग्र्यम् ॥

[Mṛgaśiras is made up of three stars, in the constellation Orion. The first is in the north, the second in the east. The remaining is the third of the group. MS (2.13.20) and Kā.S (39.13.90) refer to this star as *Invakā*. Modern names: λ, φ^1, φ^2-Ori, or γ-Ori. Star count: PT:3; AVP:3; BS:3]

१४.६ आर्द्रायाः प्राग्भागस्योपतापे मालवदेविकानिवासिनश्चोपताप्यन्ते । दक्षिणस्य व्याधिचण्डालवैकृतिकबन्धनेपालानां कलिङ्गानां च सन्धिः। पश्चिमस्य मृगाधनुर्वृत्तयश्च । उत्तरस्य नदनदीपल्वलाक्षोदकचराश्च । सर्वतस्त्वश्मकाः। स्नेहेषु तैलं पयः सुरासवेषु । यच्च पार्श्वेषूक्तम् ॥

[Ārdra is a single star. The afflictions are listed separately for the east, south, west and north part of the star. MS and Kā.S refer to this star as *Bāhuḥ*. Modern name: Betelgeuse also known as α-Orion. Star count: PT:1; AVP:1; BS:1]

१४.७ पुनर्वसोरुत्तरतारोपसर्गे देवमनुष्याः पीड्यन्ते । इतराया वणिजश्चावन्तिकाश्च। उभाभ्यां भरुकच्छपाण्ड्यापरान्तकान्तगिर्युपगिरिसूर्पो-पावृत्तकाः । कार्पासं बीजेषु । यच्चोभाभ्यामुक्तम् ॥

[*Punarvasu* is made up of two stars, the first being in the north. Occultation of this is supposed to affect divine people, perhaps a reference to the vanishing of this star alluded in Vedic literature. Modern names: α, β-Gemini (Castor and Pollux). Star count: PT:2; AVP:2; BS: 5]

१४.८ पुष्ये पूर्वेणोपतप्तः पार्थिवान् पीडयति । दक्षिणेन चेदिमत्स्यान् ।

पश्चिमेन कुरून् । उत्तरेण क्षितीशान् । सर्वतः पाञ्चालसिन्धुसौवीरवर्धमान-नासिक्यरामगिरिगौरीपुरनिवासिनः । कार्षिका द्विजाग्र्यमेधाविकधार्मिकदधि-घृतपयांसि च । यच्च पार्श्वेषूक्तम् ॥

[*Puṣya* is a single star. This star known in Vedic texts as *Tiṣya* has been famous as the birth place of Bṛhaspati, the planet Jupiter. It is likely this refers to occultation of the star or close approach of Jupiter followed by recognition of the transient object as a planet[6]. Modern name: δ-Cancri. Star count: PT:1, AVP:1; BS:3]

१४.९ सार्पाणामुत्तरेणाद्या तारा तस्या उपसर्गाद्दंष्ट्रिणः उपतप्यन्ते । प्रदक्षिणेन द्वितीयायाम् । अहिग्राहिमायाकारबन्धनपालाः । तृतीयायां गजगजाध्यक्षाः। तदनु चतुर्थ्युपसृष्टा तस्करान् विनाशयति । पञ्चमी दौवारिकान् खरकरभशूकरान् । षष्ठी भुजगसरीसृपसुरामैरेयविदानुपहन्ति । युगपत् सर्वा विदर्भनैमिषमणीमतीनिवासिनः । वर्षाशालिशुण्ठीकोद्रवविनाशाय । यच्चैकैकश उक्तम् ॥

[This *nakṣatra Āśleṣā* is also called *Sārpa*, since it resembles the image of a serpent rising spreading its head, as shown in Fig.14.2. This is in the constellation Hydrae. The first member of the group is the northern one identified here as ζ-Hydrae. The others are said to be situated clockwise. Portents are mentioned for the affliction of each member. If all the six are simultaneously affected failure of rainfall is indicated. This, we suspect, should have been connected with the rainy months *Jyeṣṭha* and *Śrāvaṇa* straddling the *Aśleṣā-division* as per the season zodiac of PT (3.12). Modern names: ζ, ε, δ, σ, η and ρ-Hydrae. Star count: PT:6; AVP: 6; BS:6]

Fig. 14.2 Sārpa (Āśleṣā) with six stars resembling a serpent's head.

6 S.D.Sharma, *Conjunction of Jupiter with δ-Cancri*. IJHS, 31.3, 1996, pp. 269-274.

१४.१० मघानां दक्षिणतारोपतापे वासिष्ठाः पीड्यन्ते । तदुत्तरेण द्वितीया । तस्यामुपतप्तायां ओषधयस्ताम्रपर्णकाश्च । तृतीयायां वृध्द्युपजीविनः। चतुर्थ्यां कोष्ठागाराणि पितृधान्यं च । पञ्चम्यां माहिष्मतीनिवासिनः । षष्ठ्यां नागा नागाश्रिताश्च । युगपदुपसृष्टासु मल्लताम्रपर्णकाधिपगणबाह्यानि । यच्चैकैकश उक्तम् ॥

[*Maghā* is made up of six stars. From Fig 14.3 it is easy to identify the first member of the group situated in the south as Regulus or α-Leonis. The second is stated to be north of the first and hence it would be η-Leonis. No direction is given for the other four. But affliction of the fourth star is supposed to affect granary or storehouses on ground. In some texts *koṣṭhāgāra* is used as a synonym for *Maghā*. This again refers to the disposition of the stars as if making an inner chamber or enclosure. *Maghā,* usually in the plural, is known in the Ṛgveda as *Aghā.* The brightest star of this group is identified with Regulus. The representative star of *Maghā* would be Regulus. It is very close to the ecliptic and hence susceptible for occultation. Modern names: α, η, γ, ζ, μ, ε-Leonis. Star count: PT:6; AVP:6; BS: 5]

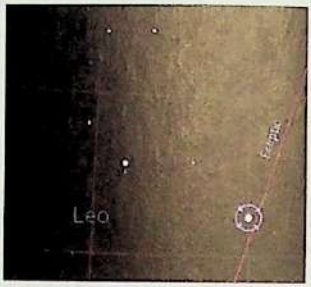

Fig. 14.3 Maghā with six stars

१४.११ भाग्योत्तरतारोपघातेन किराताश्चोपताप्यन्ते। अपरायाः सुभगवनकाम्बोजाः। युगपदुपसृष्टे तदधिपतिपाञ्चालाभीरभागीरथमहापथविदेहान् पीडयतः । रसेषु गुडविकारान् । यच्चैकैकश उक्तम् ॥

[*Bhāgya* refers to *Pūrva-phalgunī* whose deity is Bhaga. This has two stars with north south orientation. Modern names: δ,θ-Leo. Star count: PT:2; AVP: 2: BS: 8]

१४.१२ आर्यम्णस्य दक्षिणोपसृष्टा मगधाधिपतिविनाशाय । उत्तरा

उत्तरनिवासिनां शस्यानां च । उभे विदेहशाल्वमत्स्याङ्गमगधनेपाल-त्रैपुराहिताग्नीनाम् । शस्येषु कुलुत्थानाम् । यच्चैकैकश उक्तम् ॥

[Āryamā is *Uttara-phalgunī* with Aryamā as the regent deity. This consists of two stars with north south orientation. Modern names: β, 93-Leo. Star count: PT:2; AVP:2; BS: 2]

१४.१३ सावित्रस्य पूर्वदक्षिणेन तारोपसृष्टा तस्करान् पीडयति । द्वितीया दक्षिणेन प्राच्यान् । तृतीयोत्तरेण सौरगिरिकान् । चतुर्थ्युत्तरेण योगयुगन्धरभिक्षुकान्। एतस्यां तु पञ्चमी समिकलोत्कलद्वीपपुरराष्ट्राणि। युगपत् सर्वा दण्डकमध्यारण्यकचेदिगोकर्णयामुनसप्तराष्ट्रवैणिक-दशार्णाङ्गवङ्गसौरगिरिकांश्च। चतुष्पदेषु द्विरदान् । बीजेषु निष्पावमूलकानि । औषधेषु पिप्पलीम् । यच्चैकैकश उक्तम् ॥

[*Sāvitra* is the *nakṣatra Hasta* with five stars having *Savitṛ* as the regent deity. It is the well recognizable Corvus looking like a palm with five stars. The first star is in the southeast, second is in the south. The next two are in the north. The remaining star is the fifth of the group. Modern names: α, β, δ, γ, ε-Corvus. Star count: PT:5; AVP:5; BS:5]

१४.१४ अथ चित्रा प्राच्यां दिशि उपसृष्टा चेदीनामपां चाहिताय याम्यायां दण्डकाश्मकानाम् । वारुण्यां नटनर्तकचित्रकाराणाम् । सौम्यायामार्त्तिकानां भावानाम् । सर्वासु पञ्चालकैकयभागिरथकुरुगन्धर्वस्थलमद्रमाषमुद्गानाम् । विशेषतः कैकयश्रेष्ठानाम् । यच्चाशासूक्तम् ॥

[*Citrā* is a single star identified as star Spica. Afflictions are described on the four parts of the star starting with the east direction. Modern name: α-Virginis, also known as Spica. Star count: PT:1; AVP:1: BS:1]

१४.१५ स्वातिः पूर्वेणोपसृष्टा वातवृष्टिं जनयति । दक्षिणेनातिवृष्टिम् । पश्चिमेन सिन्धुसौराष्ट्रनृपांश्चोपहन्ति । उत्तरेण यवनकाम्बोजान् । सर्वतस्तु उशीनरावन्तिचेदिवासोदियाभिसारकदरदकाश्मीरोत्तरकुरूणां अभावाय । शाकेषु सर्वपाराणाम् । चतुष्पदेषु एकशफानाम् । पश्चाच्चाभिषिक्तः शैलाटविकश्च राजा विनश्यतीति॥

[*Svāti* is a single star identified as Arcturus. The older Vedic name for this star was *niṣṭyā* meaning one who is kept out. This name refers to the star being too much north of the ecliptic. This star has the largest absolute motion and quite appropriately the name *svāti* is derived as *svenaiva atati iti svātiḥ*; one who moves on its own. Occultation of *Svāti* by Moon or other planets would not have been possible. However affliction due to comets, meteors and proper motion might have been observed in ancient times. Modern name: α-Bootes also known as Arcturus. Star count: PT:1; AVP:1; BS:1]

१४.१६ विशाखोत्तरतारोपसर्गे कोशलेक्ष्वाकव उपसृष्ट्यन्ते । इतरायां भ्रातरो विभक्ताः कुरवश्च । युगपदुपसर्गे यमजाः । शस्येषु यवगोधूमाः । यच्चैकैकश उक्तम्॥

[*Viśākhā* has two stars with north south orientation. Modern names: α, β-Librae. Star count: PT:2; AVP:2; BS:5.]

१४.१७ अनुराधानामुत्तरेण ज्योतिरुपहतं सन्धिविग्रहं मित्रभेदं स्वस्थकोशलानां चोपतापं जनयति। दक्षिणेन द्वितीयचमूपतिद्वाराधिपतीनाम् । तृतीयं दक्षिणेन बालेषु विदग्धानां च । चतुर्थं शस्यानां च। युगपदुपसृष्टा मगधाङ्गकाशिवैदेहभागीरथहिरण्यकुटुम्बकानाम् । तत्पश्चिमे यवनकाम्बोजानाम्। युगपत्सर्वासु इन्द्रप्रस्थमाहेन्द्रगिरिम् । मध्यं पृथिव्याश्चेदिपृष्टमभिसारं क्षेमधृतिदरदांश्चोपहन्ति । मृगादिपशुहानिः । ऐडविडानां च श्रेष्ठस्येति । यच्चैकैकश उक्तम् ॥

[*Anūrādhā* is made up of four stars. The first is in the north. The next two are in the south. The fourth is to the west of the others. Modern names: δ, β, π, ω-Sco. Star count: PT:4; AVP:4; BS:4]

१४.१८ ज्येष्ठामध्यमधिष्ण्योपघाते ज्येष्ठनृपतिप्रधानजननारीविनाशं विन्द्यात्। पूर्वेण विदेहानाम् । एकशफानां पशुषु । स्वदेशेषु नृपस्य । शस्येषु कलायानां च। यच्चैकैकश उक्तम् ॥

[*Jyeṣṭhā* as per PT perhaps has three stars. There is mention of a middle star getting affected. There is mention of an affliction on the eastern side. The text in AS appears broken and hence not clear. Modern name: α-Sco also known as Antares. Star count: PT:3; AVP:1; BS:3]

१४.१९ मूलस्य पूर्वेणैकतारोपसृष्टा शस्यानां विपत्तये राष्ट्रदुर्भिक्षाय। उभे ग्रामनगरनिगमजनोपदेष्टृकर्णप्रावरणदस्यु-सौवीरमहिषमाहिष्मतीगिरिव्रजनिवासिनामभावाय। रसेषु च लवणस्य । मणिमतीनां च श्रेष्ठस्य । यच्चैकैकश उक्तम् ॥

[*Mūla* has two stars with east west orientation. Modern names: θ, λ-Sco. Star count: PT:2; AVP:7; BS:11]

१४.२० पूर्वाषाढायाः पूर्वेण तारद्वयमुपसृष्टं कूपनदीसरःसागरसलिलाशयानां उपतापं जनयति । अपरं काशीनाम् अवर्षं शवरेशविनाशं च । युगपच्चतस्रः त्रिगर्त्तवीतिहोत्रभार्गवबर्हिणप्रभासमार्यसुखं संजनयति। सागराश्रितांश्चोपहन्ति मत्स्येषु बर्हिकान् माहिष्मत्याः श्रेष्ठम् । यच्चासां द्वन्द्वश उक्तम् ॥

[*Pūrvāṣāḍhā* is made up of four stars, mentioned as two twins, the first two being in the east. AVP considers the two *āṣāḍhās* together and gives the count as eight. Modern names: λ, δ, ε, γ-Sagittari. Star count: PT:4; AVP:4; BS:2.]

१४.२१ वैश्वदेवस्योत्तरेण धिष्ण्यद्वयमुपसृष्टं चतस्रः समाः प्रजाः पीडयन्ति। दक्षिणेनामात्यधर्मिष्ठकांशिपुत्रं गृहस्थान् । युगपत्सर्वेषूपतप्तेषु वीतिहोत्र-मर्जुनायनताम्रपर्णसैन्धवारण्यनैमिषजच्युतमर्गकौशिकसारस्वतान्। सर्वाणि च पुण्यायतनानि । वर्णेषु ब्राह्मणान् पार्थिवेषु अग्र्यान् । यच्च द्वन्द्वश उक्तम् ॥

[*Vaiśvadeva* is *Uttarāṣāḍha* with *Viśvedevā* as the deity. This also is made up of four stars. The first twin star is in the north, affliction of which is said to induce difficulty to people for four years. Modern names: τ, σ, φ, ζ-Sagittari. Star count: PT:4; AVP:4; BS: 8]

१४.२२ तथा अभिजिता मध्यतारोपतापः शोषयति देवान् । द्वितीयोत्तरेण ब्राह्मणानृषिगणांश्च। तृतीया दक्षिणेन नृपराष्ट्रकामात्यान् । युगपत् सर्वान् ब्राह्मणान् ब्राह्मीं पुरव्रीहिमतीं पूर्वगङ्गां स्वर्गङ्गां कालकूटां स्वस्तिभद्रां सर्पातिपन्नगयवनद्वीपं ब्रह्मचारिणो द्वीपेषु भद्राश्वान् पर्वतेषु पञ्चपर्वतपुष्परुद्रकान् कुलेषु श्रेष्ठान् । यच्चैकैकश उक्तम् ॥

[*Abhijit* consists of three stars. The first mentioned is at the centre of the figure. The second is in the north, the third being in the south. *Abhijit* is generally not included in the 27 *nakṣatra* list. Modern names: α, ε, ζ-Lyra. PT:3; AVP:1; BS: Not given.]

१४.२३ श्रवणस्य मध्यमतारोपसृष्टा धनुर्धराणामभावाय । अपरा दक्षिणेन शूरसेनानां क्षत्रस्य । उत्तरेण तृतीया शूरसेनयवनकाम्बोजानां च । युगपत् सर्वाः त्रिगर्त्तानर्तमालवक्षुद्रकार्जुनायनाभीरयौधेयाम्बष्टसुह्मकान् । रसेषु सर्वरसानां च सकामानां च श्रेष्ठस्य । यच्चैकैकश उक्तम् ॥

[*Śravaṇa* is also made of three stars. The first one is in the centre the second in the south. The third star is in the north of the figure. Kā.S denotes this star as *Aśvatthaḥ*. Modern names: α, β, γ-Aquila. Star count: PT:3; AVP:3; BS:3]

१४.२४ धनिष्ठायाः पश्चिमेन तारोपसृष्टा शकयवनकाम्बोजोत्तरनेपालानामहिताय। द्वितीयोत्तरेणोत्तरपर्वतवासिनाम् । तृतीया पूर्वेण पूर्वसागरसंस्थितानाम्। चतुर्थी दक्षिणेन पक्षियवकलायसर्षपाणाम् । प्रत्यग्दक्षिणेन पञ्चमी सिन्धुसौवीराभीराणाम् । युगपत् सर्वाः पाण्ड्यकैरातोड्रशोकमोकस्वमोक-तलरवाङ्गवङ्गहेमकूटसिंहलोत्कलनैकरसमूलमध्यदेशबाह्लीकसैन्धवकाल-कूटेक्षुमतीनिवासिनाम् । शस्येषु मुद्गानाम् । शकेषु श्रेष्ठानाम् । यच्चैकैकश उक्तम् ॥

[*Dhaniṣṭhā* is made up of five stars. The enumeration is done starting from the west. The second is in the north followed by the third and the fourth in the east and south respectively. The fifth star is mentioned to be in the southwest of the figure. According to Tai. Br., the *Śraviṣṭhā* group has only four stars[7]. Modern names: α, β, δ, γ, ε-Delphinus. Star count: PT:5; AVP:5; BS:5]

१४.२५ अथ वारुणं पूर्वेणोपतप्तं कलिङ्गान् पीडयति । दक्षिणेन दक्षिणसमुद्रम्। पश्चिमेन पश्चिमभिषक् क्षुद्रौषधानि। चोत्तरेण सर्वोषधीः स्त्रीश्च सर्वतस्ताम्रपर्णां ताम्रलिप्तकहाटकसुह्मभरुकच्छपिङ्गभूपतिमूलापरान्त-कपुक्कशाश्मकपुरेन्द्रराष्ट्रसौरगिरिशैलेयपारियवनान्। सस्येषु यवगोधूमान्। ताम्रपर्णपार्थिवान् । यच्च पार्श्वेषूक्तम् ॥

[*Vāruṇam* is star *Śatabhiṣak* with *Varuṇa* as the deity. This is made of only one star and not hundred as in some later texts. The affliction is mentioned part by part of the star, starting from east and proceeding south, west and north. This star is close to the ecliptic. Modern name: λ-Aquarius. Star count: PT:1; AVP:1; BS:100]

१४.२६ प्राक्प्रौष्ठपदोत्तरतारोपसृष्टा मगधाङ्गपुण्ड्रयवनकाम्बोजानामुपतापकर्ता। दक्षिणेन एकपगोमताम्। युगपदुभे भिषगम्बष्ठमेकलोत्कलपुलिन्दशबर-

7 *catasro devīrajarāḥ śraviṣṭāḥ* (Tai. Br. 3.2.6)

दर्दुरमलयनर्मदासिन्धुसौवीरकाश्मीरहितहिरण्यबाहुवैशालेयशशकुन्त-रजमार्गगोगजाश्चानाम् । यच्चैकैकश उक्तम् ॥

[*Prāk-prouṣṭapada* is *Pūrvābhādra* consisting of two stars. The first is in north and the other relatively southwards. Modern names: α, β-Pegasus. Star count: PT: 2; AVP:2; BS:2]

१४.२७ आहिर्बुध्न्योत्तरतारोपसृष्टा महात्मनां राज्ञामहिताय । अपरा मगधकाश्मीरराजानाम् । युगपदुभे काम्बोजोशीनरत्रिगर्त्तकाश्मकार्जुन-क्षुद्रकमालवाभीराणाम् । सर्वत्र महतां कुशलानाम् । रसेष्विक्षुरसानाम् । यच्चैकैकश उक्तम् ॥

[*Āhirbudhnya* is *nakṣatra Uttarābhādra* with two stars. AVP considers the two *Prouṣṭapada* together to give the count as four. Tai. Br. also counts the number of stars in the *Prouṣṭapada* constellation as four[8]. Modern names: γ Pegasus, α Andromedae. Star count: PT:2; AVP:2; BS: 8]

१४.२८ रेवती पूर्वेणोपसृष्टा पशूनुपहन्ति । दक्षिणेनानर्त्तान् । पश्चिमेन बाह्लीकसिन्धुसौवीरकीरपह्लवान् । उत्तरेण आपः सर्वतः सुराष्ट्रवैदेहहिरण्य-पादक्षुद्रकमालवमलयजवृजिनहैमवतबाहुदाकुम्भिभोजानाम् । हिरण्यपादानां च श्रेष्ठम्। यच्च पार्श्वेषूक्तम् ॥

[*Revatī* is a single star. The afflictions are mentioned on the directional parts of the star. Modern name: α- or ζ-Piscium. Star count: PT:1; AVP:1; BS:32]

१४.२९ आश्विनस्योत्तरतारोपसृष्टा किरातकाम्बोजत्रिगर्त्तपह्लवान् पीडयति। अपरा रूपधनगुणान्वितचिकित्सकैकद्विशफानाम् । युगपदुभे प्राच्यो-दीच्यबाह्लीकपारतदरदकाशिकवत्सनिषादानर्त्तान् किष्किन्धान् यवनानां च

8 *proṣṭhapadāso abhirakṣanti sarve catvāra ekamabhi karma devāḥ* (Tai.Br. 3.1.2.9)

श्रेष्ठं बीजेषु ओषधीन् । अध्यक्षेषु चाध्यक्षान् । यच्चैकैकश उक्तम् ॥

[*Āśvina* is *nakṣatra Aśvini* made up of two stars oriented north-south. Modern names: α, β-Aries. Star count: PT:2; AVP:2; BS:3]

१४.३० भरणीनां प्राक्तारोपतप्ता मेकलोत्कलकलिङ्गान् पीडयति । दक्षिणा प्रत्यन्ततस्करान्। उदक् प्राणिनः सस्यं च । सर्वाः शबरबर्बरपुलिन्द-तिमिङ्गिलदुर्भटाङ्गवङ्गरोडुमेकलान् । सर्वदस्युकलिङ्गानां दक्षिणार्धम् । शस्येषु शूकधान्यम् । पूर्वमेकलानां श्रेष्ठं च । यच्चैकैकश उक्तम् ॥

[*Bharaṇi* is the last *nakṣatra* in this list. This is made up of three stars, the first one being in the east. The second is in south while the third is in north. Modern names: 41, 39, 35-Aries (?). Star count: PT:3; AVP:3; BS:3]

[The above list of 28 *nakṣatras* made up of 82 individual stars indicates that in more ancient times the ecliptic was not equally divided but marked in terms of visible groups of one or more stars. In the period of VJ and PT this was divided equally into six seasons each of four-and-half *nakṣatra* stretch. The affliction of the stars due to close approach of Sun, Moon and planets and their earthly interpretation surely heralded the birth of Hindu astrology with PT. In this effort PT has expanded or compiled prevalent practices in the ancient Indian society. These include Vedic practices mentioned in the *sūtra* literature on house warming, seed sowing etc on particular days governed by specific *nakṣatras*. PT has much more to say about *nakṣatras* than planets. This is again a clear indication of the more ancient nature of astrology divined by Parașara in contrast to the personalized horoscope based astrology of the medieval period. However, Parāśara does propose natal astrology as seen later in this Chapter. Ten stars were characterized as mystical or as concealing something as in (14.1) above. PT contains

further characterization of the *nakṣatras* in terms of their special properties such as fixed, soft, fast, harsh, fierce, moving and normal.]

१४.३१ चत्वारो हि चतुष्का ध्रुवो मृदुर्दारुणस्तथा क्षिप्रः ।
उग्राणि पञ्च पञ्च चराणि साधारणे द्वे च ॥

14.31 *Four nakṣatras are dhruva that is, they are certain and fixed. Soft, harsh and fast groups contain four stars each. Five stars are fierce and another five are movable. The remaining two are ordinary.*

१४.३२ चत्वारि खलु नक्षत्रेषु ध्रुवाणि भवन्ति । प्राजापत्यं त्रीण्युत्तराणि । तेषु पुरनगरग्रामकाननोपवनभवनानि । वेश्मनतरुकुसुमबीजवपनस्थिरनिधि-निधानकृषिधनगोऽश्वमित्रसङ्ग्रहणस्नपनालङ्करणपल्युद्वहनचरणाभिगमन-नृपतिनायकाभिषेकमन्त्रेज्याव्रतनियमायुष्यपौष्टिकशान्तिकधान्यानि स्थिराणि कारयेत् । ऋणधनप्रयोगपथगमनमद्यवैरक्षौराणि वर्जयेत् ॥

14.32 *In Rohiṇī and the three Uttarā stars (Uttara-phalgunī, Uttarāṣāḍhā and Uttarābhādrā) firm (constant, fixed) actions happen. All construction activities, storage of grains, immovable assets, marriage, crowning of kings, rites for health should be done under these stars. Borrowing, expenditure, travel, drinking and hair removal should be excluded.*

१४.३३ चत्वारि नक्षत्रेषु दारुणानि भवन्ति। आर्द्राऽश्लेषा ज्येष्ठा मूलमिति। एतेषु अरिनगरस्कन्धावारावरोधनम् । अथ नरेन्द्राभिघातयुद्धकलहकूटसाहसोपधानभद-वञ्चनविवादचौर्यानृतकितवच्छलनपणयन्त्रायुधग्रहणकरणदर्शनाभिचार-गदवियोगवधभृत्यनिग्रहचतुष्पददमनभटनियोगान् । विशेषतो मूले मूलकर्म। रुद्रर्क्षेषु पीडनवपनधान्यतरुकुसुमबीजवेश्मप्रवेशस्थिरनिधिनियोगांश्च कारयेत् । सर्वेषु च सर्वं दारुणं कर्म ॥

14.33 *In the four stars, Ārdrā, Āśleṣā, Jyeṣṭhā and Mūla gruesome*

(sharp, pitiless) actions happen. Under these stars attack of enemy forts, wars, adventures, deception, arguments, stealing, gambling, machinery, weaponry, black magic, control of servants, capture of animals and soldiers can be carried out. Harsh activities can be carried out under these four stars.

१४.३४ पञ्च नक्षत्रेषु उग्राणि भवन्ति। मघा भरणी त्रीणि पूर्वाणीति। एषु भटचौरगुल्मपुरुषदूतकारशौल्क्यशाठिकक्षुद्रान् स्थापयेत् । तथा निभृतनियमनप्रणधिसम्प्रयोगवैरोत्थानकलहकोलाहलसम्प्रहारवञ्चन–विवादान्यद्रव्यहरणान्यदारगमनद्यूताभिसारबिलप्रवर्तनयुद्धयोद्धायुधग्रहण–करणदर्शनारम्भाणि। नगरग्रामजनपदपुराभिघातयन्त्रोपकरणदुर्गक्रियाणां परायिकप्रयोगान् । युद्धसङ्ग्रामाभियोगेषु प्रथमरयः अभिहन्तव्या इत्यादिषु विषप्रयोगानलविसर्गाभिचारं कारयेत् । विशेषतः पित्र्ये अपितृपिण्ड–सम्प्रदानकोष्ठागारविविधाकारनिधानानि । भाग्ये सौभाग्यकस्थावराणि आप्ये जलवाहसुरासवकूपनदीवाहकुल्याखननानि । सर्वेषु सर्वमुग्रं च ॥

14.34 *In the five stars Maghā, Bharaṇī, and the three Pūrva stars (Pūrva-phalgunī, Pūrvāṣāḍhā, Pūrvābhādrā) violent (fierce, harsh) actions take place. In these stars, servants, thieves, gardeners, messengers, tax collectors and menial workers can be appointed. Similarly, punishment, acts of hatred, skirmishes, quarrels, beating, scheming, property disputes, fighting, etc can be carried out under these stars. In nakṣatra Bhāgya (pūrva-phalgunī) fixed objects portending wellness may be created. Under Pūrvāṣāḍhā, water carrying works, brewing intoxicating beverages, wells, river channels, ponds can be dug out. Fierce acts are carried out under these five stars.*

१४.३५ चत्वारि नक्षत्राणि क्षिप्राणि भवन्ति । हस्तः पुष्यः अभिजिदश्विनमिति। एतेषु विविधपण्यविक्रयधनप्रयोगःअश्वाश्वतरखरकरभदमनस्कन्धावारबल–सार्हनिर्याणदूतचरसम्प्रेषणाश्वगमनयजनयाजनाध्ययनाध्यापनशिल्पारम्भ–ध्वजपताकातपत्रवालव्यजनसमुच्छ्रयस्नपनगजग्रहणारोहणभैषज्यरक्षोग्र–

गदौषधग्रहणधारणानि सर्वाण्येव च अत्र क्षिप्राणि कर्माणि कारयेत् ॥

14.35 *The four asterisms Hasta, Puṣya, Abhijit and Aśvinī are swift (speedy, quick). Under these stars, variety of trade, commercial transactions, control of elephants, horses, donkeys, sending of messengers, Vedic sacrifices, starting of sculptures, therapy, medical treatments can be carried out. All speedy work should be done under these four stars.*

१४.३६ द्वे नक्षत्रे साधारणे भवतः । कृत्तिका विशाखेति । तयोः मृदूनि दारुणनि कर्माणि कुर्यात् । धातूत्पादनावर्तनभाण्डागारविपणिपण्योपकरणानि। यज्ञेष्टिदहनोपतापनेक्षुघृतविपाचनं वृषभोत्सर्गपशुसङ्क्लनदमनानि आरभेत । सर्वप्रहरणानि कारयेत् । ग्रामशिबिरपुरव्रजननगरव्युत्पथबन्धम् । विशाखायां विशेषेण इक्षुवृक्षबीजलताकुसुमानि वापयेत् ॥

14.36 The two nakṣatras, *Kṛttikā and Viśākhā* are common (normal, ordinary). Under these soft and harsh actions can be carried out. Mining of minerals, purification, instruments for treasury, store, and mint can be carried out under these stars. Sacrifices, fire rites, burning, heating, jaggery and ghee making can be started on these stars. Especially under *Viśākhā*, sugarcane and other tree, creeper and flower seeds should be sown.

१४.३७ पञ्च नक्षत्राणि चराणि भवन्ति स्वातिः पुनर्वसुः श्रवणं धनिष्ठा शतभिषगिति। एतेषु कुञ्जरमृगमहिषतुरगखरकरभ–गवां समावहनानि । विशेषेण पुनर्वसौ पुनर्भूगमनं विटकरणम् । वारुणे सुरासवसन्धानसरःसरित्सेवौषधविधानानि। सर्वेषु विशेषेण सर्वं चरकर्म कुर्यात् ॥

14.37 *Svāti, Punrvasu, Śravaṇa, Dhaniṣṭhā,* and *Śatabhiṣak* happen to be the five unsteady (moving) stars. Under these elephant, buffalo, horse and other animals have to be procured. *Punarvasu* is known for approaching a remarried lady and for illicit relations. Generally, moving work can be done under these stars.

१४.३८ [अद्भुतसागरे । अथ नाडीनक्षत्रपीडाफलम्। तत्र पराशरः ।]

ग्रहैरुपहतं यस्य नक्षत्रमिह दृश्यते ।
विद्यात् पराभवं तस्य कर्म चास्य विपद्यते॥
चतुर्थं जन्मनक्षत्रं यस्मात् तन्मानसं भवेत् ।
साङ्घातिकं षोडशकं यदृक्षं प्रसवर्क्षतः ॥
यन्मानसार्क्षादेकोनविंशं सामुदायं स्मृतम् ।
दशमं जन्मनक्षत्रात् नक्षत्रं कर्मसञ्ज्ञितम् ॥
वैनाशिकं तु नक्षत्रं कर्मर्क्षाद्यच्चतुर्दशम् ।
एतेष्वनुपतप्तेषु मानवो नोपतप्यते ॥
ऋक्षेषु षट्सु युगपत् संतप्तेष्वाशु नश्यति ॥

14.38 [*In AS. Parāśara describes the results of Nāḍī-nakṣatras getting distressed.*]

If the natal nakṣatra of a person is observed to be affected by planets, then he faces defeat and his work gets disturbed. Mānasā is the star from which the birth star is the fourth. From the birth star the sixteenth is Sānghātikam. The nineteenth (21st?) star from Mānasā is known as Sāmudāyam. The tenth from the birth nakṣatra is known as Karma nakṣatra. Vaināśika is fourteenth from the Karma nakṣatra. If these stars are not afflicted, the person does not suffer. If all the six stars get distressed simultaneously, the person gets destroyed soon.

[Counting from the natal nakṣatra the 10th star is *Karma*; the 16th is *Sānghātika*; the 18th is *Sāmudāya*; the 23rd is *Vaināśikā*; the 25th is *Mānasā*. In the text there appears to be an error in the count for *Sāmudāya*. It is said to be 19th from *Mānasa*, in which case it will be same as *Sānghātika*. Varāhamihira in his *Bṛhadyātrā* gives *Sāmudāyam* as the 18th star from the birth star which should be correct.]

१४.३९ [अथ शान्तिमाह पराशरः]

तत्र जन्मर्क्षोपतापे श्वेतवृषभस्य शकृन्मूत्रं तद्वर्णायाश्च गोः पयः कुशांश्च उदकुम्भे निधायाभिषेचनं कुर्यात्। कर्मर्क्षे गौरसर्षपप्रियङ्गुशतपुष्पीशतावरी-भिरभिषिक्तो मधुघृतमिश्रमग्नौ हुत्वा दशरात्रं ब्रह्मचारी मांसक्षारक्षौद्रमद्यानि वर्जयेत् । साङ्घातिके प्रियङ्गुबिल्वसितसर्षपशरलपिप्पलशतावरी-चन्दनोदकैरभिषेचनं कुर्यात् । सामुदायिके सर्वगन्धसर्षपाक्षतैः त्र्यहं स्नानं सुमनोभिरभिनवैः कुसुमैश्च द्विजानर्चयेत् । वैनाशिके वृषशृङ्गोद्धृत-मृद्बिल्वोत्पलसोमशतपुष्पाम्भसा अभिषेकं कुर्यात् । मानसे अश्वत्थसित-चन्दनशिरीषकुञ्जरमदाम्भसा सुस्नातस्तोयभवैः कुसुमैः सोममभ्यर्चयेत् । व्रतं चान्द्रायणमाचरेत् ॥ यथा नक्षत्रपूजां बल्युपहारमग्निहोमं च कुर्यात् ॥

14.39 [*Parāśara prescribes Śānti for warding off the ill effects*]

When the natal star is affected, urine and dung of a white bull and milk of a cow of the same colour, along with darbha grass has to be kept in a pot and poured on the head. In the case of Karma star; having bathed with white mustard, priyaṅgu, śatapuṣpī, śatāvarī; having offered oblations of honey and ghee in fire, the person should remain celibate staying away from meat, and alcohol for ten nights. In the case of Sāṅghātika, one should bathe in water mixed with priyaṅgu, bilva, white mustard, śarala, pippala, śatāvari and sandal. In the case of Sāmudāyika, one should bathe for three days (in water mixed) with all perfumes, mustard, turmeric mixed rice and offer respects to the twice born (Brāhmaṇas) with beautiful and new flowers. In the case of Vaināśika one should bathe in water mixed with mud lifted by the horns of a bull, bilva, night lilly, soma, and śatapuṣpi. In the case of Mānasa, one should bathe (in water mixed) with aśvattha, white sandal, śirīṣa flowers and the sweat of an elephant and further worship Moon with waterborn flowers. One should observe the rite of Cāndrāyaṇa. In all cases worship of nakṣatras with prescribed paraphernalia and fire oblations should be offered.

[The above two sections amply uphold that before the advent

of horoscope astrology, Vedic Hindus were following personal (natal) astrology based on visible *nakṣatras*. The birth star or Moon sign was the first star for the concerned person. Some kind of predictive divination was done by observing whether the 10th, 16th, 18th, 23rd and the 25th stars from the birth star were afflicted or not. Ballālasena refers to the six stars at the specified intervals as *Nāḍī nakṣatras*. The religious rites mentioned includes *nakṣatra-pūjā* which should have been same as or similar in spirit to the *nakṣatreṣṭī* of the Tai. Br., and the *nakṣatra-kalpa* of the AVP. The bad portents or *upasarga,* as we have seen, include visible closeness of planets to the stars. But interestingly enough no planet worship is prescribed in PT. It would be natural for Parāśara or his school to have given the character of persons born under the 27 stars. Utpala commenting on the *nakṣatra-jātakādhyāya* of BS quotes a set of 25 verses as due to Parāśara. This is not the style of PT, which is mainly in prose. However for sake of completeness these verses are given below.]

१४.४० [बृ.सं. नक्षत्रजातकाध्याये उत्पलविवृतौ । पराशरः ॥]

विज्ञानवानरोगो भिषक् प्रदातार्थभृत्यवनितेशः ।
दक्षः क्षितिपतिसेवी जातः स्यादश्विने शूरः ॥
धीरः क्रूरोऽनृतवाक् परवित्तहरो नरश्चपलबुद्धिः ।
बहुशत्रुपुत्रभृत्यो याम्ये प्रियमांसमद्यश्च ॥
धर्ममतिर्बहुवित्तः स्वाध्यायाभिजनरूपसंपन्नः ।
अकृपणमतिः शशियुते जातः स्यादग्निदैवत्ये ॥
सुतधनपशुमान् विद्वान् दाता धीरोऽल्पवाक् स्थिरमतिश्च ।
वृषभगतिस्तेजस्वी प्राजापत्ये नरो जातः ॥
अतिशीलरूपदृष्टः सौम्यमतिः सोद्यमः श्रुतिरहस्यः ।
चपलमतिः सुविनीतो जातः स्यादिन्दुदैवत्ये॥
रौद्रः क्रूरः क्रोधी परदारार्थापहारशीलश्च ।

वाङ्निष्ठुरोऽतिधीरो जातः स्याद्रुद्रदैवत्ये ॥
क्षयवृद्धिभावनायां यशांसि विदिशो भवन्ति कृच्छ्राणि ।
व्याधिबहुलो बहुसुतः पुनर्वसोः जायते मनुजः ॥
द्युतिकान्तिसत्त्वयुक्तो बहुश्रुतो दारदासधनचेष्टः ।
विपुलकुलवंशकर्ता वक्ता पुष्ये नरो जातः ॥
स्वल्पगतिः जिह्माक्षः क्रूरः क्रोधी नरः सदामर्षः ।
दाता हन्ता भोक्ता सार्पे जातो बहुव्यसनः ॥
पितृभक्तः क्रोधवशो मात्रा पितृयज्ञसत्रयाजी च ।
द्विचतुष्पदमित्राढ्यो बह्वरिमित्रो नरः पित्र्ये ॥
बहुभाग्योऽल्पापत्यः सुभगः प्रियदर्शनो नरोऽल्पधनः ।
नातिप्रबुद्धबुद्धिः परभाग्यविभुर्भवति भाग्ये ॥
हयगजरथप्रयायी दाता भोक्ता विहाररतिशीलः ।
मृदुवाग्गीतरतिः स्यादर्यम्णे मानवो विद्वान् ॥
उपचितकरचरणभुजो बहुविधधनधान्यताग्रणीः सेर्ष्यः ।
धर्मार्थकामभागी हस्ते सुतवान्नरो जातः ॥
वेदार्थशास्त्रकुशलः पशुमानत्यन्तशिल्पकर्मा च ।
चित्राक्षश्चित्रायां सुभगश्च नरस्त्रिपुत्रश्च ॥
बहुजनभर्ता वक्ता त्रिवर्गभोक्ता प्रियो महोत्साहः ।
वामाचारोऽल्परिपुः स्वातौ जातः कुलाग्र्यश्च ॥
श्रीमानिज्याभिरतः प्राज्ञोऽनुपसाधुकृत् कृतार्थपतिः ।
तीक्ष्णोऽभिमानयुक्तश्चैन्द्राग्नौ ख्यातकीर्तिश्च ॥
स्थिरमित्रस्तेजस्वी सुतवानत्यन्तसौख्यभागी च ।
ज्ञातिष्वग्र्योऽर्थपरो जातः स्यान्मित्रदैवत्ये ॥
ज्ञातिषु गुणेषु राजसु पूजां प्राप्नोति नाशयति शत्रून् ।
तेजोऽधिकोऽर्थभागी जातः स्यादिन्द्रदैवत्ये ॥
धनधान्याढ्यो दाता परवित्तहरो नरः कलहशीलः ।
क्रूरः परोपतापी मूले मूलोपजीवी च ॥
सलिलपथकर्मसिद्धः क्लेशसहिष्णुः परस्य दारेच्छुः ।

नित्यमकल्यशरीरः प्रियमद्यः पूर्वाषाढासु ॥
यानोद्यानवनरतिः प्रवाससुरतीर्थसाधुसेवी च ।
बहुशिल्पार्थः प्रियवाक् जातः स्याद्वैश्वदेवे च ॥
ज्ञातिश्रेष्ठो धनवान्दानवानरुचिर्भवति दक्षिणो दक्षः ।
नित्यमरोगशरीरः श्रवणे हतशत्रुपक्षश्च ॥
धनधान्यसञ्चयानामीशः स्यान्नृपतिसत्कृतो यज्वा ।
अक्लेशभाक् जितरिपुः श्रविष्याभीष्टदारश्च ॥
परदारमद्यसेवी क्लेशसहो वारुणे नरो धीरः ।
स्थिरसञ्चयः स्थिरसुहृद् भिषक्क्रियापंडितो रोगी ॥
दारुणकर्मा क्रोधी निशाचरस्तीक्ष्णविक्रमश्चपलः ।
विषमः प्रसह्य हन्ता प्राक्प्रोष्ठपदे भवति जातः ॥
नृपसत्कृतो बहुसुतः प्रदानशीलो जले सततभीरुः ।
इज्याध्ययनरतिः स्यादहिर्बुध्न्ये नरो जातः ॥
सर्वार्थभुक् प्रदाता प्रवासनिरतो विशुद्धकुलशीलः ।
गोमाननलपुत्रः पौष्णे विद्वान् नरो जातः ॥

[This list starts with *Aśvinī* and ends with *Revatī*. Star *Abhijit* described in (14.22) is not included here as a possible birth star.]

15

॥ ग्रहयुद्धम् ॥ Planet Conjunctions

१५.१ [अद्भुतसागरे ग्रहयुद्धाद्भुतावर्ते । पराशरतन्त्रे]

अथ भगवन्तं अनन्ततपसं पराशरं कथान्ते शान्तः शार्ङ्गधरः कृताञ्जलिः संपूज्योवाच । यत् सूत्रमुक्तं भगवता युद्धमिति तत् संशयो नः कथमुपर्युपरिव्यवस्थानां ग्रहाणां समागमः स्वर्गे वाऽपि विग्रहोऽस्तीति । तमुवाच भगवान् । एवमेतत् सौम्य । किन्तु योगदर्शनतः शुभाशुभं दर्शयन्ति प्रजानाम् ॥

15.1 [*In AS. In Parāśaratantra*]

Then at the end of the discourse Śārṅgadhara asked Parāśara. We have a doubt about what you said cryptically as battle among planets. How planets which are arranged one above the other, can come together and how can there be strife even in the heavens? Parāśara answered him. What you say is correct my boy! But by displaying such visible conjunctions they indicate good and bad effects to people on earth.

[*Grahayuddhādhyāya* is Chapter 17 in BS. Utpala has quoted a few sentences of Parāśara but not in detail as in AS. Here we follow Ballālasena's presentation of PT. It appears Varāhamihira has basically built his *Samhitā* on the model of PT borrowing heavily from Parāśara and adding extra information that would have been prevalent during his time.]

१५.२ [पराशरेण त्वपसव्यमनभिधाय आरोहणेन चतुष्प्रकारत्वमुक्तम्। तद्यथा]

भेदनमारोहणमुल्लेखनं रश्मिसंसर्गश्च इति । ग्रहयुद्धं चतुर्विधमाचक्षते कुशलाः। तेषां पूर्वात् पूर्वो गरीयान् इति । संयुक्तयोः सपर्याधोऽवस्थितिरारोहणम्॥

15.2 [*Ballālasena: Parāśara has not recognized the left-handed movement. He states only four types of battles such as the Climb.*]

Breaking, climbing, grazing and confluence of rays are the four types of planet wars. Among them the previous one is stronger than the next one. Climb is defined as one staying below the other reverentially.

१५.३ [अथ पराजितजययुतलक्षणम्]

दशभिर्लक्षणैः ग्रहं जितं विद्यात् । विवर्णः परुषः सूक्ष्मो याम्याशामार्गस्थो विरूढो (अधिरूढो) विकृतो निष्प्रभो अथवा अभिहतो अप्राप्य निवृत्तो वेपनश्च । अन्यथा विजयी ॥

15.3 [*Now signs of defeat and victory*]

By ten signs one can know that a planet has been defeated. These are: loss of colour, harshness, becoming small in size, station in southern lanes, getting climbed up by another planet, change in shape, lackluster, getting hit, having approached returning without reaching another planet, and shaking. Otherwise the planet is considered victorious.

१५.४ [अथ रव्यादीनां पराजयफलम् । पराशरस्तु]

15.4 [*Now the effects of Sun and other planets getting defeated are stated by Parāśara*]

१५.५ सूर्यपीडायां वरनृपतितपस्विधार्मिकयशस्विभ्राजिष्णुतेजस्विपीत–लोहितबीजफलपुष्पौषधिमणिधात्वग्न्युपजीविनः शकयवनकाम्बोज–

दरदपारदपह्लवा नागरैः सह उपतप्यन्ते । सोमे सोमपद्विजस्वाध्यायिव्रत-दीक्षितविद्वत्साधुसरित्सलिलोद्भवसागराश्रिताः क्षीरिण्यः ओषधयः देवताभिः सह उपतप्यन्ते । अङ्गारकवधे स्फीतजनपदग्रामनैगमजनवनधान्यनिचय-कोषेश्वरधनभूपलक्ष्म्यधिपौषधिबीजवनपुष्पफलशौण्डिकाग्न्युपजीविनो व्याधिभयशस्त्रेण उपतप्यन्ते। बुधाघाते नैगमजनधान्यनिचयमित्रोपजीवि-मन्त्रिपोतयात्रिकहयगजयोधमार्गणधीवराश्च तापमुपयान्ति । बृहस्पतिवधे सिन्धुसौवीराभिसारपौरत्रिगर्त्तमत्स्योशीनरशिविवैयासहारभूतयः नैगमजल-चित्रकारशाल्वग्रामघोषनगरविद्वज्जनब्राह्मणपुरोहितब्रह्मचारिदीक्षितजप्य-मङ्गलतत्परा आश्रमाश्च पीड्यन्ते ॥

हते शुक्रे नश्यन्ति अभियोक्तृवङ्गाङ्गकलिङ्गमगधविदर्भचेदिवत्सभद्रकार-यौधेयभरुकच्छसिन्धुसौवीराभिसारपौरत्रिगर्त्तमालवकैकयाम्बष्टकाः शिबयः मालवद्रविडपौण्ड्रकोटीवृषपह्लववर्णरूपवन्तः कुसुमानि हस्त्यश्वयोधेश्वरा राजानः । वर्षाविघातं च विद्यात् ॥

सौरपीडायामपि गोरण्डासेनापतिप्रधानपश्वस्फीतजनपदास्त्राग्न्युपजीविनः बहुस्त्रीकाः तथा शकमहिषदरदपारता आश्विनैः सह उपतापमुपयान्ति । वधे राहोः निकृष्टजनबन्धनपालतस्करोपवर्त्तिकाः शितशमीधान्यशूलिक-वार्धुषिकदुर्गबिलकरवराहकुक्कुराश्वशृगालदुष्कराः दस्यवश्च विनश्यन्ति । वधे केतोः केतुभूतानां राज्ञां ग्रहक्षेत्रनिधिनिधानोद्युक्तनृपतिसाधुजनपार्वतीयानां शस्त्रवृष्टिप्रादुर्भावो भेदश्च ॥

15.5 [The purported ill effects of each of the nine *grahas* getting defeated as per 15.3 are listed above.]

१५.६ [रविचन्द्रबिम्बे राहुदर्शनं तच्च ग्रहणं न तु युद्धम् । वृद्धगर्गेणापि भौमादिपञ्चकस्यैव युद्धमङ्गीकृतम् ॥]

15.6 [*Ballālasena: The sight of Rāhu on Sun and Moon is an eclipse and not a battle. Vṛddhagarga accepts war only among the five planets Mars*

etc.]

१५.७ [स्थावरा अकृतोद्यमयायिन उद्यमविषयास्त एव पौरा इत्युच्यन्ते । चराः कृतोद्यमयायिन इत्यर्थः ॥ पराशरस्तु]

15.7 [*Ballālasena: Sthāvara planets are fixed ones as though they do not work, they are also known as paurā or nāgara. The others are known as travelers (nomads). Parāśara says*;]

१५.८ सूर्यबुधबृहस्पतिशनैश्चरा नागराः । सोमाङ्गारकशुक्रराहुकेतवो यायिनः। तेषां तज्जयाद्विजयो वधाद्वधो अन्योन्यभेदाद्भेदः साम्यात् साम्यम् ॥

15.8 *Sun, Mercury, Jupiter and Saturn are Nāgara (city dwellers). Moon, Mars, Venus, Rāhu and Ketu are travelers. Depending on the victory, defeat and balance between the members of the two groups of planets, there will be victory, defeat and balance between city dwellers and nomads (or migrants) in the country.*

१५.९ अथाष्टौ ग्रहयोगाः कोपः शृङ्गाटको व्यूहो माला धनुस्तुलाध्वजश्चक्रं चेति । तत्रैकर्क्षे पञ्चतारग्रहाः सूर्यानुगताः स्युः स कोपः । एकर्क्षगास्त्रयश्चन्द्रसंयुक्ताः स शृङ्गाटकः । विना सोमेन दृश्याश्चत्वारः स व्यूहः। पञ्चैकर्क्षगा दृश्येरन् स ध्वजः। एकैकर्क्षान्तरिताः पञ्च स माला। उदयेऽस्तमये च ग्रहरूपं दृश्यते सा तुला स एवाकृतिवशाद्धनुः । उदयास्तमध्यान्तरेभ्योऽन्यर्क्षगाः स चक्रं तत्र दुर्भिक्षकृतकोपः । शृङ्गाटको नृपयायिनाम् नाशाय भवति । व्यूहे पुराणामवरोधनम् ॥

15.9 *There are eight types of planetary conjunctions, known as Kopa, Śṛṅgāṭaka, Vyūha, Mālā, Dhanuṣ, Tulā, Dhvaja and Cakra. While stationed with the same star the five planets are followed by Sun, it is known as Kopa (Anger). If under the same star three planets combine with Moon it is Śṛṅgāṭaka. Without Moon if four planets are seen, it is Vyūha. If all the five planets are stationed in the same star it is Dhvaja. If they encircle the same*

star the formation is Mālā (garland). If one planet is rising and another is setting the figure is called Tulā (Balance). Tulā with slight variation in the figure is called Dhanuṣ (Bow). If, between rise and set, a planet moves to another star, it is known as Cakra; this induces drought. Śṛṅgāṭaka is for the destruction of kings and travelers. During Vyūha, cities get encircled (by enemies).

१५.१० मालाऽभिषिक्तनाशाय मध्यदेशविपत्तये ।
धनुः कुनृपनाशाय चोरदस्युक्षयाय च ॥
शस्याम्बुनाशाय तुला तुलाज्ञश्चोपजीवति ।
ध्वजः शस्यविनाशाय चक्रं चक्रं विनाशयेत् ॥
उदयास्तमयस्थौ तु यदा शुक्रबृहस्पती ।
पूर्वसन्ध्यागतौ घोरौ जनयेतां महद्भयम् ॥
कृत्तिकासु शनैश्चारी विशाखायां बृहस्पतिः ।
तिष्ठेद्यदा तदा घोरः प्रजानामनयो भवेत् ॥
एकनक्षत्रमाश्रित्य दृश्येतां युगपद्यदि ।
अन्योन्यभेदं जानीयात् तदा पुरनिवासिनाम् ॥
एकेन यदि वा द्वाभ्यां ग्रहाभ्यां सहितो गुरुः ।
शनैश्चरो वा दृश्येत कोपवत् फलमादिशेत् ॥
पुरस्ताद्यत्र दृश्यन्ते पञ्चतारा ग्रहा दिवि ।
प्रकाशन्ते ध्वजाग्राणि पार्थिवानां युयुत्सताम् ॥
यदा सर्वे समागम्य मध्ये तिष्ठन्ति दारुणम् ।
तत्रापि देशाः पीड्यन्ते मध्यदेशो विशेषतः ।
प्रतीच्यां यत्र दृश्यन्ते पञ्च ते दिविचारिणः ।
क्षुभ्यते पृथिवी सर्वा न च शस्त्रं प्रकुप्यति ॥
यद्यत् फलमिह प्रोक्तं ग्रहयोगसमुद्भवम् ।
तत्तन्नक्षत्रदेशेषु तेषु तेषु विनिर्दिशेत् ॥

15.10 [The above in verse form mentions the bad effects of the various planet figure formations. The last verse connects astral-geography of

Chapter 13 with the position of planets in the *nakṣatras.*]

१५.११ तत्र राहोरदर्शनं केतोश्च मघासु च वक्रातिपीडनं ब्रह्मराशिभेदः केतूल्काग्रभेदश्च रोहिणीनां सौरेण सप्तर्षिध्रुवेन्दुग्रहपीडनं केतोर्वा मरकदुर्भिक्षशस्त्रवृष्टिभिः प्रजाक्षयाय॥

15.11 *Absence of Rāhu (eclipse) for a long time, retrogression and station of a comet in the Maghā constellation, bisection of the constellation of Brahma, (Lyra) breaking of the head of a comet and of meteors, affliction of Rohiṇī by Saturn, or troubling of Saptarṣi, Dhruva and/or Moon by a comet are portents for depletion of population due to death, famine and weapon showers.*

[This statement of Parāśara is quoted in AS in the chapter on *miśrakādbhuta* or combined anomalies. In Chapter 11 of PT the comet Calaketu is said to have touched U.Major and the Pole Star. There has been no mention of a comet stationed in the Leo constellation among the 26 listed in Chapter 11. Hence this could be a later comet observed by the successors of Parāśara and added to the original Parāśaratantra. The star group *Brahmarāśi* has been mentioned previously in (7.3) and (11.9). This refers most likely to the constellation Lyra which has *Abhijit (Vega)* as the prominent star.]

16

॥ तिथिकरणमुहूर्तम् ॥ Tithi, Karaṇa and Muhūrta

१६.१ [उत्पलविवृतौ तिथिकर्मगुणाध्याये । पराशरः]

तिथयस्तु नन्दा भद्रा जया रिक्ता पूर्णा मासा मित्रा महाबला उग्रसेना सुधन्वा सुनन्दा यमा जया उग्रा सिद्धिः इति ॥

16.1 [*In Utpala's commentary on Tithikarmaguṇādhyāya, Chapter 98 of BS.*]

The tithis are named Nandā, Bhadrā, Jayā, Riktā, Pūrṇā, Māsā, Mitrā, Mahābalā, Ugrasenā, Sudhanvā, Sunandā, Yamā, Jayā, Ugrā and Siddhi.

[The names of the fifteen *tithi*s in their order of occurrence are given here. No distinction is made between the dark and the bright fortnights. Thus the name *Siddhi* will apply equally to Full Moon and the New Moon day. PT does not say how a *tithi* was measured or computed. PT specifies names for the *tithis* which appears to be a more ancient convention than the currently prevalent tradition of counting the *tithis* as *Prathamā, Dvitīyā* etc.]

१६.२ तासु कर्माणि । प्रतिपत्षष्ठ्योः विवाहक्षेत्रासववास्तुबीजवपनमित्र-धनसङ्ग्रहाभिषेकसत्रादि स्थिरं इष्टमनिष्टमध्वाध्यापनमध्यनं क्षुरकर्मेति।

द्वितीयासप्तमीत्रयोदशीषुपत्युद्वहनभवनशयनशकटयानक्रियाध्वगमनाम्बरालङ्कारधारणशिल्पभैषज्यस्वस्त्ययनपौष्टिकव्रतायुष्याणि । विशेषतो मित्रायां मित्रकर्मनृपतिशासनसन्धानानि । तृतीयायां बलकरणदमनानि । प्रतिपदि द्वितीयायां चतुर्थ्यामपि विषमथनदमनबन्धनानि । चारभेदकवाटाभियोगाग्निविषसम्प्रयोगक्रिया उग्रौग्रसेनयोश्च । पञ्चमीदशम्येकादशीषु भवनशयनस्वस्त्ययनौषधपौष्टिकसुभगाध्वगमनकेदारव्यवहारभूषणकन्यावरणोद्वहनस्थिरचरसौम्यमृदुकर्माणि।एकादश्यां स्त्रीभृत्यनिग्रहा विशेषेण।अष्टम्यां बलोपकरणदर्शनायुधग्रहणदुर्गोपकरणावरणपरिखाभिखननकेदारव्यवहारभूषणकन्यावरणोद्वहनस्थिरचरसौम्यगुप्तिकरणानि।द्वादश्यां स्थिरचरकर्माग्न्याधानयज्ञोपनयननिधिनिधानपाणिग्रहणानि । पञ्चदश्यां पितृयज्ञदेवगोगुरुबल्युपवासेष्टिक्रियाः प्रशस्यन्ते ॥

16.2 [This lists the type of work that is recommended to be carried out under the different *tithis*. Here the *tithis* are referred to by their positional order in all places except two, namely *Mitrā*, which is *Saptamī and Ugrasenā which is Navamī. Pratipat* is the first *tithi* also sometimes known as *prathamā.*]

१६.३ अपि च ब्रह्मामरमन्त्रिजनार्दनयमसोमकुमारमुनिवसुपिशाचीधर्मरुद्ररविकामरुद्रपितरः तिथिदेवाः ॥

16.3 *The residing deities of the tithis are Brahmā, Aamaramantri, Janārdana, Yama, Soma, Kumāra, Muni, Vasu, Piśācī, Dharma, Rudra, Ravi, Kāma, Rudra & Pitṛs.*

[Like *naksatras*, *tithis* have their regent deities. Here, the fifteen *tithis* are assigned in sequential order to the named deities. Jupiter assigned to the second *tithi* is here called *Amaramantri* the minister of gods. The sixth *tithi* is governed by *Kumāra*, who has six faces. The seventh appropriately has *Muni* referring to the Seven Sages or U.Major. Similarly, the eighth is assigned to *Vasu* who are eight in number.]

१६.४ शकुनौ शकुनिग्रहणप्रहरणभृत्ययोद्धृयुद्धोपकरणक्रियाः सर्वमुग्रं कुर्यात् । चतुष्पदे नृपतिविजयाभिषेकपितृदेवधर्मक्रियाचतुष्पददानानि । नागे सलिलोपकरणावेशनप्रवेशागदगदौषधधारणानि । किंस्तुघ्ने सुरगुरुतीर्थव्रत-दीक्षाभिगमनस्नपनानि। बवे मणिकनकरजतालङ्कारवास्तुक्रियाभिप्रयाणासव-कुसुमगन्धाधिकाराणि । बालवे व्रतोपवासनियमसत्रयज्ञद्विजगुरुसेवनानि । कौलवे पुरक्षेत्रलेख्यगन्धगान्धर्वपितृदेवधर्मक्रियाः।तैतिले निष्कर्मसाहसद्यूत-युद्धाभिषेकमङ्गलव्रतदीक्षागृहप्रवेशाः । गरे दारूद्यानवनाधिकारिकोप-भोगाः वैवाहिकादिकरणानि । वणिजि वणिक्प्रयोगाध्ययनशिल्पसंबन्धार्था-भिवादावनबलिकर्मविधिभिः यद्यथारभ्यते क्रिया काचित् । विष्ट्यां न किमपि समृद्धिं एति बीजमिव यथोषरप्राप्तम् इति ॥

16.4 [Here, eleven *karaṇas* are listed along with what work may be (or may not be) carried out under these time intervals. The names of the *karaṇas* are *Śakuni, Catuṣpāt, Nāga, Kinstughna, Bava, Bālava, Kaulava, Taitila, Gara, Vaṇik, Viṣṭi*. By definition one *karaṇa* is equal to half of a *tithi*. The first four listed above are known as *dhruva-karaṇa* or fixed. These are assigned to the *half-tithis* starting from the second half of *kṛṣṇa-caturdaśi tithi*. The other movable seven *karaṇas* are distributed into the remaining 56 half-tithis of a month by repeating them eight times. *Bava* starts with the second half of *Pratipat*. The others, *Bālava* etc follow in sequential order and get repeated without disturbing the fixed slots. One may refer to the BS edition with translation of Bhat for more information on *tithi* and *karaṇa*[1].]

१६.५ रौद्रमितमैत्रसाधनसारभटात्मसहवैश्वदेवाभिजिद्रोहिणीन्द्रबलजय-पित्र्यभाग्यवरुणनैर्ऋताग्नेययाम्यगन्धर्वध्यानपदराक्षसेन्द्राग्नेयप्राजापत्या-श्विनेन्द्रब्रह्मगुरुसावित्र्यवैष्णवपौष्णाः । तेषां यत्समानदैवतनक्षत्रं तन्नक्षत्रवत् कर्माण्यरभेत । विशेषोपदेशं उपदेश्यामः । तत्र श्वेतमैत्रात्मसहरोहिणीषु रोहिणीव सर्वं साधनम् इष्टिव्रताधानाध्ययनानि । सारभटे अभिचारवधवादान्।

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1 *Bṛhatsamhitā* (Ed. & Transl.) M. R. Bhat, Motilal Banarsidas Publn., 1982, Delhi.

अभिजिति सर्वकर्माणि । बले नृपतिबलसमारम्भाः । जये अन्नप्रमाणम् । गन्धर्वे गान्धर्वरतिविवाहाः । ध्यानपदे अभिषेकभूषणमङ्गल्यानि । सन्ध्ययोस्तु पूर्वा अग्निदेवता पश्चिमा रौद्री तयोर्न किञ्चित् कर्मारम्भो नान्यत्र नियमात् प्रयतमुपतिष्टन्नोपासीत । पश्चिमायां विशेषतश्चाग्नौ न प्रविशेत् न अश्नीयात् न मैथुनमभिगच्छेत् ॥

16.6 The thirty muhūrtas are Raudra, Mita, Maitra, Sādhana, Sārabhaṭa, Ātmasaha, Vaiśvadeva, Abhijit, Rohiṇī, Indra, Bala, Jaya, Pitṛ, Bhāgya, Varuṇa, Nairta, Āgneya, Yāmya, Gandharva, Dhyānapada, Rākṣasa, Indrāgni, Prājāpatya, Āśvina, Indra, Brahma, Guru, Sāvitrya, Vaiṣṇava, & Pauṣṇa. As with the deities of the nakṣatras work may be started in the muhūrtas. We describe this specially. In the muhūrtas Śveta, Maitra, Ātmasaha and Rohiṇī all rites, rituals and studies can be done as under Rohiṇī nakṣatra. Sārabhaṭa is for black magic, killing and arguments. Abhijit is fit for all actions. In Bala celebrations of the army of the King; in Jaya food preparation; in Gandharva marriage and intercourse; in Dhyānapada wearing of ornaments and make up can be carried out. The two Sandhyās (morning and evening twilight) have Agni and Rudra as their deities. No work should be started during these two periods. With no other injunctions, one should sit quietly and meditate. In the evening one should not enter the fire place, should not eat and should not have sexual intercourse.

[Here, the thirty *Muhūrtas* in a day are listed by name. In Vedic texts also a day is divided into 30 parts, but the names of the divisions during daytime and nighttime in the two fortnights of a month are different[2]. The *muhūrta*s of PT refer to thirty equal time divisions from Sun rise to Sun rise or one *ahorātra*. Hence each *muhūrta* division is nearly equal to 48 minutes. How this was standardized is a matter of conjecture. Practical measurement of this time interval should have been carried out using the gnomon. *Atharvaṇa-vedāṅga-jyotiṣa* has the same list

2 S.B.Dikshit, *Bharatiya Jyotih Shastra* (Engl. Transl.) by R.V.Vaidya, Pt.I, Govt. of India, 1969, Calcutta.

of thirty *muhūrtas* as above. This ancillary Vedic text which appears to be much later than Lagadha's VJ and PT describes the correspondence between the *muhūrtas* and the shadow lengths[3]. Some historical background on measurement of *muhūrtas* is available in the works of Lishk and Sharma[4]].

3 *Ātharvaṇa-Jyotiṣam* (Ed.) Pt.Bhagavad Datta,1924, Lahore.

4 S.S.Lishk and S.D.Sharma, *Standardization of time unit muhūrta through the science of sciatherics in Atharva-vedānga-jyotiṣa* , IJHS, 16,2, 1980 pp.193-203.

17

॥ प्रवर्षणम् ॥ Rainfall

१७.१ [उत्पलविवृतौ गर्भलक्षणाध्याये । पराशरः]

अथ माघेन श्रावणं फाल्गुनेन भाद्रपदं चैत्रेणाश्वयुजं वैशाखेन तु कार्तिकं शुक्लेन कृष्णं कृष्णेन शुक्लं दिवसेन रात्रिं रात्र्या दिवसं गर्भाः प्रवर्षन्ति इति ॥

17.1 [*In Utpala's commentary on Garbhalakṣaṇādhyāya of BS Chapter 21: Parāśara says*]

Clouds nucleating in the month of Māgha, and Phālguna rain in Śrāvaṇa and Bhādrapada months respectively. Similarly clouds conceived in Caitra and Vaiśākha precipitate in Āśvayuja and Kārtika months. Cloud of the bright fortnight, rains in the dark fortnight. Clouds nucleated in day time deliver in night.

[Here the ancient concept of cloud formation and subsequent rainfall is stated. The atmospheric condition, six and half months (195 days) before the rainy season, is proposed as a precursor. Several ancient texts recognize rainfall season to be of four months duration. Hence the (astronomical) season statement of PT in (3.1) should not be taken to mean that rains were expected just for two months, during the (solar) months *Nabha* and *Nabhasya*, as Sun moved from middle of star division *Āśleṣa* to

end of *Hasta*. This clarification is necessary because the months were reckoned in terms of *tithis* and the solar year made up by intercalation. The rainy season of four months (lunar) included *Jyeṣṭha, Āṣāḍha, Śrāvaṇa* and *Bhādrapada*, the last two being considered perhaps more important for the society. Rains being important for agriculture several characterization and prognosis techniques are described in the texts. BS has seven chapters devoted to topics connected with Rainfall. But, from the stray quotations given by Utpala in these chapters, it is difficult to extract the opinion of Parāśara. A comparison between Utpala's commentary and AS shows that Ballālasena has preserved PT better. Hence, here we closely follow the AS text.]

१७.२ [अद्भुतसागरे मेघानां गर्भाद्भुते । पराशरः]

वाय्वभ्रविद्युत्स्तनयित्नुवर्षाणि गर्भाः । तान् लक्षयेत् प्रशस्तानप्रशस्तांश्च । प्रशस्तता च यदा सूर्येन्दुनक्षत्रान्तरिक्षाश्रयाणां वर्षलिङ्गानां प्रादुर्भावरूपता गर्भाणां धारणमासे त्वसूतिः । विपर्यये त्वशस्तता । येषु येषु नक्षत्रेषु गर्भस्थितिः स्यात् तेषु तेषु ग्रहाणां उदयास्तमयोल्कानिर्घाताशनिपात–गन्धर्वनगरदिग्दाहार्करश्मिविकारभूचलनप्रादुर्भावो वर्षासु अवर्षाय । विशेषतो ज्येष्ठबहुलपक्षद्वादश्यादिदिनचतुष्टयं धारणं गर्भाणां । क्रमात् सप्तरात्रस्रावो मासविघाताय ॥

17.2 Nucleation or conception of clouds is characterized by wind, lightning, thunder and precipitation. One has to observe whether these are conducive to rains in its season. Good portents depend on Sun, Moon and other atmospheric conditions for rain cloud formation and its holding (for 6½ months), without precipitation (miscarriage) in the month of conception. In whichever stars the cloud conception takes place, if in those nakṣatras, malefic planets rise, meteors shower, earth quakes, Sun's rays get distorted there will be no rains in the season. Especially the atmospheric conditions during the 12th to15th days of the bright fortnight, in the month of Jyeṣṭha, (the first month of summer) are important for nucleation of rain bearing

clouds. But there should be no continuous drizzle for seven nights in that month.

१७.३ रोहिणीयोगे पुनः प्रदक्षिणो मृदुर्मारुतः स्नेहवन्ति चाभ्राणि विद्युच्छक्रचापालङ्कृतानि स्वादुसुरभिविमलशिशिरतावृद्धिश्च अम्भसां वृष्टिक्षेमसुभिक्षाय । यावन्तो दिवसान् निमित्तप्रादुर्भावानुबन्धः तावद्वर्षाणि सुभिक्षक्षेमम्। आसप्तरात्राद्बिलवासिनां बिलेभ्यो निष्क्रामणं स्त्रीपुरुषबालानां प्रमोदः पक्षिणां पुष्कललक्ष्मीक्षीरवृक्षसेचनम्। तरूणां अच्छिद्रस्निग्धपत्रता पुरपौरहिताय । सूर्यचन्द्रमसोः परिवेषणं तद्विपत्तये ॥

17.3 When Moon is in the constellation of Rohiṇī, breeze blowing clockwise, friendly (oily looking) clouds endowed with circles and bows of lightning and pleasant feeling of increase in cold is good for rainfall and food security. For as many days the portents remain, for so many years there will be plentiful food production. Coming out of animals living in holes and pits within seven days; happiness among children, ladies and men; birds in abundance sprinkling hibiscus and fig trees are good portents. If Sun and Moon are covered by haloes, the good indicators will be nullified.

[This condition refers to the rainy season in the lunar month of *Āṣāḍha*. A few Moon-star conjunctions were already mentioned in Chapter 4.]

१७.४ [अब्दुतसागरे मेघाब्दुते । पराशरः तत्राषाढे स्वातिसंयुक्ते चन्द्रमसि शुभाशुभमेघलक्षणमाह॥]

स्वातिसंयुक्ते चन्द्रमसि घनस्निग्धस्तनयित्नुविद्युन्मण्डलनिरम्भोदैः नभसः अवच्छादनं सुभिक्षक्षेमाय । वातप्रादुर्भावोल्कानिर्घातकम्पोपघातैश्च तद्विपर्ययः। अथाभ्रविकारेषु वृक्षपरिघस्तनितसंचयात्मकेषु सद्यःफलमादिशेत्। अत्र सप्तरात्राद्वा षण्मासात् तु गर्भकालजं वर्षम् । तत्र वृक्षेष्वेव तावद्यदि सन्ध्यायां पीतमाञ्जिष्ठो दृश्येताभ्रवृक्षः शान्तायां दिशि राज्ञो विनाशाय

स्यात् । स एव दीप्तायां दक्षिणतो वा अर्कस्य हस्त्यश्वयोधानां अन्यतमः श्रेष्ठविनाशाय । कपिलः कृष्णो वा तथा भाग एव राज्ञो भयाय स्यात् । श्वेतो विजयाय । सन्ध्याकृतिश्चेत् पीतमाञ्जिष्ठनीलो वा हन्याद्राजानम् । पीतवर्णः अर्कस्य पच्यमानः सद्यो बलकोपाय । पीताग्रश्चेत् घनः सन्ध्यायां प्रकाशेत आहितक्षयाय । बहुकपिलस्तु ब्राह्मणानां पीडायै । लोहितः क्षत्रियाणां हरितो वैश्यानां कृष्णः शूद्राणाम् । चित्रो गणकानाम् । बहवश्चेत् गर्दभरूपिणः अरुणवर्णा विलापिनः परुषाः सर्ववर्णोपतापाय । धूम्रश्चेत् दृश्यमान आदित्यमियात् अभ्रवृक्षाकारोऽपि महते भयाय स्यात् । अच्छिन्नश्चेताग्रेण नभसो मध्यस्पृक् सद्यो वर्षाय । तथैव सूर्यमावृत्य तिष्ठन् नीलश्चेताग्रो यदि वा वंशवीरणगुल्माभ्रवृक्षादुदीयादस्तमियाद्वाऽर्कः । एवमेव विरूपेषु मूलवत्सु विशालेषु स्तनयित्नुनिर्घोषसतडित्कलापः तमधिसप्ताभिहन्यात् छादयन् तामभियुञ्जीत राजा ॥

17.4 [*Ballālasena in AS: Parāśara has described the good and bad effects of clouds when Moon is with Svāti nakṣatra in the month of Āṣādha.*]

When Moon is in Svāti star, covering of the sky with dense, thundering clouds with lightning is good for abundant food and health. With generation of wind, meteor hits and earthquakes, the effect (of the clouds) will be opposite. Among cloud anomalies, formation of tree figures, thundering and collective clouds indicate immediate rainfall. The clouds after conception precipitate either in seven nights or in six months .....

[This describes the formation of clouds in the *Āṣāḍha* month which is approximately the second summer month in the seasonal zodiac of PT as per Table (3.1). Parāśara connects Moon's position in the pre-monsoon month as a precursor for normal or deficient rainfall. Previously in (4.8) he has already held some positions of Moon to be beneficial for good rainfall. The above statement is about anomalies in cloud formation when Moon is situated near *Svāti* star. Parāśara describes the variegated geometry and colours of the clouds to be used as

portents not just for rainfall but also for social and political conditions.]

१७.५ आषाढीसंयुक्ते शशिनि स्निग्धाभ्रवृक्षप्रादुर्भवः प्रावृड्वृद्धये । अथाभ्रपरिघस्त्रिवर्णो भानुमावृत्य तिष्ठन् महते जनक्षयाय स्यात्। कपिलो वातहर्षाय। कृष्णच्छिद्रः सद्यो वर्षाय स्निग्धनीलो महावर्षाय श्वेतः सुभिक्षाय। रक्तः शस्त्रकोपाय। माञ्जिष्ठो अग्निभयाय। अरुणो वाताय पीताभः क्षयाय द्विपदानां रोगाय च। ताम्रः शस्त्रसमुत्पाताय पशूनां च हरणाय। श्यामो गन्धर्वपीडायै चौरवृद्धये वा॥

17.5 *When Moon is stationed with the star Pūrvāṣāḍhā, development of sharp cloud-tree formation is for increased rainfall. If a cloud with three colours stays covering Sun, there will be large scale deaths. A dark cloud indicates strong winds. Black and broken clouds indicate immediate rains. Oily dark colour is for heavy rainfall and white colour is for abundant food for people……..*

[*Āṣāḍhī* refers to the Full Moon stationed near star *Pūrvāṣāḍhā*. The lunar month *Āṣāḍha* derives its name from this condition. As per Fig.(3.1) Parāśara's second half of summer starts when Sun is in the last quarter of the *Punarvasu*-division. If this happens to be a Full Moon night, Moon has to be 180° away from Sun. This corresponds to the last quarter of the *Pūrvāṣāḍhā*-division of PT season zodiac. Thus even if the position of Moon, which being difficult to observe on a cloudy night, could not have significantly helped in prognosis of rainfall there was an effort to closely observe the sky for any anomaly that may provide a clue for the failure of seasonal rains.]

१७.६ अथान्तःसूक्ष्मा रक्ताः परुषा नैर्ऋत्यां दिशि प्रपद्यमाना राजवधाय स्युः। शेषा रश्मिभिः समानफलाः। अथाभ्राणि सञ्चितानि सेनानगरकबन्धरूपाणि सङ्ग्रामाय। तत्र दिक्षु वर्णेषु यथास्वं जयपराजयं विन्द्यात्। विमूढानि

घनानि महान्ति प्राकारशिखररूपाणि महावर्षाय पारावतमयूरवर्णानि च। तथा नृपजलचरामोदाय घटरूपाण्युपरिमण्डलवाद्याकृतीनि। काञ्चनाञ्जनरूप-शङ्खमणिमुक्ताप्रवालकाण्डधौतकृष्णायःप्रसन्नानि। तथा विद्युत्स्तनयित्नुमन्ति सुजातानि सूर्यस्य पुरस्तात् तान्यर्यमनाम्नः प्रदक्षिणपरिवर्तीनि। मध्याह्नरात्र्योश्च वायुस्तनयित्नुमन्त्यभिवर्षाय। पीतलोहितपीतनीलातिमात्र-सञ्चयानि अनृतौ शस्त्राय वर्षाय च। सूक्ष्माणि अव्यक्तरागाणि विच्छिन्नमूलानि अनर्थाय अतिवातवेगाय वा। तथा वराहाश्वखरदंष्ट्रिरूपाणि शीघ्रनिपातीनि शस्योपरोधाय अवग्रहाय वा॥

17.6 *Clouds with sharp interiors, red and harsh, originating from southwest portend killing of the king. Clouds which are collected like cities and soldiers indicate skirmish. There, depending on the colours, victory or defeat has to be decided in the different directions. Dispersed thick huge fort and tower like clouds of parrot and peacock colours are for very heavy rainfall. Clouds organized vertically like pots and musical instruments are for happiness of kings and aquatic animals. Clouds of the colour of golden ointment, conch, crystal, pearl and coral forms are pleasant. Clouds named Aryamā are with lightning and thunder well formed and circling clockwise in front of Sun. In the afternoon and night wind along with thunder indicates rainfall. Yellowish-red and dark yellow coloured clouds collected in large sizes out of season, portend weapons (war) and rainfall. Clouds with undefined colours, subtle and without starting roots are for destruction and strong wind. Similarly, clouds looking like boar, horse, and donkey shapes are for quick descent but obstruct plant growth and indicate drought.*

[Here further portents due to cloud colours and figures are described. The observational power of Parāśara is remarkable. He fairly well explains the lateral as well as the vertical formation and stratification of clouds in terms of similes prevalent during his time.]

१७.७ अहः प्रथमभागे वर्षे क्षेमम्। द्वितीये शस्यसरीसृपादिवृद्धिः। मध्ये

प्रावृट्कालाप्तवर्षणम्। तृतीये व्याधिभयम्। अन्येषु सकलाहोरात्रवर्षणं च सर्वप्रावृट्सम्पत्तये। रजन्याः पूर्वभागेऽभिवृष्टे शस्यम्। द्वितीये शिम्बिधान्यानाम्। तृतीये ग्रैष्मसम्पत्तये। चतुर्थभागे सर्वरसस्य विनाशाय॥

17.7 *Rains in the first part of the day are good. In the second half, crops and reptiles increase. In the central part of the day, the seasonal rains are delivered. In the third part of the day, diseases are indicated. Otherwise, continuous rainfall day and night is beneficial for the rainy seasonal wealth. Rain in the first part of the night is generally good. In the second part, rainfall is good for cereals. In the third part, it is beneficial for summer crops. Rains in the fourth part are destructive for all herbs.*

१७.८ सद्योवर्षलिङ्गानि भवन्ति तद्यथा। लवणं प्रस्विद्यते आदित्यस्तीव्रतरं तपति अण्डानि पिपीलिकाः सञ्चारयन्ति शस्त्रादर्शतलेषु अकस्मान्मला लिप्यन्ति प्रशान्तमेव मारुते नभस्युदयन्तं अविच्छिन्नमेघः सूर्यमावृणोति। नीलश्वेताग्रैः द्वित्रिचतुष्पञ्चमण्डलाद्यैः परिवेष्टौ चन्द्रार्कौ परिविष्येते। द्व्यहमेकमण्डलेन सचन्द्रग्रहनक्षत्रनभसः प्रत्यन्तपरिवेषणम्। अप्सु वैरस्यं शीतोष्णाता च प्रादुर्भवति। उष्ट्राः स्वेदसम्भिन्नं मूत्रपुरीषमुत्सृजन्ति। गावश्च घोरमुच्चैर्नदन्त्यः चरणानास्फोटयन्ति। अधोमुखांशुर्दिवाऽऽदित्यो लक्ष्यते। मेघार्करश्मिप्रतिसूर्यकाश्च अस्योत्तरतः सन्ध्ययोः प्रादुर्भवन्ति। प्रतिमुखं चास्योल्काः स्निग्धा नीला नीचैः प्रपतन्ति । अरुणादिक्चारिणश्च शकुनयः पांशुष्वप्सु वा स्नानं कुर्वन्ति। गोमायुश्चोष्णं पांशुं नीचैरुद्वहन्ति। सशीकराश्च शीतवाताः परिपतन्ति। मत्स्यैरावतेन्द्रधनूंषि प्रत्यक् पूर्वाह्णे द्विगुणानि त्रिगुणानि चोत्पतन्ति। सिकतापांशुकूटवल्मीकाग्राणि अजैण्डककीटपिपीलिकाः समारोहन्ति। क्षीरवृक्षाणां च स्नेहा भवन्ति। श्वशृगाललोमशोलूक-मार्जाराश्चोच्चैर्विनदन्ति। रवोत्तराश्च मृगाः। सूर्यश्चापसव्यं गच्छति। एतानि वर्षनिमित्तानि वारुणसार्पमाहेन्द्रेषु वार्षिकेषु नक्षत्रेषु तथा मासपक्षर्त्वयन-दिवससन्धिषु अष्टम्यां ग्रहेष्वमर्दितेषु वर्षासु वाऽप्यवश्यं फलप्रदानि भवन्ति। तत् संवत्सरमत्सरास्तु यदभ्रचन्द्रग्रहनक्षत्रमृगपक्षिणां वर्षनिमित्तं तन्मासान्तरात् महाभयं जनयतीति ग्लपितं सुतरामपि चात्रोदाहरन्ति॥

प्रतिसूर्यः शक्रधनुर्दण्डकः परिवेषणम् ।
तथैरावतमत्स्याश्च स्निग्धा ये चार्करश्मयः ॥
विद्युतो भूरिकाराश्च वर्णा ये च प्रदक्षिणाः ।
सन्ध्यासु यदि दृश्यन्ते सद्यो वर्षणलक्षणम् ॥

17.8 [Here signs for immediate rains such as salt becoming wet, ants quickly moving their eggs, sudden blowing of cold winds etc are described.]

१७.९ [अब्भुतसागरे विद्युदब्भुते पराशरः]

अथ विद्युदूर्ध्वाधस्तिर्यग्गतित्वात् पिण्डितत्वाच्च ज्वालावर्णवातविशेषान् दृष्ट्वा तत्फलं ब्रूयात् सद्योजलधरो वर्षेत् ॥ तत्र पूर्वा सूर्यकान्ता दक्षिणा शतह्रदा पश्चिमा तटित् उत्तरा सौदामिनी शेषा दिग्देवता विख्याताः । तासां सूर्यकान्ता सौदामिनी ऐशानी वार्षिक्या । सूर्यकान्ता तु कृष्णा कृष्णमेघस्था अवर्षाय । श्वेता वर्षाय च । वृषशिरसि स्थिता ग्रहयोर्वा मध्ये वातवर्षाय। आग्नेयी नैर्ऋती च वार्षिक्यौ । हरितावभासा तु नैर्ऋती महावर्षायेति । स्निग्धा हरितावभासा सरश्मिः शतह्रदा मेदोवर्णा च महावर्षाय । सर्वाश्चेत् प्रदक्षिणमभिवृत्योदयन्त्यः स्युर्महावर्षाय । विपर्यये विपरीताः । तासु बलवती चाशुगतिः पाण्डुताम्रा बहूदका । सर्वा एव वाताय कपिलिकाः। आतपाय लोहिताः । सर्वोर्ध्वगतयो रश्मिवत्यः अन्तःपरिवेषगताः । स्निग्धा नीलाश्चेतरेतरं विशेयुः ताडयेयुः उल्लिखेयुर्वायोश्चादित्यं विशेयुः श्वेतमण्डलाकाराः सोमान्निष्क्रम्य सूर्यं विशन्त्यो वर्षाय । सूर्यान्निष्क्रम्य नीलश्वेतारुणावभासाः सोमं विशन्त्यः भयाय वर्षाय वा । दक्षिणमार्गे सर्वाः स्युरवर्षाय । त्रिषु चेन्मार्गेषु मध्यमोत्तमयोश्चरन्ती वर्षायैव । अजवीथ्यादिषु या नीलाभ्रस्था तिर्यगूर्ध्वचारिणी श्वेता या चाभ्रं चन्द्रं च युगपदेव संस्पृशेन्महावर्षाय। श्वेता त्र्यहमेव। इन्द्रपथेऽन्तःसप्ताहाद्देशनिपाताय अन्या भयाय स्युः । सर्वाः सन्ध्ययोर्दिवा च प्रादुर्भूता अवर्षिण्योऽपि महावर्षाय । श्वेतारुणैका विरश्मिर्नभोमध्यचारिणी सद्योवर्षाय । सूर्यकान्ता अघोरा कपिलाभ्रे च

आग्नेयी पीता । रक्ताभ्रे शतह्रदा ताम्रचूर्णे नैर्ऋती तडित्सौदामिन्यौ च अस्निग्धकपिलमेघेषु शस्त्रपाताय इति ॥

17.9 [*In AS. Parāśara about lightning*]

Since lightning has movement upward, downward, lateral and also be like a ball, one has to tell the effects by looking at the colour of the flame and wind anomalies, for immediate rainfall. Among the lightning, the eastern is known as Sūryakāntā, the southern Śatahradā, the western Taṭit, and the northern Saudāminī. The others are known by the names of the directional deities. Among these, Sūryakāntā, Saudāminī and Aiśānī (north-eastern) produce rain. Sūryakāntā in dark clouds is not for rain; in white clouds it brings rain. If the lightning is stationed in Vṛṣaśiras or in the middle of two planets, it is for windy rains. Southeast and southwest lightning also indicate rains. The southwest lightning, seemingly yellowish, is for heavy rains. Śatahradā, oily, looking yellow with rays is for heavy rains. All, if originating clockwise are for heavy rains. Otherwise the effect is opposite. Among these, strong and fast lightnings with pale coppery colour have large amount of water. All lightnings for strong wind look tawny; red colour is for heat. All vertically formed with rays have haloes inside. Oily and dark ones, hitting one against the other, or merging together go towards Sun. Lightning, white in colour and circular in form, starting from Moon and entering Sun produces rainfall. Those of bluish white and red colours departing from Sun and entering Moon are for fear or rains. In the southern path, all types of lightnings are for no rains. Among the three paths, the northern and the middle ones are for rains. Along the Ajavīthī etc (see 9.1) *should lightning in dark clouds touch simultaneously white clouds and the Moon, there will be heavy rains……..*

[In the above, a sky-part by name *Vṛṣaśiras* meaning Head of the Bull is mentioned. The actual position of this is not indicated anywhere in PT. The notation of the zodiacal signs *Meṣa, Vṛṣabha*, which is not used by PT, is of late occurrence in Indian texts. However from the context of lightning seen in

the sky *Vṛṣaśiras* has to be identified with the region comprising *Kṛttikā, Rohiṇī* and nearby stars. Alternately, the original author might have meant *Mṛgaśiras* which has got distorted in scribal transmission.]

१७.१० [अद्भुतसागरे वाताद्भुते । पराशरः]

इह खलु वायवो अष्टासु दिक्षु भवन्ति तेषां सुरभिरनुकूलो मृदुः सम इति सर्वदा शस्यते । तत्र पूर्वो मेघानां सञ्जननः । पश्चिमो विनाशनो अन्यत्र नभोनभस्ययोः । नित्यं वर्षाय उत्तरः । दक्षिणो अभ्रसंप्लवकरो मन्दवर्षाणि यच्छति अपि वा अन्यवातजं वर्षम् । नैर्ऋतो वायव्यश्च अभ्रवान् महावर्षाय । ऐशान्यो मृदुरपि वर्षाय । नानावातसंपातो महावर्षाय। सर्वेषां चान्यवातकृतानां अभ्राणां उपसृष्टवर्षाणां तत्प्रतिलोमो विनाशाय । अनुपसृष्टवर्षाणां तु महावर्षाय । पूर्वश्चेन्महाशब्दो नीचैर्बलाहकानामाकर्षी महावर्षायैव स्यात् । यस्यां च दिशि पूतिगन्धिनो निमित्तमागच्छेयुः तस्यां दिशि शस्त्रकोपजननं विन्द्यात् ॥ ग्रीष्महेमन्तयोः चेन्नाभिवर्षेत् वर्षाणां सम्पदं कुर्यात् । आधानकाले शर्कराकर्षिणो नीचैः स्वराः खरवपुषश्च शस्यन्ते । सर्वेष्वेव अतिमात्रेषु अनवरतेषु शीघ्रेषु सप्तरात्रपरेषु भयं महावर्षं वा विन्द्यात् । द्वादशरात्रपरेषु महावर्षं राजमृत्युं वा । पक्षपरेषु भयमेव च । तत्र क्षुद्भयम् ऐन्द्रे । आग्नेये क्षुच्छस्त्रभयं दस्युतो राजदेशविनाशयोः अन्यतरम् । याम्ये मूलफलपुष्पघातम् उत्पातातङ्कपिटकभयम्। नैर्ऋते कृमिपतङ्गदंश-मशकक्लेशशस्त्रप्रादुर्भावम् ईतिं चाधिकम् । वारुणे फलपुष्पदमारोग्यं वा। वायव्ये क्षुच्छस्त्रभयैः राजदेशविनाशयोरेकतरम् । सौम्ये क्षेमसुभिक्षम् । ईशान्ये शस्यसम्पदम् । सर्वतो दिग्भ्यस्तु युगपन्महाराजभयं सर्वदा ॥

17.10 [*In AS: Parāśara about wind anomaly*]

Winds happen in the eight directions. Among them pleasant, fragrant and breezy wind is always good. The wind in the east is responsible for cloud production. The one from west destroys clouds in the months of Nabha and Nabhasya (rainy season). Northern wind is conducive to daily rains.

Winds from south produces cloud groups but rains less or rains due to other directional winds. Winds with clouds from southwest and northwest are for heavy rains. Wind from northeast even if soft is good for rains. Combination of winds from different directions is for heavy rainfall. If rainfall is obstructed due to other reasons, it may not rain, otherwise there will be heavy rainfall. Loud sounds from the east and attraction of cranes to fly at lower level are indication for heavy rainfall. The direction from where foul smell is carried by the winds indicates the place of weapons for war preparation. If it does not rain in summer and dewy season, rain waters are to be stored. During the time of nucleation (of rainy clouds) low sounds and attraction (uplifting) of dust are good signs. Rain falling continuously over 7, 12 or 15 nights indicates fear, or death of the king. In such cases, wind from east portends hunger; from southeast fear either due to hunger and weapons or destruction of the State by robbers is indicated. From south destruction of roots, fruits and flowers and fear of utpāta (natural disasters) is indicated. From southwest, increase in pests and insects; but from west increase in fruits, flowers and health is indicated. From northwest, due to fear of hunger and weapons, the indication is for destruction of either the king or the region. From north, the portent is for health and abundance; and from northeast, the indication is for good crop yield. If winds (with continuous rainfall as above) are from all the eight directions together, it is always a cause of fear for the chief king.

१७.११ [आषाढपौर्णमास्यां तु विशेषमाह ॥]

अतोऽनन्तरं आषाढीसंयुक्ते शशिनि सुरभिरनुकूलः स्पर्शवान् मारुतः । पूर्वः पूर्वोत्तर उत्तरो वर्षशस्यातिवर्षकरो नैर्ऋताग्नेययाम्यवारुणवायव्यो मध्यशस्यवर्षकरः । विपर्ययो विपरीतेषु । आधानविसर्गान्तभागे निमित्तानि प्रावृषामाद्यन्तेषु मध्येषु फलम् इति ॥

17.11 [*Ballālasena: Special statement for the Full Moon in the month of Āṣāḍha*]

Then in the month of Āṣāḍha when Moon is full near the Pūrvāṣāḍhā star

and when wind is blowing breezily with fragrance it is stated as follows. From east, northeast and north wind is good for rain fed crops. Wind from the direction of southeast, southwest, south, west and northwest is for rains leading to medium crop growth. This may get disturbed if the portents are opposite. The conditions and portents observed during the nucleation, peak and end of rains lead to results respectively in the beginning, middle and end of the rainy season.

१७.१२ [उत्पलविवृतौ । वृष्टेराढकद्रोणप्रमाणपरिज्ञानं पराशर आह]

आढकांश्चतुरो द्रोणमपां विन्द्यात् प्रमाणतः ।
धनुष्प्रमाणं मेदिन्या विन्द्याद् द्रोणातिवर्षणम् ॥
समे विंशाङ्गुलानाहे द्विचतुष्काङ्गुलोच्छ्रिते ।
भाण्डे वर्षति सम्पूर्णं ज्ञेयमाढकवर्षणम् ॥

१७.१३ [अद्भुतसागरे प्रवर्षणाद्भुते । पराशरः]

आढकश्चतुरो द्रोणानपां विन्द्यात् प्रमाणतः ।
धनुःप्रमाणं मेदिन्यां विन्द्याद्द्रोणाभिवर्षणम्॥
चतुर्विंशाङ्गुलानाहे द्विचतुष्काङ्गुलोच्छ्रिते ।
भाण्डे वर्षाम्बुसंपूर्णे ज्ञेयमाढकवर्षणम् ॥

17.12-13 [The above verses define how to measure rainfall as per Parāśara. The quotations of both Utpala and Ballālasena are shown above. It is clear that these have come from the same source with modifications. It is amazing to see Parāśara, more than 2000 years ago, to have thought of measuring Indian monsoon rainfall. The first verse in both the sources is almost same. It says four *āḍhakas* make one *droṇa* and if water collects on ground for the measure of a bow the amount of rainfall will be known as one *droṇa*. *Dhanuṣ* was an ancient length measure equal to the size of a standard bow. Perhaps this was about a

meter in length. Hence the first verse is a thumb rule which says if water gets deposited on ground in a pool of about one meter diameter the quantity should be taken as one *droṇa*. The second verse is more specific and accurate but the two readings differ about the diameter of the vessel. As per this, one *āḍhaka* of rainfall is equivalent to rainwater getting fully collected in a cylindrical vessel of 20 or 24 *aṅgula* diameter and height of 8 *aṅgula*. This, in spirit, is very similar to the modern definition of *1 cm* of precipitation being equivalent to water collected for a depth of *1 cm* over an area of one square meter.]

१७.१४ [अद्भुतसागरे प्रवर्षणाद्भुते । पुनर्वसुप्रभृति नक्षत्रयुक्तशुक्लप्रतिपत्सु प्रवर्षणजलपरिमाणमाह पराशरः॥]

इह खलु शुक्लप्रतिपत्प्रभृतिवर्षं दशाकुलमाचक्षते । तस्यां यावदभिवृष्टे देशे वर्षतः अपां प्रमाणं अन्नशस्यप्रजाक्षेमाक्षेमलक्षणं वार्षिकमुपदेश्यामः॥

17.14 [*Ballālasena, in AS: Parāśara gives the expected rainfall for the season from the first rains on the star of the first day of the month, starting from star Punarvasu.]*

Now we enunciate the seasonal conditions starting from the first day of the bright fortnight. Here we teach the prognosis of yearly rainfall and effects on people.

१७.१५ तत्रादित्ये विंशतिद्रोणाभिवर्षा सर्वशस्यक्षेमारोग्याय। पुष्ये अष्टादशद्रोणान् पश्चादभिवृद्धवर्षाय जघन्यशस्यसम्पदे। आश्लेषायां वर्षबीजक्षेमसाधुजनविघाताय त्रयोदशवृष्टये। पित्र्ये शस्योदकविघातकर-पर्वतीयनृपतिवृद्धिं चतुर्दशद्रोणाभिवर्षणं च विन्द्यात्। भाग्ये चतुःषष्टिमाढकाणां वर्षत्यपि च शस्यरोगवृद्धये। शतमाढकानां आर्यम्णे अभिवृष्टो जनानभिनन्दयति। हस्ते पञ्चदशद्रोणान् क्षेमशस्यसम्पदं विन्द्यात्। पञ्चषष्टि द्रोणाभिवर्षी त्वाष्ट्रे सर्वजनवृद्धये। चतुरः स्वातौ शस्यविघातमक्षेमं चादिशेत्।

ऐन्द्राग्ने विंशतिद्रोणाभिवर्षी राज्ञां विरोधिकृद्भवति। मैत्रे द्विसप्तक द्रोणाभिवृष्टे नरेन्द्रोद्योगवणिग्बीजक्षीररोगवृष्टिं (?) विन्द्यात्। ऐन्द्रे चतुर्द्रोणाभिवर्षी बीजान्युच्छेदयति। तच्चतुर्गुणो मूले सर्वशस्याभावी न क्षेमाय। आप्ये म्लेच्छसर्वशस्यव्याधिप्राबल्यम्। अष्टादशग्रहावसाने (?) द्रोणान् षोडश वर्षति। हेमन्ते वा वैश्वदेवे शस्यवृद्धिः क्षेमायाभीक्ष्णविंशतिपर्यन्तं द्रोणवर्षाय। श्रवणे मुखरोगातिसारज्वरशस्यप्राबल्यम् वृष्टिद्रोणाश्चात्र षोडशैव। वासवे शीर्षरोगप्राबल्यं च। वारुणे तच्चतुर्भागमपि च शस्त्रं दुर्भिक्षजननं च विन्द्यात्। आजे अष्टादशद्रोणप्रततवर्षाप्रधानभूपतिविरोधाय। आहिर्बुध्न्ये चतुर्दशाढकवर्षा कुक्षिरोगशस्यदा। अश्विन्यां द्वादशद्रोणान् पश्चात् अभिवृष्ट एकदेशे निम्नेषु शस्यं निष्पादयति। भरण्यां पञ्चदशद्रोणाभिवर्षा भवति अग्निचौरक्षुद्व्याधिकरी। आग्नेये अग्निदंष्ट्रिशस्त्रभयाय षोडशद्रोणवर्षाय च। रोहिण्यां आढकशतवर्षा सर्वजगदामोदाय। सौम्ये विप्रशस्यव्याधिवृद्धये षोडशद्रोणवर्षाय। आर्द्रायां अष्टादशाढकवर्षा बीजशस्याभयाय॥

17.15 *In Punarvasu nakṣatra it leads to 20 droṇas of rainfall beneficial for crop health and growth. In Puṣya rains will be 18 droṇas for delayed increasing rainfall and growth of inferior crops; in Āśleṣā 13 droṇas hurting seeds and good people. In Maghā it leads to 14 droṇas of rainfall and progress of mountain based kings obstructing water needed for agriculture. In Pūrvaphalgunī even with 64 āḍhakā rainfall crop diseases increase. In Uttaraphalgunī with 100 āḍhaka rains people become happy. In Hasta with 25 droṇa there will be good crop yield. With 65 droṇa in Citrā all groups of people progress. In Svāti 4 droṇas of rains indicate crop destruction and drought. In Viśākhā with 20 droṇa rainfall, enmity between kings increases. In Anurādhā with 14 droṇa rains, diseases to kings, workers, traders, seeds and milk increase. In Jyeṣṭhā with 4 droṇa seeds get uprooted. Four times this (16 droṇa) in Mūla there will be dearth of all crops and is not beneficial. In Pūrvāṣāḍhā with 16 droṇa , mlecchas become strong as well as crop diseases increase. In Uttarāṣāḍhā with up to 20 droṇa it is good for winter crops and health of people. In Śravaṇa it rains only 16 droṇa and increases crop yield and diseases of the mouth, cholera, and fever among people. In Dhaniṣṭhā diseases related to the*

head increase. In Śatabhiṣak with a quarter of that leads to weapons and drought conditions. In Pūrvābhādrā with 18 droṇa of continuous rainfall there will be opposition to a prominent king. In Uttarābhādrā 14 āḍhaka rainfall leads to normal crops and stomach diseases. In Aśvinī with 12 droṇa there will be crop growth at lower ground levels after the rains. In Bharanī there will be 25 droṇa rains and fire, robbery and diseases due to malnutrition. In Kṛttikā rainfall will be 16 droṇa with fear of fire, wild animals and weapons. In Rohiṇī with 100 āḍhaka rainfall there will be happiness all around the world. In Mṛgaśiras with 16 droṇa rainfall, diseases among the learned and crops increase. In Ārdrā with 18 āḍhaka, seeds and crops are just protected.

[The above statement of rainfall quantities is unique in ancient literature. *Śārdūlakarṇāvadāna*[1] a Buddhist text originating around 300 BCE and translated into Chinese c 100 CE contains a similar list of rainfall values stated in *āḍhakas*. PT not only proposed how to measure rainfall but also came out with some type of average rainfall prediction for each year based on the date of first rains in the rainy season. However the above, taken from the printed version of the AS text detailed as it is, is still corrupt and unintelligible at places. For instance the minimum to maximum variation could not have been as large as from 4 *droṇa* in *Svāti* to 65 *droṇa* in *Citrā*. What is meant by the end of the *18th Graha* is not clear. What is the rainfall number for *Dhaniṣṭhā?* Hence quarter of this amount for *Śatabhiṣak* is not known. There is no statement for *Revatī*, which is clearly an editorial error. Until a critical edition of AS is available the above statements have to be taken as approximate numbers estimated as per the *āḍhakā* and *droṇa* measures of PT (17.12-13). Parāśara is here forecasting the seasonal rainfall and agricultural conditions based on the date of first rainfall in the lunar month of *Āṣāḍha*. This can be understood from BS where Varāhamihira states the rainfall amount in *droṇa*

1 Text in Sanskrit (Ed.) S.Mukhopadhyaya, Visvabharati, 1954, Santiniketan.

without attributing this to Parāśara. However a comparison of the two texts brings out that the numbers and the forecast are from the same ancient source which should have been PT. A brief comparison and further statistical analysis of the rainfall numbers is presented below.]

17.16 Rainfall numbers of PT and BS

In chapter 23 verses (5-9) of BS, Varāha states that in whichever star it rains in the beginning, rains can be expected under the same star in the season again. He further states the amount of rainfall for the year, based on the first rains under the 27 stars. The rainfall numbers given in *droṇa* are: *Hasta, Pūrvāṣāḍhā, Mṛgaśiras, Citrā, Revatī and Dhaniṣṭhā 16; Śatabhiṣaj, Jyeṣṭhā and Svāti 4; Kṛttikā 10; Śravaṇa, Maghā, Anurādhā, Bharaṇī and Mūla 14; Punarvasu, Viśākhā and Uttarāṣāḍhā 20; Āśleṣā 13; Uttarābhādrā, Pūrvaphalgunī, Uttaraphalgunī and Rohiṇī 25; Pūrvābhādrā and Puṣya 15; Aśvinī 12 and Ārdrā 18.* Now comparing these numbers with those of PT we see that rainfall under *Punarvasu, Viśākhā, Uttarāṣāḍhā, Svāti, Jyeṣṭhā,Maghā, Anurādhā, Āśleṣā, U.Phalgunī, Rohiṇī, Mṛgaśirā, Aśvinī, Ārdrā* are same in the two texts. There are a few differences in the other places. BS specifies 16 for *Dhaniṣṭhā* and quarter of this for *Śatabhiṣak* which is four. This should have been correct for PT also. For *Ārdrā* the number is same but the measure given in AS should be wrong since 18 *āḍhakā* is only four-and-half *droṇa* very nearly the drought condition similar to 4 *droṇa* under *Svāti*, contrary to the prognosis that crops get protected. With large overlap in the rainfall numbers and in the absence of a critical edition for AS, we take the numbers of BS as the ancient traditional rainfall measurement originating from the school of Parāśāra.

At this stage it would be useful to equate one *droṇa* of rainfall in modern terms. This question has been discussed previously with the conversion ranging from 5.1 cm to 6.4 cm of precipitation[2,3]. The variation is mainly

2 T.M.Srinivasan, *Measurement of rainfall in ancient India*, IJHS, 11, 1976, pp.148-157.

3 H.V.Balkundi, *Commentary in Kṛṣi-parāśara* (transl. N.Sadhale) Agri.History Bull. No.2. Asian Agri-History Foundation, 1999, Secunderabad.

due to the uncertainty associated with the conversion of the ancient *aṅgula* varying in the range of 1.6 to 1.9 cm. Kauṭilya's *Arthaśāstra* (c 400 BCE) also prescribes measurement of rainfall using a vessel of 20 *aṅgula* diameter. Kauṭilya states that the expected rainfall over the Avanti region in the Mauryan kingdom was 23 *droṇa*. The ancient city of Avanti was succeeded by Ujjayinī (Ujjain) where Varāhamihira lived in the 6th century CE. The present average seasonal (June-September) rainfall of the region in and around Ujjain is 83-86 cm with standard deviation of about 30 cm. If the northeast monsoon season were to be included, the annual rainfall may be taken as 90 cm. If we take Kauṭilya to have been fairly accurate in the measurements, 23 *droṇa* should have been an official normal value equal to115-135 cm of annual rainfall. In comparison with present day rainfall value for the region, this is on the higher side. But noting that the standard deviation is 30 cm, the ancient value is realistic.

The present writer in 2004 statistically analyzed the 27 numbers reported in BS under the impression that these were original values of Varāhamihira as measured during his time in and around Ujjain[4]. The average value of the 27 values, assuming that these were observed over a period of several years, is 15.59 with standard deviation of 5.73 in *droṇa* units. The coefficient of variation (σ/m) works out to be 37%. Now, it turns out that the rainfall value of BS is from PT, even though Varāhamihira has not acknowledged it to be so. Hence we should wonder whether the rainfall values of the previous section were for the region where PT was composed or narrated. From what little evidence we could secure from Chapter 12, through archaeoastronomical analysis of the observation on rise and set of *Agastya* (Canopus), it is highly probable that PT originated in the Puṣkara region. The present day seasonal rainfall for Jaipur-Pushkar region is in the range 55-60 cm with coefficient of variation of 38-42%. The present annual rainfall of Ujjain is 82 cm with coefficient of variation of 34%. It is not proper to compare average rainfall value of PT with present day numbers other than concluding that the ancient numbers could not have been arbitrary. They were realistic and firmly based on empirical

4 R.N.Iyengar, *Description of rainfall variability in the Bṛhatsamhitā of Varāhamihira*, Current Science, 87,4, 25 August 2004, pp. 531-533.

observations and measurements. The coefficient of variability of 37% for the data of PT and BS points in the direction of Pushkar-Jaipur region, rather than Ujjain, as the place of measurement.

After Parāśara several authors have written on monsoon rainfall and forecasting. These have been undoubtedly important for agricultural operations in ancient India. But no one has surpassed Parāśara in describing the phenomena vividly taking great care to measure and quantify the water received from the clouds. How far the explanations offered by Parāśara, for good and deficient rainfall, are scientific from present day standards does not concern us here. Parāśara is remarkable for his keenness in observing a natural event in its diverse details and attempting to relate the different parts as coherently as possible to present a holistic picture of the monsoon season. Futhermore, true to his scientific temparment Parāśara measured the rainfall to understand the interannual variability of the Indian monsoon rainfall.

In Chapter 1 while describing the creation of *Śukra* (Venus) Parāśara attributes control or modification of Sun induced (summer) rainfall to Venus. Even though we do not know how this concept arose, Kauṭilya in his *Arthaśāstra* made visibility of Venus in the eastern sky during the season a precursor for good rainfall. This principle has been shown to be linked with the 2-3 year cycle of inter annual variability of Indian monsoon rainfall. Similarly, the qualities attributed to the regent deities of the five year *yuga* of VJ as in PT (2.4) has lead to the concept of a five year cycle in rainfall.[5]]

5 R.N.Iyengar, *Monsoon rainfall cycles as depicted in ancient Sanskrit texts. Current Science*, 97, 3, 10 August 2009, pp. 444-447.

18

॥ भूकम्पनम् ॥ Earthquake

१८.१[अद्भुतसागरे भूमिकंपाद्भुते । पराशरस्तु]

प्राक् खलु भगवन्तं अमरगुरुवरं गुरुं समुपसृत्य गौरवानतशिरसः पराशरमुत्तरे हिमवतः पार्श्वे अभितप्यमानतपसं प्रतपन्तमिव उदयगिरिशिखराधिरूढमर्कं ऋषिगणमध्यस्थं जगन्मध्यस्थं अन्तेवासिन ऊचुः। न ह्यवनिचलमल्पकारणं नः प्रतिभाति। तत् किं नु खलु भगवन्नकस्मात् किमधर्मगौरवात् अवनिधरस्कन्धप्रचलनप्रतिचलनमिति तद्वाञ्छन्ति तत् किमदृष्टकारितम्। उत अर्णशयविचेष्टितमिति। शिष्यवचनमथ निशम्य नेत्युवाच भगवान्॥

18.1 [*In AS about earthquakes; according to Parāśara*]

Once, when Parāśara was sitting in the midst of sages near the Himalayas, his students reverentially approached him and asked. "Bhagavan! Shaking of the earth does not seem to be due to trivial reasons. Please enlighten us, whether this is due to sudden increase of unrighteousness (in the society) or due to the movement of those shouldering the earth or is it due to unseen (chance) reasons. Or could it be due to movement of animals in the ocean?" Having heard his students, Parāśara said 'no'.

१८.२ पुरा अतिवीर्यवेगप्रवृद्धप्रभावाः पक्षिणः पवनपथविचारिणोऽचलाः प्रपतन्तः शतशः अवनिमसकृदभिकम्पयाम्बभूवुः। तदखिलजगदहितमवनि–

चलनमभिसमीक्ष्य सुरपतिः अविहतगतिमुपरि कुलिशमुपक्षिप्य क्षितिधरपक्षान् क्षणान्निपात्य अवनिमुवाच। अद्रिजमतः परं भयमपनयामि अनिलानलाम्बुपतिमदभिसृष्टाः कम्पाः कदाचिज्जगति हिताहितवेदिनो भविष्यन्तीति॥

तत्र चतुर्षु चतुर्भागेषु दिवानक्तं अनिलानलेन्द्रवरुणजं कम्पक्रमं विन्द्यात् इति। अर्कचन्द्रग्रहणग्रहविकृतचारजांश्च कम्पानाहुः॥

18.2 *In ancient times, extraordinarily fast and strong winged hills flying in the sky, falling down in hundreds shook the earth continuously. Having seen this shaking of the earth, Indra threw his weapon to cut off the wings of the flying hills. He told Earth, 'henceforth I will remove your fear caused by the rocks. But occasionally disturbance caused by anila (vāyu, wind or gas), anala (agni or fire), ambupati (varuṇa or oceans) and myself (Indra) will occur indicating good and bad effects to the world.' Day and night each are divided into four parts. The earthquakes are induced in the same order by anila, anala, indra, varuṇa respectively. Eclipse of Sun, Moon and anomalistic movement of planets are also said to induce earthquakes.*

१८.३ वायव्याभिजिद्वासवाश्वार्यम्णहस्तत्वाष्ट्रेष्वनिलो भूमिं कम्पयन् परुषपवनविघातैः (निपातैः) तरुकुसुमसस्यानुच्छेदयति। उन्मादश्वासश्वयथु-विषमज्वरातङ्ककृत्। विशेषतो भिषग्वणिक्पण्यस्त्रीशिल्पिशूरचित्रकार-कविविद्याविवादशीलधूर्तकुरुयवनदण्डकमत्स्यमगधसाल्वसौवर्धनपुलिन्द-वैदेहसुराष्ट्रनलदरददशार्णाङ्गवङ्गावन्तिमालवपौरवत्रिगर्तसौवीरयौधेयक्षुद्रक-शिबिकानभिहन्ति॥

18.3 *Anila having shaken the earth under nakṣatras Svāti, Abhijit, Daniṣṭhā, Aśvinī, P.Phālgunī, Hasta, Citrā destroys trees, flowers and plantation with severe wind. This causes delirium, respiratory diseases, anxiety and fever. Especially doctors, traders, comfort women, sculptors, painters, poets and debaters get affected. Among the countries, Kuru, Yavana, Daṇḍaka, Matsya, Magadha, Sālva, Sauvardhana, Pulinda,*

Vaideha, Surāṣṭra, Nala, Darada, Daṣārṇa, Aṅga, Vaṅga, Avantī, Mālava, Paurava, Trigarta, Sauvīra, Yaudheya, Kṣudraka and Śibikā get affected.

१८.४ अग्नीन्द्राग्न्यजयमपितृगुरुभगदैवतेषु अनलोऽभिकम्पयन् वर्षसरित्सरःस्रोतसामपः क्षपयन् मुखाक्षिरोगरोचकपिटकपाण्डुरोगज्वर-किटिभदद्रूदाहकृद्विशेषाद्दारुपावकाग्निदिक् पुलिन्दयवनबाह्लीकवङ्गोष्ट्रा-वन्त्यश्मकेक्ष्वाकुकुलूततुखारशिबिकत्रिगर्तवैदेहद्रविडसुराष्ट्रमध्यदेश-दाशार्णांश्च हिनस्ति इति॥

18.4 *Anala type earthquake occurring under the stars Kṛttikā, Viśākhe, P.Bhādrā, Bharaṇī, Maghā, Puṣya, U.Phalgunī, decreases rainfall, river flow and water in lakes and springs. It affects people by increasing mouth, eye, and skin diseases. Especially the southeast direction is affected. Pulinda, Yavana, Bāhlīka, Vaṅga, Avantī, Aśmaka, Ikṣvāku, Kulūta, Tukhāra, Śibika, Trigarta, Vaideha, Draviḍa, Surāṣṭra, Madhyadeśa, Dāśarṇa provinces are troubled.*

१८.५ ऐन्द्रवैश्वदेववैष्णवप्राजापत्यसौम्यादित्यमैत्रेषु सुरपतिरवनिमति-चालयति। प्रावृड्ाम्भोदयज्ञधर्मान्नपानोत्सवो। अन्यत्र प्रथितकुलाधिपतिसुराष्ट्र-चीनकाश्मीराभिसारप्राच्यशककिरातपौरवाच्युतवास्वर्णवमालवपह्लव-दण्डककाशिकार्षककैलासमल्लहलवहालानुपतापयति इति ॥

18.5 *Indra shakes the earth under Jyeṣṭhā, U.āṣāḍhā, Śravaṇa, Rohiṇī, Mṛgaśiras, Hasta and Anurādhā asterisms. This is for good rains, and celebration of religious festivals with food and drinks. At another place, a famous chief of a clan will be troubled. Surāṣṭra, Cīna, Kāśmīra. Abhisāra, Prācī, Śaka, Kirāta, Paurava, Arṇava, Mālava, Pahlava, Daṇḍaka, Kāśi, Kailāsa, Malla, Halava, Hāla provinces will be troubled.*

१८.६ वारुणाहिर्बुध्न्यपूषारुद्रभुजगनैर्ऋत्यदैवतेषु कम्पोऽम्बुपतिकृतः। प्रततजलधरधाराप्रभिन्नकेदारपुरनगरप्रवृद्धतरतरुणक्षुपशष्पसस्यश्च। अतिसारहिक्काक्षिरोगकृदपि च। विशेषतः किरातकाश्मीरापरान्तककौकुरेय-

शौर्यारिकचेदिवत्ससैन्धवोदकपात्र–उदधिनदनदीसंश्रितांश्च देशानुपहन्ति इति॥

18.6 *Earthquakes under the asterisms Śatabhiṣak, U.bhādrā, Revatī, Ārdrā, Āśleṣā, Mūla are caused by Varuṇa. With continuous rainfall the fields, cities and trees get broken. It brings in diarrhea, hiccup and eye diseases. Especially Kirāta, Kāśmira, Aparānta, Kaukureya, Śauryārika, Cedi, Vatsa, Saindhava countries and people living in coastal regions and river banks get troubled.*

१८.७ स्निग्धस्वनाः प्रदक्षिणानुयायिनोऽम्बुधरधाराभिषिक्ताः पर्वसु च सर्व एव प्रशस्यन्ते। अभीक्ष्णा बहवः अवनिपतिविग्रहाय भयाय च इति। त्रिचतुःसप्तरात्रे पक्षमासत्रिपक्षान्तरे प्रततानुकम्पनः प्रवरनरपतिविनाशाय। अपि च शमयन्त्यासप्ताहात् कम्पादिकृतं निमित्तमाश्वेव। अतिवर्षणोपवास–व्रतदीक्षाजप्यहवनानि ॥

18.7 *Events occurring with pleasant sounds that follow in the clockwise direction during New and Full Moon with heavy rains are beneficial. But when too many occur at frequent intervals, it portends fear to the king. Earthquake repeatedly occurring at three, four, seven nights and also at fortnight, month and one and half month interval, is for the destruction of an important king. The bad omens indicated by earthquakes get nullified quickly in seven days by religious rites.*

[In the regions affected by earthquakes PT includes Drāviḍa. But as in other chapters on astro-geography, this is combined with Surāṣṭra. Even though in historical times Drāviḍa country was located in South India, in more ancient times it was likely to have been identified in the Gujarath-Rajasthan region. Varāhamihira in BS and Ballālasena in AS give more detailed description including the variable distance to which the four types of earthquakes are felt. Several other regions are included in the lists by other writers. A concise article on the ancient

information about earthquakes is presented elsewhere[1].]

१८.८ [उत्पलविवृतौ। पराशरे तन्त्रे विशेषतरं पठ्यते]

योऽन्यस्मिन्नक्षत्रे भागे चान्यत्र भूचलो भवति।
स भवेद् व्यामिश्रफलस्तन्मे गदतो निबोध त्वम्॥
कुरुशाल्वमत्स्यनैषधपुण्ड्रान्ध्रकलिङ्गविन्ध्यपादस्थान्।
वाय्वाग्नेयः कम्पः सानलजीवान् भजति मैत्र्याम्॥
प्राच्यशकचीनपह्लवयौधेयकपर्दियक्षवद्गोमान् ।
शरदण्डमगधबन्धकिविनाशनः शक्रवायव्यः ॥
आवन्तिकाः पुलिन्दा विदेहकाश्मीरदरदवासान्ताः ।
बाह्याश्रिताश्च वायव्यवारुणे प्राप्नुयुः पीडाम् ॥
ऐक्ष्वाकवोऽश्मरथ्यान् पदच्चराभीरचीनमरुकुत्सान् ।
ऐन्द्राग्नेयः कम्पो हिनस्ति राज्ञश्च समुदीर्णान् ॥
सरितः सरः समुद्राश्रितांश्च गोनर्दमङ्गनाराज्यम् ।
क्षत्रियगणांश्च हन्यात् कम्पो वरुणाग्निदैवत्यः ॥
काश्याभिसारकाच्युतकच्छद्वीपार्यदेशजाः पुरुषाः ।
गणपूजिताः कुलाग्र्या नृपाश्च वरुणेन्द्रवध्याः स्युः ॥ इति

18.8 [*Utpala's Commentary: In Parāśaratantra a special statement*]

[These verses are about regions affected by combination of *Vāyu, Agni, Indra* and *Varuṇa* type earthquakes.]

1 R.N.Iyengar, *Earthquakes in Ancient India*, Current Science, 77, 6, 1999, pp. 827-829.

19

॥ उल्कापातप्रतिसूर्यपरिवेषादि ॥ Meteors, Mock Sun, Haloes

१९.१ ॥ उल्कापातम्॥

[अद्भुतसागरे बल्लालः– तत्र सामान्येन पतता ज्योतिः विशेषेण एव उल्का इति संज्ञा प्रतिपादिता पञ्चविधाश्चोल्का भवन्ति ॥ पराशरस्तु]

युगपदर्चिस्तनयित्नुमत्यो निपतेयुः पार्थिवाभावाय । श्वमयूरसूकररक्षः प्रविकीर्णकेशनिकाशाभिः प्रवरनरपतिविनाशः स्यात् । पतन्त्येव चेत् खण्डशो विशीर्येत सन्निपातं राज्ञां इतरेतरभेदं च। सधूमा खरनिर्ह्रादिनी व्यभ्रे अतिचण्डनिर्घाता नैर्ऋतीं दिशमभिपतेत् ज्वलन्ती तालमात्रा सधूमदण्डा हन्याद्रक्षःपिशाचदस्यून् कुराज्ञश्च। यत्र अतिमात्रज्वालाङ्गारकणानि चोद्वमन्ती भृशं स्तनयितुमत्यभिपतेत् तत्राचिरात् परचक्रम्। या च अवनिमभिपत्याशु पुरुषमात्रमभिज्वलेत् सा पञ्चमासाभ्यन्तरात् अन्यभूपतिकारिणी स्यात्। या च निपत्याङ्गारमिव आभासेन्मुहुः अन्तर्दशरात्रीः सा अन्यमवनिपतिमधिकुर्यात्। तथा सुमहती सधूमज्वाला तारागणानुसृता यमभिप्रायात् तमपसव्यतः प्रतिलोमं वा आगच्छेत् तं हन्यात्। श्वेतरक्तपीतकृष्णवर्णाः सौम्यादि–दिगनुगामिन्यो ब्राह्मणादिवर्णघाताय अन्यवर्णा अन्यदिशमभिपतन्ती उभयवर्णमभिहन्यात्। महती चोज्ज्वलन्ती तिर्यक् सूर्यमभिद्रवेत् वधाय राज्ञः। सूर्यमेव चेदभिहत्योल्का याम्यां दिशमभिपतेत् राज्ञो वधाय। या च अर्कचन्द्रयोरग्रतो निपतेत् नृपतिजयं अविजयं च पृष्ठतः। उदयेऽस्तमये

भानुमुल्काऽऽहत्य समुच्छ्रिता प्रज्वलन्ती तथा राजा क्षिप्रं शस्त्रेण हन्यते। उपरक्तं चन्द्रमसमभिदध्यात् अभियोक्तुर्वधाय। पीताऽरुणनीलासितरक्ता वा सस्फुलिङ्गाङ्गारार्चिर्वा अर्कमिन्दुमुद्यन्तमभिघ्नन्ती प्रवरनरपतिविनाशिनी स्यात्। असिमुशलभिन्दिपलोरुभुजगाकृतिश्चेत् निर्घाताङ्गारधूमार्चिष्मती या वा महती यस्यर्क्षं अवनिपतेः अभिहन्यात् स हन्यते सराष्ट्रम्। दिवा पतन्त्यतिमात्रं अन्यनृपतिकारिणी स्यात्। सौम्यां दिशमर्धरात्रे अभिपतति महावर्षमिति। मध्याह्ने तु यदा सधूमोल्कापातो भवति तदा सप्ताहाभ्यन्तरे फलं भवति॥

19.1 Fall of Meteors

[*In AS. Ballālasena: Any falling light (fire) is technically known as Ulkā. These are of five kinds. According to Parāśara*]

When meteors fall with sound and light it is for absence of the king. Meteors looking like dogs, pigs, peacocks with disheveled hair are for the destruction of an important king. If during the fall the object breaks to pieces it portends division among kings. In cloudless sky, looking like a burning tree, making terrible sound, if a meteor dives with smoke in the southwest direction, it kills enemies, demons and minor chiefs. In whichever place it falls burning and spouting sparks loudly, very soon, there will be attack by another country. That which falls on earth burning a single person will replace the king by another person within five months. That which after fall looks like burning coal again, will cause within ten nights another king to take over. If a large meteor with flame going along the path of the stars were to approach a person, circling him, it will kill him. Meteors of white, yellow, red and dark colours going in the cardinal directions (north etc) affect the four groups of people, Brāhmaṇas and others respectively. If a huge burning object approaches Sun in a crooked path it is for the death of the king. If an Ulkā, having approached Sun falls in the southern direction it portends death of the king. If the eclipsed Moon is hit by a meteorite, it is a portent for the death of the chief administrator.....If a meteor with smoke falls in the afternoon, the results will be felt within seven days.

[This is among the earliest matter-of-fact description of meteors in Sanskrit literature. Ṛgveda refers to what can be visualized as meteor shower or storm. But due to the traditional post-Vedic classical interpretation of *Marut* as wind, the real import of the Vedic texts is not yet fully understood[1]. After Parāśara several others have added to the description and classification of meteorites. The five types of *Ulkā* to which Ballālasena refers are mentioned in BS also. These are *Dhiṣṇyā, Ulkā, Vidyut, Aśani* and *Tārā*. Incidentally these are words found first in the Vedic literature.]

१९.२ ॥ प्रतिसूर्यकाः॥

तथा प्रतिसूर्यकेषु रवेः पूर्वतो युवराजस्य राज्ञो वधाय। दक्षिणपूर्वतः अग्निवृद्धये। दक्षिणतो विग्रहाय। प्रत्यग्दक्षिणतो दस्युविनाशाय। प्रत्यग्वर्षदः। पश्चिमोत्तरतो वातवृष्टिदः। उत्तरतो अतिवृष्टिकरः पूर्वोत्तरतश्च। सन्ध्यायां बहवश्च दृश्येरन् क्रमात् दिक्षु सकलनृपतिविनाशं कुमारवधं मरकभयं दस्युशस्यपीडां अन्नक्षयं व्याधिशस्त्रकोपयजमानयाजकभयम्। पाखण्डिपीडां सप्रभे प्रतिसूर्ये। निष्प्रभे रवौ राष्ट्रवधं विद्यात्। परिधी उभयपार्श्वतः स्निग्धौ वर्षकरौ रूक्षौ विनाशनौ पृष्टतो वा संग्रमाय। परिमण्डलाः कुम्भकुण्डाकृतयः प्रशस्ताः। विपरीता अन्ये शङ्खवैडूर्यपरिग्रहाः। स्निग्धाः प्रशस्ताः सन्निकृष्टाः प्रजाहिताय वर्षाय च पीते व्याधिभयं विद्यात्। ताम्रे शस्त्रकोपो भवति ॥

सन्ध्यासमीपे यदि भास्करस्य दृश्येत माला प्रतिसूर्यकाणाम्।
सूर्ये भवेयुः प्रचुराश्च वैरा रोगाश्च घोरा विविधप्रकाराः॥
दीप्ताग्निवर्णः कनकप्रभो वा सन्ध्यासु चेद्भास्करमावृणोति।
कम्पेत भूः खात्प्रपतेन्महोल्का नृपो विनश्येत् सहितः प्रजाभिः ॥
प्रत्यर्कमिन्द्रायुधमत्स्यदण्डाः सविद्युदभ्राशनिवर्षवाताः ।
भवन्त्यभीक्ष्णं दिनरात्रिसन्धौ भयं तदा भूमिपतेर्वधः स्यात् ॥

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1 R.N.Iyengar, *Comets and Meteoritic Showers in the Ṛgveda and their Significance.* IJHS, 45.1, 2010, pp.1-32.

19.2 Mock Suns

[This section describes the phenomenon of more than one Sun being seen which happens under some special atmospheric conditions. Mock Suns appear due to refraction of Sunlight passing through ice crystals present in clouds of particular type. Vedic people in India watched the sky intently to wonder what the anomalies may mean to man on earth. Even if the physical reason for the observed peculiarity was not known, the description in PT is fairly realistic. PT describes possibility of a strand of mock Suns being observed in the evening. The last two verses above are from the commentary of Utpala on BS.]

१९.३ ॥ परिवेषणम्॥

अथ परिवेषा वाताभ्ररश्मिविकारसमुत्थानं चन्द्रे सूर्ये वा सद्यः फलमादिशेत् अतः सप्तरात्राद्वा यावद्दर्शने भेदे। अखण्डा विकृता सद्योजाः श्वेताः स्निग्धाश्च नताः परिवेषाः सद्यो वर्षाय वा॥

धूम्रवर्णो अग्निवर्णो वा अग्निभयाय। अतिमात्रं रक्तः शस्त्राय। पीतो व्याधये कृष्णो विरुद्धानां अन्योन्यवधाय वर्षाय च। परुषो अन्योन्यवधायैव। नील उपयातो बलस्य एकदेशोपघाताय। लोहितः चौराणाम्। कपिलो ब्राह्मणानां पीतवर्णः संधानाय। पाण्डुरो निःश्रेयसे। समवायेषु तु द्वादशासु काल-कालपरुषपरुषहरितनीलनीलताम्रताम्रकपिलकपिलारुणारुणरक्तरक्तशुक्ल-शुक्लपीतपीतपाण्डुकृष्णेषु द्वयोर्वर्णयोः पूर्वात् पूर्वो वर्णो गरीयान्। अभ्यन्तरो अभ्यन्तराणां बहिर्बाह्यानां त्रीणि चेत् मण्डलानि स्युरन्तर्लोहितं मध्ये पीतं बहिः श्वेतं स्यात् बाह्यस्य राज्ञो वधाय अभ्यन्तरस्य च वधाय। विपर्यये विपरीतम्। अभ्यन्तरतः कुलीनमेवाभिषिञ्चति। अन्तःपीतके रक्तमध्ये बहिःश्वेते इति ॥

सोमसूर्ययोः सकलाहोरात्रपरिवेषणं क्षुद्व्याधिभयैः प्रजानाशाय। सन्ध्ययोः चेत् सप्तमण्डलानि सूर्ये अभीक्ष्णं दृश्येरन् उपतापस्तस्य देशस्य मरकः

स्यात् क्षुच्छस्त्रकोपाभ्यां अन्योन्यविरोधाच्च॥

यत्र त्रीणि अवरुध्येरन् चन्द्रमाः सनक्षत्रो ग्रहः तत्र त्र्यहादेवो वर्षति। मासाद्वा भयं ब्रूयात् । राज्ञः शस्त्रेण निधनम् पिनद्धे दैत्यमन्त्रिणि। सौरे स्यादम्भसा पीडा जीवे राज्ञः पुरोधसाम्॥ बुधे ज्ञानिवधो भौमे दस्युशस्त्राग्निसम्भवः। ग्रहाणां परिवेषो यथास्वं पीडयति नक्षत्राणां च॥

परिवेषमण्डलम् यस्यां दिशि भिद्येत दारुणम्। तस्यां दिशि विशेषेण विद्यात् तीव्रतरं फलम्॥ सर्व एव सन्ध्ययोः दृश्यमाना वर्षासु वर्षकाः स्युः अन्यत्तौ भयाय॥

19.3 Haloes

[Parāśara true to his scientific approach reasons out that halos of Sun and Moon are due to deviations in the light rays caused by wind and clouds. Colours and locations of the haloes and the corresponding portents are described in detail.]

१९.४ ॥ इन्द्रधनुः॥

प्रविच्छिन्ने बहुरागे स्निग्धवातानुबन्धे सद्यो वर्षं तथा कृष्णे स्निग्धे नीलाभ्रवृक्षत्रयस्थे सूर्येऽप्येवम्॥ स्निग्धे समद्रद्विनगे वा वर्षमनृतौ भयं च। रक्तमाञ्जिष्ठे श्यामारुणनीलपीतके भयम्। परुषे राजमृत्युं सर्वस्मिन्नेव च। पश्चिमश्चेति सूर्ये तिष्ठत्यनुदेशं पुरस्ताद्दृश्येत क्षेमाय स्यात् तनुवर्षाय विपरीतं वर्षविघाताय। प्रागुत्तरस्यां दिशि श्वेतवर्णचापदर्शनं दुर्भिक्षाय। सूर्यं भूमिं चेद्विष्टभ्यति तदा पुरोहितवधः। सन्ध्ययोश्च सूर्याचन्द्रमसौ परिरभ्य विन्द्यात् मन्त्रिसेनानायकानां अनामयम्। शत्रुभिः उपरुद्धे पुरे यदि सपरिवेषात् सूर्यात् सादितमिन्द्रधनुर्भवति तदा पुरमोक्षं भवति न नृपतिविरोधप्रदम्। अनृतौ संस्थानकाले चेत् गर्भसामर्थ्यकरमिन्द्रधनुः शेषकाले तु भयदम् इति। रात्रौ श्वेते ब्राह्मणानाम्। रक्ते क्षत्रियाणां च। पीते विशाम्। कृष्णे शूद्राणाम्। यथा

अष्टदिक्षु च एषामयनं ब्रूयात्। सर्वासु दिक्षु तु रूक्षे विच्छिन्ने गणानाम्। अथेन्द्रधनुषः सद्यःफलं सप्तरात्राद्वा इति ॥

19.4 Rainbow

[This section describes portents due to different types of rainbows.]

१९.५ ॥ रश्मिदण्डम्॥

अथ दण्डा धनुर्भिः समानरूपफलाः। विशेषतस्तु उभयतो विच्छिन्नो दण्डो अमूलवान् स्यात् अपरं धनुरदृश्यात्मवत्। दृश्यन्तश्च रश्मयः तीक्ष्णाग्राः चन्द्रसूर्ययोः। अन्तस्न्यहात् फलं तेषु त्रिषु विद्यात्। घनाः स्निग्धा दीर्घाः परिपूर्णाः रक्तनीलाः श्वेतानुगामिनो योगक्षेमाय। रक्ता रूक्षा ह्रस्वा नीचास्तु वर्षाय। काला दुर्भिक्षाय। धूम्रलोहितास्तनवः शस्यस्यापदे। अत्यन्तं आनीलकृष्णाः पाण्डुराः पारावतम्यूरचित्रवर्णा वा वर्षाय। बहवश्च स्निग्धा द्वौ नीलौ रक्तौ परुषौ वा परचक्रभयाय। तथा च रक्तपरुष एकच्छिद्रो विच्छिन्नो दुर्जातो राजमृत्यवे। विपरीतो राजजन्मने। पुण्डरीकाकारः उल्कापाताय। रक्तकपिलौ पीतरक्तौ वाऽत्यन्तगौररूक्षौ राजनिर्याणाय। त्रिवर्णो राजक्षयाय। स्थूलाकारो अञ्जनवर्णो वर्षसम्पत्तये। अस्तमितमात्रे रश्मिदर्शनं मुख्यामात्यविनाशाय॥

19.5 Light Column

[This section describes occasional light structure looking like a vertical column. The results are said to be same as in the case of rainbows. Hence *raśmi-daṇḍa* may be same as a rainbow with some differences.]

१९.६ ॥ गन्धर्वनगरम्॥

उपस्थितायां दृश्येत चेत् सन्ध्यायां कुमारवधम्। अतीतायां वृद्धस्य

राज्ञः। गन्धर्वनगरेण सहैवोदितः सूर्यः परचक्रागमनं कुर्यात्। दीप्तायां दिशि विच्छिन्नरूपं वृक्षाग्रेषु दृश्यते महाभयम्। ऐशान्यां दिशि अभियोक्तृवधाय। वारुण्यां अभियुक्तस्य। एभ्यस्त्वन्यानि दिशान्ते स्निग्धरूपाणि अविच्छिन्नानि शुभानि विन्द्यात्। अथ गन्धर्वनगराणि प्राच्यादष्टासु दिक्षु प्रादुर्भूतानि क्रमात् फलं आवेदयन्ति। क्षुत्पीडां अग्निप्रकोपं युवराजवधं तस्करोपद्रवं राजपीडां तपस्विनां भयं भूतागमनं वर्षं इति ॥

19.6 Celestial City

[*Gandharva-nagaram* or celestial city is referred to in several Sanskrit texts. Most probably this refers to special transient cloud formations of circular or rectangular geometry, which quickly change their shape and colour and appear to dissolve. The modern equivalent of this could be the UFO.]

१९.७ ॥ निर्घाताद्भुतम्॥

अथ निर्घातेषु दिक्कालतिथिनक्षत्रानुबन्धेन चतुर्विधं फलमुपदिशन्ति यावच्छब्दे देशे। तत्र क्रमादष्टासु राजमरणरोगमरककोपक्षयातिवात-पुरोहितवधव्याध्यग्निभयानि। पूर्वाह्णे सराजका गणा वध्येरन्। मध्याह्ने अनलभयात् प्रजापालनविनाशः। शस्त्रानावृष्टिरोगदुर्भिक्षैः अपराह्णे। राज्ञस्तदनुजीविनां च प्रदोषे। सोपद्रवनावृष्टिः मध्यरात्रे। लोहजीव्यतया पररात्रे। सन्ध्ययोः ब्राह्मणानां रौद्रकर्मणां च। प्रतिपदष्टमीचतुर्दशीषु प्रादुर्भूतो मृदुः इतरास्वितरः इति। यत्र नक्षत्रे वर्षणं प्रदुष्यात् तस्मिन् वर्षणं विन्द्यात्। महास्वनश्च समग्रफलो भवति। निर्घातस्तु त्रिभिर्मासैः ॥

19.7 Explosive Sounds

[*Nirghāta* here refers to loud sounds as in explosions. These may be due to impact. BS explains this as caused due to two different wind masses combining and impacting the earth.]

१९.८ ॥ सन्ध्याद्भुतम्॥

निर्वातनिर्मलस्निग्धायां शान्तमृगद्विजायां प्रसन्नायां अनुपहतायां योगक्षेमं विन्द्यात्। स्निग्धा गौरी योगक्षेमाय भवति श्वेतायां वस्त्रवृद्धिः। वैडूर्यरजतहेमप्रभा सन्ध्या प्रावृड्वृद्धये। परिमण्डलायां रक्तायां भयम्। हरितायां शस्त्रभयम्। माञ्जिष्ठायामग्निम्। पीतायां चतुष्पद्रोगम्। श्यामायां चौरतो भयम्। नीलपीतायां ईतिभयम्। हरितालवर्णायां प्रथमामात्यस्य शस्त्रेण वधम्। आम्रकोरकवर्णायां वर्षम्। नीलरक्तायां अवग्रहम्। कृष्णायां अवर्षम्। त्र्यहं चेत् श्यामा रक्ता गौरी वा स्यात् पशुघातं विन्द्यात्। वातकपिलायां अस्तमितमात्रे सूर्ये या अतिमात्रप्रकाशा स्यात् प्रभा सा नामासौ तस्यां वर्षं विन्द्यात्। प्रत्यूषसि तद्रूपायामेव राज्ञः सेनापतेर्वा वधम्। तथा महावर्षं रूप्यवर्णायां नीलायां वा कृष्णायामनृतौ वर्षणमृतौ अवग्रहाय। तथा च नीलमाञ्जिष्ठायां अग्निजीविनां वधाय स्यात्। लोहितश्यामायां चौरवृद्धये। एवमेव चतूरागा पञ्चरागा वा। स्निग्धाः परिपूर्णाः शुक्ला माञ्जिष्ठवर्णाः पीता अभ्यन्तरगामिनो रश्मयः शस्यन्ते। रूक्षा विच्छिन्नाः तनवो ह्रस्वा धूमाभा लोहिता विवर्णा गर्हिताः॥

बन्धुजीवनिकाशेन तपनीयनिभेन वा।
उदये रजसा सूर्यः संवृतः शस्त्रमावहेत्॥
शङ्खचूर्णनिकाशेन रजसा संवृतो रविः।
राज्ञो विजयमाख्याति वृद्धिं जनपदस्य च ॥

19.8 Evening/Morning Twilight

[This section is called *sandhyā-lakṣaṇa* in BS Chapter 30. The texts attributed to Parāśara by Utpala in his commentary are very similar to the ones shown above from AS. The description is about the colours of the early morning and evening sky.]

१९.९ ॥दिग्दाहाद्भुतम्॥

अथ दिग्दाहेषु प्राच्यादिष्वष्टासु दिक्षु दह्यमानासु विद्यात् तत्रैव देशे अष्टमासानन्तरात् अनावृष्टिभयं त्रिमासाद्रोगं महोत्पातं च नवमासादग्निप्रकोपं दशमासाद्बलक्षयं मासाद्राज्ञः शस्त्रेण भयम्। अष्टाभ्यः सर्वतो भयं सप्तभ्यो युवराजभयं षड्भ्यः कन्यानां भयम्। सप्ताहात् सर्वासु चावर्षम् ॥

दिव्या व्यभ्रे विरजसि वा रवौ छायादर्शनं तत्प्रतिलोम्यदर्शनं वा जनमारभयम्॥

19.9 Horizon Blaze

[This phenomenon seems to be due to gases emanating from the earth and the space above appearing unusually bright. Before and after earthquakes, there have been reports of the region appearing bright. *Digdāha* may also be referring to lights seen at the horizon in some seasons.]

१९.१० ॥तमोधूमरजोनीहाराद्भुतम्॥

अथ तमांसि स्थानदिग्वर्णविशेषैः शुभाशुभं दर्शयन्ति प्रजानाम्। स्थानफलमाह। भूम्याश्रिते तमसि वर्षं विन्द्यात्। नभसि महावर्षम्। शरदन्नप्राचुर्यं उदक्चराणां च प्राणिनां उपद्रवम्। पर्वतौषधीनां अभावं ग्रामनगरजनपदपीडाम्। पांशुरजो अरुणप्रभेषु वृष्टिं श्वेते ब्राह्मणपीडां इतरवर्णवृद्धिं लोहिते शस्त्रकोपं नीले शस्त्रक्षयं वर्षणं च प्रदोषे महाभयम्॥

19.10 Dark Patches and Dust Veils

[*Tamas* means darkness. This as per PT can show variation in colour intensity due to its location. Dust veils and sudden darkness may be caused by cyclonic weather conditions. Meteoritic dust and volcanic ash can also be reasons for colour variation in the atmosphere.]

[In the BS, the above topics are covered in chapters 31 and 33-39. The treatment of the subject by Varāhamihira follows closely the work of Parāśara and Garga. However, PT might not have been the first one to recognize the anomalous nature of visible atmospheric and terrestrial phenomena. The *Ṣaḍvimśa-Brāhamaṇa* a Vedic text belonging to the *Sāmaveda* has a section known as *Adbhuta-Brāhmaṇa*[2]. This text lists almost all the abnormal events described in PT and prescribes religious rites to mitigate their ill effects. The AVP, also has long chapters on some of the above topics covered by PT[3].]

2 *Ṣaḍvimśa-Brāhmaṇa with the Commentary of Sāyaṇa* (Ed.) B.R.Sharma, K.S.V series No.9. 1993, Tirupati.

3 *Atharva-veda-pariśiṣṭa,* (Ed.) G.M.Bolling and J.von Negelin, 1910, Leipzig.

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॥ मानुषम्॥ Dreams and Divination

[*Ballālasena* groups his treatment of anomalies (*adbhuta*) under three heads titled celestial (*divyāśraya*), atmospheric (*antarikṣāśraya)* and terrestrial (*bhūmyāśraya*) depending on the location of the events. Under the third category apart from natural events such as earthquakes, and rainfall, he includes topics of human interest such as dreams, omens of chance and portents based on bird sounds. One of the chapters in AS is named *mānuṣādbhutam*. Utpala in his commentary following Varāhamihira does not cite all the above topics but quotes Parāśara extensively on divination of bodily signs. All such texts of Parāśara are brought together in this chapter without detailed translation. Social scientists studying ancient cultures may find the information interesting.]

२०.१ [अद्भुतसागरे स्वप्नाद्भुते पराशरः॥]

अभियातव्यदिगीशेन्द्रयमवरुणसोमेभ्यः पृथिव्यै वायवे सूर्याय ग्रहेभ्यश्च यथाकल्पं यथामन्त्रं यथोपहारमुपकृत्य शुचौ देशे कुशसंस्तृतायां भूमौ शय्यायां शीर्षकश्रियै पदाभ्यां भद्रकाल्यै बलिमुपहृत्योभयतः सर्वरत्नबीजौषधिगर्भान् नवानुदकुम्भान् कल्पयित्वा कृतस्वस्त्ययनः सावधानः शुचिः सूक्ष्मक्षौमाहतवसनः प्राङ्मुखो रुद्रेति हृदि रुद्रं समाधायातिरुद्रं जपेत् स्वप्नदर्शनार्थी॥

20.1 [*In AS. Dreams according to Parāśara*]

After having worshipped directional deities, Indra, Yama, Varuṇa, Soma, Earth, Wind, Sun and planets as prescribed, a person desirous of seeing (divining) a dream should sit east facing on clean ground on a seat of darbha grass and offer worship to Bhadrakālī. Further, having established on either side nine water pots with precious stones, herbs and seeds he should wear a clean fine silk garment and calmly meditate on Rudra with the Rudra hymn.

२०.२ तस्य त्रिविधं दर्शनम्। अपार्थकं यथार्थमन्यार्थं च। मनो हि निद्रानिहिततत्त्वविज्ञानम्। कदाचित् अतिहर्षशोकक्रोधचिन्ताभयमद-प्रमोदेर्ष्याकलुषितमतिदृष्टश्रुतार्थभूतार्थभावितम्। अविशुद्धधातुदोषप्रकोप-प्रतापप्रतप्तेन्द्रियमिव उद्भवान्तमवशम् अभिक्षिप्तमतिबहुशः अतिव्याकुलं दिवावृत्तं वा स्वप्नगतमनुभवति तदनियतमपार्थकं चोपदिशन्ति॥ कायवाङ्मनोविशुद्धानां चातिसत्त्वानां देवताः प्रत्यक्षवदभिदर्शयन्ति तद्यथार्थमित्याचक्षते। न चानिमित्तभाविनो भावाः। कालो हि भूतार्थनिमित्तमेष्य फलबोधकं स्वप्नाख्यमभिदधाति। तदन्यथा दृष्टमन्यथानियतफलमिति। भवति चात्र मनोविकारजस्वप्नं अभिवाञ्छन्त्यपार्थकम्। यथार्थदर्शनार्थत्वात् यथार्थदेवताश्रयं वा॥

20.2 *Three types of dreams are seen; with no purport, with correct purport and with some other purport. Mind is indeed the scientific principle behind sleep. Sometimes due to mind having been disturbed by excess of happiness, anger, sorrow, worries, fear, arrogance, jealousy and festivities dreams reflect happenings seen and heard in the past. Due to imbalanced health conditions, and senses getting excited with uncontrolled and hidden feelings, day time happenings are experienced in dreams. These do not indicate any special meanings. For noble people with pure body, speech and mind, deities (gods) show happenings as if in direct vision. These are dreams that come true in reality. No event (occurrence) is independent of proximate reasons (precursors). Time itself taking the role of a past*

portent indicates results in the form of dreams. These dreams are seen in one way but to be interpreted otherwise. Dreams originating due to disturbance of the mind convey distorted meaning. Those seen with the help of deities are real and come true.

२०.३ यो ह्यन्यदर्शनादन्यफलः आत्मनिमित्तजः तमन्यार्थमनेकार्थं प्रवक्ष्यामि अखिलार्थतोऽन्यः॥

20.3 *Now, I will explain those self caused ones, which lead to results different from the dreamt scenes.*

२०.४ तत्र अवनेर्भुजगचलेनोद्धृत्य स्कन्धारोपणे वा ग्रसनमभिलङ्घनं अर्कचन्द्रसंभक्षणं तृणमधिरोहणमुदधिसलिलसकलाभिपानमभितरणमवनेश्च रुधिरपरिप्लावनमन्त्रैरविकलपरिवारणं भुजापरिष्वञ्जनं वा सकलवसुधाधिपत्याय। तथा स्निग्धहरितफलितसितसुरभिकुसुमकुसुमितप्रशस्ततरुसमधिरोहणम्। बृहदमलदृढहर्म्यश्वेतगजमस्तकक्षितिधरसितशिखरज्वालितरथनृपतिशिरसामपि। नरशिरोभक्षणमसृग्ह्रदावगाहनमभिषेचनपानानुलेपनं अवनिविजयाय राज्ञाम्। अराज्ञामिष्टधनविद्यासुखाधिपत्याय। दुर्गाधिरोहणं स्वभुजचलान्मानुषामानुषद्विषदनिमित्तपातनं असिशरकवचचापभूषणान्यप्रहरणलाभो अरिविजयाय। सिंहव्याघ्रतुरगर्षभगजनररथादिरोहणममलसलिलपुलिनविमलनभोग्रहार्कचन्द्रतारोदयाभिदर्शनम्। दर्शनं च सुरगुरुनृपतिसिद्धद्विजाचार्यकसितसुरभिकुसुमितवनप्ररूढवनहरितोद्यानविविधवननवसस्यपाकापाण्डुप्रवर्त्तितमहीतलानाम्। तथा आममत्स्यमांसभक्षिभिः स्वाङ्गारशमनं परानन्नाङ्गसंभक्षणं अभिनववास्तुप्रवेशकरणदर्शनं अभिप्रवेशोऽवनिपतिमहिषीणां भवनशयनाङ्गज्वलनशकृदनुलेपनप्रभक्षणमदिरान्नपानसङ्गाभिताडनं अगम्याभिगमनपलितपाणिसमेतवृद्धकेशश्मश्रुनखरोम्णामभिलषितकार्यसिद्धिवृद्धये अधमानाम्॥

सिंहव्याघ्रतुरगर्षभभुजङ्गमानां लाभो लाभश्च सितकुसुमितलतास्रग्वीणासन-

शयनकर्णिकाञ्जलिकादशनयवनपादुकास्थवृककङ्कविकानां स्त्रीलाभाय। वृश्चिकाहिदर्शनं मणिरत्नदर्शनं काञ्चनप्रदीपगजकलभतुरगकिशोरवत्सहंस-सर्पार्भकलाभः पुत्रलाभाय। श्वेतसूक्ष्माविरजःप्रशस्ताहतवसन-भृङ्गारव्यजनसितचामरध्वजातपत्रद्विरदपायससैन्धवलवणदधिपयः प्रशस्तसितकुसुमवनशस्यलाभो अर्थलाभाय। श्वानरोष्ट्रखरनकुलमार्जार-महिषवराहद्वीपिभासाद्यप्रशस्तान्यदंष्ट्रिनखिक्रव्याददर्शनमभिद्रवणं वातक्लेशाय। यानं व्याधये। वधो वधाय। निपातः पराजयाय। केशलोमनखदर्शनपातनं मणिरत्नाभरणपतनं छेदनाय। हरणं व्याधिक्लेशबन्धुनाशाय। श्मश्रुकर्मोन्मर्दनं सकृन्मूत्रकरणं नग्नता आत्मनो घृततैल-वसनाभ्यङ्गवसनादिविकृतपुरुषस्त्रीभिः अमानुषैः असकृदभिद्रवणं पक्वमत्स्यमांसभक्षणं व्याधिक्लेशभयाय। विरेचनमन्नक्षयाय। घृतोद-पूर्णकुम्भकमण्डलूपस्थानच्छत्रसूत्रबद्धरज्जुदर्शनं लाभो वा अध्वगमनाय। मत्तप्रव्रजितनग्नशौण्डिकप्रशुष्कनदीह्रददतीर्थाभिदर्शनं शुकमयूरगोधा - मूषिकाजाविकनटनर्त्तकाशववारणगीतवादनं स्वयं वा गीतनृत्यवादनं कांस्यभाण्डावभेदः सेतुतरुच्छेदः प्रवेशस्तमसि शून्यभिन्नागारेषु च शुष्कवृक्षदर्शनारोहणं अवनेर्विचलनं अशनिमेघनभोनीहारदर्शनं कृमिकीट-पतङ्गदंशनमशकमक्षिकाभिदर्शनं अभिलपनं च। अञ्जनत्रपुताम्रसीसलोहा-भावो रथशिखरयानच्छत्रावपतनं मज्जनं वा कलुषजले पङ्कवल्मीकपांशु-सिकताऽधिरोहणमवसनं वा कलिक्लेशाय अनर्थाय। स्वभवनहर्म्यप्रासाद-निपतनमभिनिष्क्रमणं वा स्वगृहादुत्थितरुदितानामङ्गनानां अङ्गुलीभिः सम्मार्जन्या वा मार्जनं सर्वस्वनाशाय। चन्द्रार्कनिपतनं अभिप्लवो वा चक्षुर्व्याघाताय पार्थिवोपद्रवाय वा। नगरपुरशिखतोरणेन्द्रध्वजसुरपतिभवननिपतनं नृपतिविघाताय स्वपति क्लेशाय वा॥

श्वानरोष्ट्रखरनकुलमार्जारमहिषवराहद्वीपिश्येनभासाद्यप्रशस्तान्यदंष्ट्रिनखि-क्रव्यादीनां अधिरोहणं नग्नं वाऽधिरुह्य याम्याशाभिगमनं मज्जनं वा क्वचिद्भस्मरक्तचन्दनतैलमसीप्रलिप्तगात्रशो पुण्डरीकभृतो बिसानि भक्षयतः

पांशुसिकतागोमयेषु महति कलुषह्रदे वा निमज्जनं तथा कुसुमितकिंशुक-कोविदारकरवीरचैत्ययष्टिरूपाधिरोहणं करवीरकमलदलमालाबन्धो वा भृष्टयवमसिभस्मतैलवशापानं गात्रानुलेपनं वा मरणाय। सुवर्णरजतमूत्रपुरीषाणां वा स्वप्ने छर्दनं दशमे मासि मरणाय। यक्षरक्षःप्रेतपिशाचानां स्वप्ने दर्शनमतीन्द्रियाणां नवमे मासि॥

20.4 [This long text describes the earthly result for the third type of dreams which are seen in one way but are to be understood differently. Interpretations are given for kings and also for lay people. The last section above refers to dreams which are supposed to indicate death. Some of these statements, such as riding a camel southward in dream as a death portent, are prevalent even now.]

२०.५ ॥अङ्गविद्या॥

इह खलु चराचराणां भूतानां कालोऽन्तरात्मा सर्वदा सर्वदर्शी शुभाशुभैर्यः फलसूचकः स विशेषेण प्राणिनां स्वपराङ्गेषु स्पर्शव्याहारेङ्गितचेष्टादिभिः निमित्तैः फलमभिदर्शयति। तत्प्रयातो दैवज्ञोऽनुपहतमतिः अवधार्य स्वशास्त्रार्थमनुस्मृत्य यशोधर्मानुग्रहार्थमर्थिनां शुभाशुभानामर्थानां भावाभावमभिनिर्दिशेत्। तत्र देशे दिशः कालं व्याहारं द्रव्यदर्शनम्। अङ्गप्रत्यङ्गसंस्पर्शं समीक्ष्य फलमादिशेत्॥ अथ पुष्पितफलितहरितस्निग्ध-त्वक्पत्रप्रशस्तनामाङ्कितसौम्यद्विजनिषेविततरुच्छायोपगूढे सस्यकुसुमहरित-मृदुशाद्वलसक्तमृष्टह्रद्यप्रसन्नसलिलावकाशे देवर्षिसिद्धसाधुद्विजावासे प्राङ्मुखोत्तरोत्तरपूर्वाभिमुखो वा यः पृच्छेत्तस्य प्रार्थितार्थोपपत्तिमभिनिर्दिशेत्॥ छिन्नभिन्नशुष्करूक्षवक्रजन्तुजग्धदग्धकण्टकिक्रव्यादद्विजनिषेविताप्रशस्त-नामाङ्कितपादपच्छाये श्मशानशून्यायतनचत्वरोषररिपुनापितायुधमद्यविक्रय-शालासु नैर्ऋताग्नेययाम्यवारुणवायव्याशाभिमुखः प्रचोदयेत्तस्येष्टमर्थ-मनर्थाय विन्द्यात्॥

वेलाः सर्वाः प्रशस्यन्ते पूर्वाह्णे परिपृच्छताम्।
सन्ध्ययोरपराह्णेतु क्षपायां तु विगर्हिताः॥
यात्राविधाने निर्दिष्टं निमित्तं यच्छुभाशुभम् ।
तदेव दृष्ट्वा दैवज्ञो वाञ्छासिद्धिं विनिर्दिशेत्॥

अङ्गानि मुष्कस्तनपदोरुगुह्यभुजहस्तसमस्तकर्णांसशङ्खदन्तौष्ठाङ्गुष्ठनखगल-गण्डकेशसन्धयः पुरुषाख्यानि। भ्रुवौ नासाग्रीवावलयोऽङ्गुलयो लेखा श्रोणिनाभी रसना जङ्घे पिण्डिके पालिस्फिजौ पार्ष्णिः स्त्रीसञ्ज्ञानि।शिरोललाट-मुखचिबुकपृष्ठजठरजत्रुजान्वस्थिपार्श्वहृदयकर्णपीठाक्षिमेहनोरस्त्रिकतालि्विति नपुंसकाख्यानि॥ तत्र पुन्नाम स्निग्धमुचितमनुपहतमक्षतमरोगभङ्गं स्पृष्टं दिग्देशकालव्याहारेष्टदर्शनैरुपपन्नं प्रष्टुः पृच्छार्थं सकलफलमभिनिवर्तयति। स्त्रीसञ्ज्ञमपि पूर्वोक्तलक्षणयुक्तं यत्नात् कालान्तरेण सफलम्। नपुंसकाख्यं अकार्यसिद्धिमनर्थानां वा आगमनं कुर्यात्॥ अथ पृथक् पृथक् फलनिर्देशः। तत्र पादाङ्गुष्ठे प्रचलयन् स्पृष्ट्वा वा पृच्छेत् प्रष्टुः चक्षुरोगम् विनिर्दिशेत्। अङ्गुलिं स्पृष्ट्वा दुहितृशोकं शिरोऽभिहन्यमानं राजतो भयम्॥

उरः स्पृष्ट्वा विप्रयोगं स्वगात्राद्वस्त्रमुत्सृजेत्।
तस्यानर्थागमं पादं पादेन संस्पृशेत् पटम्॥
तमभिगृह्य वा पृच्छेत् विन्द्यात् प्रियसमागमम्॥
अङ्गुष्ठेन लिखेद्भूमिं क्षेत्रचिन्तां विचिन्तयेत्।
हस्तेन पादौ कण्डूयेत् कुर्याद्दासीकृतां स ताम्॥
तालभूर्जपत्रदर्शने वस्त्रार्थं केशास्थिभस्मान्याक्रम्य व्याधिभयं ब्रूयात्।
निगडजालरज्ज्वाश्रित्य वल्कलान्यधिष्ठाय दर्शने वा बन्धनभयम्॥

पिप्पलीनां दर्शने प्रदुष्टस्त्रीकृतां चिन्तां मरिचस्य पापपुरुषकृतां शृङ्गवेरस्य मृतचिन्ताम्। अजाज्याः सुतनाशकृतां रोध्रस्यार्थनाशकृतां मुस्तस्य सर्वनाशकृतां कुष्ठस्य सुतनाशकृतां वस्त्रस्यार्थनाशकृतां ह्रीवेरस्य धान्यनाशकृतां तगरस्य भूमिनाशकृतां शतपुष्पया चतुष्पन्नाशाय मांस्या द्विपदनाशकृताम्। अश्वत्थन्यग्रोधफलैर्हस्तस्थैः पृच्छेद्धनागममादिशेत्।

मधुकौदुम्बरफलैः काञ्चनागमम्। द्विपदागमं तिन्दुकैः। वस्त्रागमं प्लक्षजैः। रूप्यस्यागमं आम्रैः। ताम्रस्यागमं बदरैः। लोहस्यागमं जम्बूकैरिति वा। धान्यपात्रपूर्णोदकुम्भदर्शने कुटुम्बवृद्धिं जानीयात्। हस्तिना द्रव्यागमम्। हस्तिशकृतो भ्रंशमैश्वर्यस्य वा। गोमयस्य स्त्रीव्यभिचारम्। शुनः सुहृद्विनाशम्॥ महिषस्य क्षौमवस्त्रागमम्। मणिभाण्डस्य गजवाजिनां और्णिकानाम्। व्याघ्रस्याभरणागमम्। पङ्कजस्य रक्तवस्त्रचन्दनलाभम्। रूप्यस्य कौशेयवस्त्राणाम्। निर्ग्रन्थिदर्शने दासीपृच्छा। वृद्धश्रावकदर्शने मित्रद्यूतकृता वा। शाक्यस्य चौरकृता परिव्राजकस्य नृपसूतिकागणिकार्था वा। उपाध्यायस्य चमूपतिकृता। नैगमस्य श्रेष्ठिकृता। नैमित्तिकस्य योधार्था। अर्हतो वाणिजिकार्था। उञ्छवृत्तिनो विपन्नार्था। तापसस्य प्रोषितार्था। शौण्डिकस्य पशुपालनार्था। कैवर्तस्य वध्यघातकृता॥

आदिशार्य इत्येवं पृच्छेदैश्वर्यचिन्ताम्। भणेत्युक्ते कुटुम्बकृताम्। इच्छामि प्रष्टुमिति संयोगकृताम्। पश्यत्वार्य इति लाभकृताम्। निर्दिशेत्यध्वकृतां जयपृच्छां वा। पृच्छामि तावदाचार्येति वा सम्यक् मां प्रत्यवेक्षस्वेति बन्धुकृताम्। अथ काले निःश्वसनान्तः सहसा बहुजनमध्यगतं दृश्यतामिति पृच्छेदिति चौरचिन्तां जानीयात्॥ बाह्याङ्गस्पर्शने बाह्यचौरम्। अन्तः स्वकृतम्। तत्र पादाङ्गुष्ठे दासम्। अङ्गुलीषु दासीम्। जङ्घयोः प्रेष्यम्। जठरे मातरम्। हस्ताङ्गुलिषु दुहितरम्। अङ्गुष्ठे सुतम्। नाभ्यां भगिनीम्। गुरुं शिरसि। हृदि भार्याम्। दक्षिणबाहौ भ्रातरम्। वामे भ्रातृभार्याम्॥

अभ्यन्तराङ्गं स्पृष्ट्वा बाह्यं स्पृशेन्निर्हरणं वा श्लेष्मपुरीषमूत्रत्यागं कुर्यात् हस्ताद्वा किञ्चित् पातयेत्। गात्राणि वा स्फोटयेत्। क्षतहृतपतितमुषितविस्मृतनष्टकष्टानिष्टभग्नगतजीर्णशब्दप्रादुर्भावो वा स्यात्। रिक्तभाण्डतस्कराणां दर्शने न प्रष्टा लाभं विन्द्यात्॥ अथ रोगाभिघात-च्छर्दमूत्रपुरीषोत्सर्गे केशास्थिभस्मतुषविषादीनामशुभानां दर्शने तथा छिन्नभिन्नव्यापन्नहतमृतावक्षतजग्धदग्धबद्धपाटितरुदितशब्दश्रवणे वा रोगिणां मरणमादिशेत्॥

अथ स्निग्धं दृढमभ्यन्तराङ्गं स्पृष्ट्वा उद्गिरन् पृच्छेत् भुक्तमन्नं विन्द्यात्। तत्र ललाटस्पर्शे शूकानां वा शाल्योदनम्। उरसि संस्पृष्टे षष्टिकौदनम्। ग्रीवायां यवान्नम्। जठरे तिलौदनम्। कुक्षौ माषौदनम्। स्तनयोः क्षीरौदनम्। जानुनो यविकम्। स्वादयेदोष्ठौ वा परिलिहेत मधुरम्। आविसृक्के जिह्वामपि स्फोटयेदाम्लम्। विकूणयेत् कटुकम्। हिक्केत् कषायम्। निष्ठीवेत्तिक्तम्। शुष्कमल्पं श्लेष्माणमुत्सृजेदतिलवणम्। क्रव्यादानां दर्शने मांसप्रायम्। तत्र भ्रूगण्डजिह्वौष्ठसंस्पर्शने शाकुनम्। हन्वोर्वाराहम्। कर्णयोः पार्षदम्। जङ्घयोर्मार्गम्। केशानामौरभ्रम्। शङ्खयोर्गव्यम्। वस्तिगलयोर्माहिषम्। मूर्ध्नि कौञ्जरम्। पाटितच्छिन्नभिन्नानां स्पर्शने गोधामत्स्यमांसम्॥

20.5 Divination of Body Signs

[This PT text appears in Utpala's commentary on BS Chapter 51. It explains divination by means of observing the body of the interrogator, time and place of questioning and other observable omens due to visible objects and audible sounds. The words used by the client and the style of questioning are also treated as omens to decipher the unsaid question. This and the next section are not included by Ballālasena in his AS text. It is possible Utpala and Ballāla had access to different redactions of PT, which matched closely on topics concerning astronomy, but differed on other topics.]

२०.६ ॥स्त्रीप्रश्नम्॥

अथ स्त्री भ्रुवौ जठरमङ्गुष्ठेन वाङ्गुलिं स्पृष्ट्वा पृच्छेद् गर्भपृच्छां जानीयात्। तथा फलच्छायावृक्षप्रवालाङ्कुरमधुघृतहेमगर्भप्राजापत्ये वा मातृधात्री-पुत्रनिदर्शनशब्दप्रादुर्भावे गर्भपृच्छामेव॥ तत्र जठरस्पर्शे गर्भिणीमेवमेव ब्रूयात्। अङ्गुष्ठेन नासास्रोतसि दक्षिणे कुर्यात् मासान्तरेण गर्भग्रहणम्। वामाद् द्विवर्षान्तरेण। कर्णच्छिद्रे मासद्वयेन। वामे वर्षद्वयेन। स्तनयोरङ्गुष्ठेनैव स्पर्शे चतुर्भिर्मासैः। पीठमर्दकं कृत्वा चानन्तरमुदरं कण्डूयेत् अग्रहस्तं

हस्तेनाभिगृह्य वा पृच्छेद् भग्नलौहिकपिठरकुद्दालककुठारस्रुतिचलित-पतितभग्नदर्शनशब्दे प्रादुर्भावे वा गर्भपतनं विन्द्यात्। तथान्नपानपुष्पफल-पक्षिद्विचतुष्पदानां अन्यद्रव्याणां पुंसञ्ज्ञानां दर्शनशब्दप्रादुर्भावे पुञ्जन्म विद्यात्। स्त्रीसञ्ज्ञानां स्त्रीजन्म। नपुंसकाख्ये नपुंसकानाम्। पुंसञ्ज्ञमङ्गं संस्पृश्य गर्भिणी पृच्छेत् पुञ्जन्म विन्द्यात्। स्त्रीसञ्ज्ञानां स्त्रीजन्म नपुंसकाख्येषु नपुंसकानाम्॥

अथ विशेषः - वेणीमूलमभिगृह्य पृच्छेत्तदा द्वे कन्यके त्रीन् पुत्रान् जनयिष्यसीति ब्रूयात्। ललाटमध्यं स्पृशन्ती चत्वार्यपत्यानि। ललाटान्तं त्रीणि। कर्णयोः संस्पर्शे पञ्चापत्यानि। दक्षिणोरुसंस्पर्शे द्वौ पुत्रौ द्वे च कन्यके जनयिष्यसीति। वामस्य तिस्रः कन्या द्वौ पुत्रौ। पादाङ्गुष्ठस्य कन्यकैका। पाष्ण्र्योः कन्यकैकैवेति॥

शिरसि संस्पृष्टे कृत्तिकासु जन्म विन्द्यात्। ललाटे रोहिण्याम्। भ्रुवोर्मृगशिरसि। कर्णयोरार्द्रायाम्। गण्डयोः पुनर्वसौ। हन्वोस्तिष्ये। दन्तयोराश्लेषासु। ग्रीवाभ्यां मघासु। दक्षिणांसे प्राक्फल्गुन्याम्। वामांसे उत्तरफल्गुन्याम्। हस्ते हस्तयोः। चिबुके चित्रायाम्। स्वातौ नालके। उरसि विशाखायाम्। दक्षिणस्तने अनुराधासु। ज्येष्ठासु वामे। हृदि मूले। दक्षिणपार्श्वे प्रागाषाढासु। उत्तराषाढासु परपार्श्वे। जठरे श्रवणे। श्रोण्यां धनिष्ठासु। स्फिग्गुदयोर्वारुणे। दक्षिणोरुणा प्राक्प्रोष्ठपदायाम्। वामेनोत्तरपदायाम्। जानुभ्यां पौष्णे। जङ्घयोरश्विन्याम्। पादयोर्भरण्यामिति॥

20.6 Female Interrogation

[This is in continuation of the previous section. Here divining the questions, especially by a lady about pregnancy are listed. The parts of the body accidentally touched by the lady during enquiry are treated as signs to interpret when the lady will conceive or when the child of what sex will be delivered. The

text describes how the number of children a woman will have is foretold. The last section is about divining the *nakṣatra* under which the delivery will take place.]

२०.७ ॥ पिटकाः॥

अथ पिटकाः सितरक्तपीतकृष्णवर्णा द्विजादीनां वर्णानां क्रमात् स्थानवर्णविशेषेण सकलफलदा भवन्ति। तत्र सुव्यक्तः स्निग्धः सुवर्णोऽभिषेकागमं कुर्यात्। शिरसि धनागमम्। केशान्ते सौभाग्यम्। ललाटे धनसञ्चयम्। भ्रुवोर्दौर्भाग्यम्। सङ्गरे दौःशील्यमिष्टसङ्गमं च। नेत्रपुटयोः शोकम्। नेत्रयोरिष्टदर्शनम्। शङ्खभेदे प्रव्रज्या। चिन्तामश्रुपाते। गण्डयोः सुतनाशम्। नासादंशे वस्त्रलाभम्। अन्येषूत्पन्नं सुरभिसङ्गमं च। चिबुकाधरोष्ठाधरेषु अर्थमभिप्रेतम्। हन्वोर्धनागमम्। गले पानमाभरणं च। शिरःसन्धौ ग्रीवायां चोपघातं शस्त्रेण। कर्णयोस्तद्भूषणमानन्दश्रवणम्। पार्श्वयोः शोकम्। उरसीष्टसङ्गमम्। स्कन्धयोर्भैक्षाचर्यम्। कक्षयोरर्थक्षयम्। हत्स्तनयोः पुत्रलाभम्। पृष्टे दुःखशमनम्। अरिविनाशो बाह्वोः। प्रबाह्वोराभरणम्। मणिबन्धे नियमः। पाणौ धनागमम्। भाग्यं चाङ्गुलीषु। शोकमुदरे। अन्नपानावाप्तिर्नाभौ। चोरैरर्थहरणं अधरे। धनधान्यावाप्तिर्वस्तौ। सौभाग्यमर्थलाभं वृषणयोः। पुत्रजन्म स्त्रीलाभं मेहने। गुदे सौभाग्यम्। मानाङ्गनालाभं ऊर्वोः। जानुनोः अरिभिरुपघातम्। शस्त्रेण जङ्घायाम्। गुल्फयोरध्वपरिक्लेशागमनम्। स्फिजोरपहरणम्। पार्ष्णितलयोः अगम्यागमनम्। अङ्गुलीष्वङ्गुष्ठे ज्ञातिपूजा इति॥

20.7 Sign of Pimples

[Both Utpala and Ballālasena include this text of PT in their works. This describes how pimples on human body have to be interpreted to understand the health, financial and social conditions of a person.]

२०.८ ।।कायारिष्टम्॥

तत्र व्यभ्रे नभसि रविचन्द्रज्वलनप्रभाछाया अरुन्धतीध्रुवान्यतारकाणां अदर्शनं मरणाय मासि द्वादशे। वह्निसूर्येन्दुप्रभाणामदर्शनं एकादशे। रक्षोयक्षपिशाचानां स्वप्ने दर्शनमतीन्द्रियाणां मूर्तित्यागो नवमे। बहुसम्पन्नभुजो वाऽकस्मात् बलोपचयहानिरशुभो वाऽतिवृद्धिः अष्टमे। सिकतापांशुकर्दमेषु विकृतासकलपादाङ्कदर्शनं वा सप्तमे। काकश्येनगृध्रादीनां क्रव्यभुजां पक्षिणां वा अकस्मात् शिरोऽभिलयनं षष्ठे। गोमायुचूर्णतुल्यरजसोऽङ्गेभ्य उत्तमाङ्गात् प्रवर्तनं पञ्चमे। विद्युतां दर्शनं अमेघे चतुर्थे। व्यक्तमिन्द्र-धनुषादर्शनमुदकं तृतीये मासि। एकनयनस्रावो विना रोगमवघट्टनं स्थानभ्रंशनं वा द्वितीयके। अर्धमासात् शवशोणितकुणपविण्मूत्रामनोज्ञगन्धप्रवर्तन-हेतुकं गात्रेभ्यः। जलार्द्रशिरसि धूमाभिदर्शनं सूर्यसंतप्तमस्तकस्य अदर्शनं ऊष्मणो वा त्र्यहात्। सद्यः स्नानानुलिप्तस्य हृत्पाणिपादानुशोषणं त्र्यहात्। श्रोत्रच्छिद्रयोः अङ्गुल्यग्रावनद्धयोरन्तर्नादश्रवणं सद्यो मरणाय। गण्डयोश्च रक्ततिलकानामुत्पत्तिरहोरात्रात्। कृष्णपुरुषवर्णप्रादुर्भावमात्रोऽहोरात्रात्। स्वच्छायाविकृतदर्शनं पञ्चमे मासि। निर्मलेऽम्बुन्यादर्शे चात्मदेहादर्शनं स्वशिरश्च सद्यो मरणाय॥

यो न वेत्तीन्द्रियग्राह्यं वेत्ति वाऽतीन्द्रियं नरः।
तपोयोगादृते देही देहमन्यं प्रयात्यसौ॥
अकस्मात्पुष्पिता रूक्षा दग्धा स्थिरदृशाश्चलाः।
सूक्ष्मस्थूलविपर्यस्था विरलाः सहितास्तथा।
अतिह्रस्वातिदीर्घा वा नताः शर्करिणोऽसिताः।
प्रकृत्या विकृता दन्ता दृश्यन्ते जीवितक्षये॥
सुरभिर्वाऽप्यसुरभिर्यस्य गन्धः प्रवर्तते।
अस्वस्थः स्वस्थदेहः स्यात् दृष्टं तज्जीवितान्तकृत्॥
स्वरः प्रकृत्या विकृतो विस्वरोऽतिस्वरः कृशः।

अजैडकानुकारी वा पक्षिणो वाऽप्यसुक्षये॥
अतिदीर्घोऽतिह्रस्वो वा भृशमुष्णोऽतिशीतलः।
उच्छ्वासःप्राणसंत्यागे गतासूनां प्रजायते॥

20.8 Terminal Illness

[This PT text is from AS. This lists indications for impending death. Some of these appear to be valid medical conditions.]

२०.९ ॥निमित्तानि॥

साधुद्विजविहङ्गशूरपतिधार्मिकैः पुरपरित्यागः पुरविनाशाय। रक्षः पिशाचपतङ्गैः पथिरोधनं जनमारभयाय॥ पूज्यावमाननं अपूज्यपूजनं ज्येष्ठकनीयस्त्वं देवपुरपूजोत्सवनिवर्तनं स्त्रीणां पुष्टिविस्रंसनं महते भयाय। स्त्रीणां अब्दद्वयं गर्भधारणं त्रिचतुर्विकृतपक्षिपशुनागजननं वा कुलदेशविनाशाय। अथास्तमवेलायांपुरद्वारमभिगम्यनिमित्तान्युपलक्षयेत्।तत्रगोगजाश्वरथप्रथम-प्रवेशेषु विजयो वानरखरोष्ट्रनकुलमार्जाराश्वप्रवेशे विद्रवो नेत्राङ्गहीनेष्वशनि-भयम्॥

चैत्यप्रासादतोरणशिखरिशिखराद्रीणां अकस्मात् प्रपतनं देवध्वजेन्द्रेष्टयक्षितिपातः पत्रच्छेदनमवनिपतेर्विनाशाय। धेनोरनडुहां शुनां चान्ययोनिष्वाधानं अन्योन्यं च स्त्रीणां परचक्रागमाय। अतिमात्रशीतोष्णविपर्ययो महते भयाय॥

अथ देवताभिज्वलनरोदनहसनापक्रमणवेपनपतनोद्वीक्षणस्वेदयुद्धधूमस्नेह-दधिपयः शोणिताद्यनिमित्तप्रवर्त्तनं महतां विनाशाय। तत्र पितामहर्षिधर्मान् ब्राह्मणानाम्। गुरुभृगुशनैश्चराणां कृतः कम्पः पुरोधसाम्। शक्रधनद-यमवरुणरविशशाङ्कानां प्रवरनृपतीनाम्। यक्षगन्धर्वविनायकानां भयकृत् सचिवानां सेनापतीनाम्। स्कन्दविशाखयोः माण्डलिकानां नरेन्द्राणां च।

रुद्रोपेन्द्रपवनविश्वकर्मणां प्रजानाम्। भवशक्रधनदपत्नीनां नृपमहिषीणाम्॥
देवप्रैष्ये नृपप्रेष्यो देवस्त्रीषु नृपस्त्रियः।
वास्तुदेवेषु विज्ञेयं गृहिणामेव नान्यथा॥

दीप्तासु पूर्वतो युवराजभयाय। आग्नेय्यामग्निभयाय। दक्षिणस्यां सार्थस्य निवेशघाताय। नैर्ऋत्यां चोरभयाय। पश्चिमतः सर्वे पर्वतघाताय। वायव्यां वातोद्गमाय।ऐशान्यांमित्रविरोधोविपर्ययःशान्तासु।नक्तंदिवाचारिस्थलान्तरिक्ष-चराणां उत्तरोत्तरा बलवन्तः। तेषां स्वदेशकाले फलसामग्री। वृषतरुरुमृग-चमरहरिणसिंहव्याघ्रादीनां आरण्यानां स्वयमनुप्रवेशः पुरविनाशाय। शुक-शलभमूषकबिडालपन्नगानां अभिपतनं शस्यदुर्भिक्षाय। अथैन्द्यादि दिक्-पतङ्गावरोधने राजापनयबलप्रकोपरोगपरचक्रागमगोपवधशस्यक्षयगोगजवधं आदिशेत्। कटाहादि गृहवत् इति॥

येऽन्यदेशसमाचारो देशेऽन्यस्मिन् प्रवर्तते।
स तद्देशे सदाऽसत्त्वं देशः समधिगच्छति॥

यदि धनुरसिलोष्टकाष्ठहस्ताः पुरि शिशवो रणवत् समाचरन्ति।
प्रहरहरजहीत्युदाहरन्ते भयमचिरात् तुमुलं निवेदयन्ति॥

अनग्निज्वलनमग्नेरज्वालनं अवनिपतिविनाशाय इति। चतुष्पाद्पक्षि-मनुष्याणामङ्गेषु धूमादिदर्शनं परचक्रागमनाय। प्रासादचैत्यधूमप्रादुर्भावो महते भयाय॥

अनाहतानां वाद्यानां श्रवणं आहतानां अश्रवणं महते भयाय॥ लूकातूर्यध्वनिः पुरः सैन्यमाचष्टे विजने पुरे। चरस्थिरविपर्ययः परचक्रागमाय। आसनशकटयानभाण्डानामकस्मात् सृतिर्महते भयाय। मुशलदर्वीसूर्पखनित्र-दृषदुपलानां क्रोष्ट्रादिदर्वीहाराभिसरणविकृतचेष्टारुतानि नृपतिभयाय॥

20.9 General Portents

[This section describes general portents such as disrespecting noble people but respecting undeserving ones. It is said that the omens have to be observed in the evening at the gate of the city. This applies to all types of events. Shaking of idols in temples is mentioned as a bad omen. Accidental smoke and fires in buildings are considered as bad omens. Occasional sounding of drums and musical instruments due to blowing wind is also considered to be an ill omen. This section is mainly compiled from statements attributed to Parāśara in AS.]

२०.१० [उत्पलविवृतौ वास्तुविद्या]

तत्र बहिर्देवताः प्राक्पर्जन्यकरग्रहमहेन्द्ररविसत्यभृशान्तरिक्ष-पवनाः। दक्षिणतः पूषावितथबृहत्क्षतयमभृङ्गन्धर्वमृगपितरश्चेति। पश्चिमतो दौवारिकसुग्रीवपुष्पदन्तासुरवारुणयक्षरोगशोषाश्चेति। उदङ्नागराजमुख्यभल्लाटसोमादितिकुबेरनागहुतवहाः। तन्मध्ये ब्रह्मा तत्पुरतोऽर्यमा दक्षिणतो विवस्वान्मित्रः प्रत्युदक् पृथ्वीधर इति। ब्राह्मपदानुषङ्गिणो अष्टावन्ये। आपापवत्सौ ऐशान्यां सावित्रसवितरौ आग्नेय्यां जयेन्द्रौ नैर्ऋत्यां रुद्रवायू वायव्यामिति सर्वा देवताः पञ्चचत्वारिंशदिति। तथान्यैः सहैतेषां पदानामसादृश्यम् इति। निमेषशतमतीत्य आखातश्चभ्रगतजलगतां चारिणीं समुद्धृतां आपूर्यमाणां अतिरिक्तां मृदं चतुःषष्टिपलाढकां तुल्यां च इति॥

20.10 [*In Utpala's commentary. Vāstu as per Parāśara*]

[This text names the deities occupying the outer perimeter of a location identified for construction of a building. The description as available here is cursory. For further detail one has to refer to later texts such as BS (Chapter 53). The last sentence above of PT describes how the quality of the soil at the site has to

be tested. It specifies that a pit should be dug and filled with water. After lapse of 100 *nimeṣa* of time, if the water is still retained or when the extracted soil is poured into the pit, some amount of mud remains above, the site is considered good. It is interesting to note that PT is scientific here also as with rainfall measurement. It states the basic concept of good soil in terms of its density. Specifically, it recommends a site where one *āḍhakā* volume of soil is sixty four *pala* in weight.]

21

।।सङ्कीर्णम्।। Miscellany

[Apart from the texts reproduced in the previous 20 chapters, PT contains statements about plants, animals and birds. Portents due to anomalies in clothes, footwear and bird-calls are also described. These are collected in this concluding chapter. Text from Utpala's commentary is given first, followed by the text in AS. Sections that are common to both are not repeated.]

२१.१ ।।गोलक्षणम्।।

साश्रुणी लोचने यासां रूक्षाल्पे च न ता शुभाः।
चलच्चिपिटशृङ्गाश्च करटाः खरसन्निभाः॥
दशसप्तचतुर्दन्त्योऽलम्बवक्त्रा न ताः शुभाः।
विषाणवर्जिता ह्रस्वाः पृष्टमध्यातिसन्नताः॥
ह्रस्वस्थूलगला याश्च यवमध्याः शुभा न ताः।
भिन्नपादबृहदुल्फा याश्च स्युस्तनुगुल्फकाः॥
श्यावातिदीर्घजिह्वाश्च महत्ककुदसंयुताः।
याश्चातिकृशदेहाश्च हीना अवयवैश्च याः॥
न ता शुभप्रदा गावो भर्तुर्यूथस्य नाशनाः॥
आपादक्षारकपिलाः कृष्णपुष्पचिताश्च याः।
मार्जारकपिलाक्षाश्च दुर्बला यूथघातिनः॥

पङ्कादिवार्ताः पादानुद्धरन्तो व्रजन्ति ये।
अधूर्वहा भवन्त्येते भाराध्वनि विगर्हिताः॥
मृदुसंहतताम्रौष्ठाः तनुजिह्वास्तनुस्फिजः।
वैडूर्यमधुवर्णैश्च जलबुद्बुदसन्निभैः॥
रक्तस्निग्धैश्च नयनैः तथा रक्तकनीनिकैः।
सिंहस्कन्धा महोरस्का दृढपुष्टाः ककुद्मिनः॥
भूमौ कर्षति लाङ्गूलं प्रलम्बस्थूलवालधिः।
पुरस्तादुन्नता नीचाः पृष्टतः सुसमाहिताः॥
वृत्ताङ्गाः स्थूलगात्राश्च विस्तीर्णजघनाश्च ये।
स्पष्टताम्रतनुश्लक्ष्णैः शफैरविरलैर्दृढैः॥
समुद्गवरसंस्थानैः समास्फुटितपार्ष्णिभिः।
वृत्तस्थूलोद्धता ग्रीवाः ककुदैश्च समुच्छ्रितैः॥
एते भारसहा ज्ञेया धुरि याने च पूजिताः।
आवर्तैर्दक्षिणावर्तैः युक्ता दक्षिणाश्च ये॥
वामावर्तैर्वामतश्च संयुक्तास्तेऽपि पूजिताः।
प्रलम्बवृषणोऽत्यर्थं संक्षिप्तोदरवंक्षणाः॥
विस्तीर्णवक्षोजघनो भरे याने च पूजितः।
स्निग्धपिङ्गेक्षणः श्वेतः ताम्रशृङ्गो महानसः॥
स तु गौः पद्मको नाम गोसहस्रप्रवर्धनः॥

[अद्भुतसागरे]

बलीवर्दोऽक्षतश्च योऽनिमित्ततो वित्रस्तः प्रणदन्नावेदयति भयम्। दक्षिणेन यदा भूर्यन्नहृष्टरूपमुत्क्राम्य जघनचरणान् धूनयत्यनर्थः। अन्यदेशाक्रमणं भिन्नवृत्तिः तद्वसुभृतः। धेनुकानां अनिमित्तमुत्क्रामः प्रकृत्यारोग्यम्॥

21.1 Sign of Cows

[This section is about Bovines. In Utpala's quotations, which

are in verse the good and bad qualities of bulls, cows and oxen are described. The prose text of AS is not that detailed.]

२१.२ ॥अश्वलक्षणम्॥

जघन्यमध्यज्येष्ठानां अश्वानामायतिर्भवेत्।
अङ्गुलानां शतं ज्ञेयं विंशत्या दशभिस्त्रिभिः॥
परिणाहाङ्गुलानि स्यात् सप्ततिः सप्तसप्ततिः।
एकाशीतिः समासेन त्रिविधः स्यात् यथाक्रमम्॥
तथा षष्टिश्चतुःषष्टिः अष्टषष्टिः समुच्छ्रयः।
द्विपञ्चसप्तकयुता विंशतिः स्यान्मुखायतिः॥
श्मश्रुहीनं मुखं कान्तं प्रगल्भं तुङ्गनासिकम्।
ह्रस्वप्रोथं तनुश्रोत्रं रक्तगम्भीरतालुकम्॥
षडब्दमाद्वादशकं मृदुनासापुटं दृढम्।
दीर्घोध्दतमुखं ग्रीवं ह्रस्वकुक्षिखुरं तथा॥
विवशं चण्डवेगं च हंसमेघसमस्वनम्।
हरितं शुकवर्णं वा श्वेतं कृष्णं समण्डलम्॥
अश्वमीदृशमारोहेत् हस्तेन श्रवणेन वा।
आश्विने नोदनाभिज्ञा वाहयेयुर्द्विजातयः॥
तथा च वर्णैनैकेन स्निग्धवर्णो भवेद्यदि।
स हन्याद् वर्णजान् दोषान् देहः सर्वत्र शस्यते॥

दश ध्रुवावर्ताः। प्रपाणे एको ललाटे एक एव मूर्धनि दौ द्वौ वक्षसि रन्ध्रोपरन्ध्रयोः द्वौ द्वाविति॥

[पराशरमहर्षिणा अश्वानां आयुष्प्रमाणपरिज्ञानमभिहितम् । तद्यथा॥]

अथ रेखा दीर्घा गम्भीरा अविच्छिन्नास्तिस्रः प्रोथे यस्य तस्यायुर्वर्षाणि

त्रिंशत्। द्वाभ्यां विंशतिः। दशैकया च। दक्षिणेनाभिवृत्तया द्वादश। वंशाग्रमनुगतया अष्टादश। ह्रस्वजिह्मवक्रविच्छिन्नाव्यक्तरूक्षकबन्धकाक-पादाकारया जघन्यमायुः इति॥

[अद्भुतसागरे अश्वाद्भुते]

हयानां प्रहेषणं क्रीडननिषण्णतारोहापकर्षणस्तम्भनं चरणयोः अन्योन्यप्रोथस्पर्शनं जयाय। प्रधानमश्रुपातः पानान्नविद्वेषात् उद्भ्रंशो वा यानापध्वंसोऽकस्मात् वेपथुः। स्नेहो गात्रस्य धूपनं स्वगात्रभक्षणं खुरैर्वा स्फोटनं पूर्वपादावलेहनं अवसादनं अनिमित्तासृक्प्रसृतिः मुखपादयोः नमनं अक्षिचलनमालस्यं पर्याणादियुक्तस्य अन्यवाहनेन आरोहणप्रणाशो विकृतिर्विरोधः। छायाविकृतिरश्रीकता अतिलोमविसरणं पराजयाय। स्निग्धगम्भीरह्रेषं जयाय। मुखात् अग्निविस्फुलिङ्गोल्काज्वालाप्रपतनं उत्तमाङ्गज्वलनं नाशाय। पृष्टपुच्छगुदज्वलनं गात्रस्य धूपनं पश्चाज्ज्वलनं सेनापराजयाय। अथ पुष्पं श्वेतं स्निग्धं अवर्णस्य प्रशस्तम्। श्वेतस्य कृष्णं पीतं रक्तं च। यस्याश्वस्य ललाटे श्वेतकलेन्दुतारकासंस्थानं वा पुष्पं स्यात् तदनुसारि विजयं विद्यात्। आप्रोथाक्तमलं यस्य हिरण्यपुण्ड्रकं धाम स्त्रीविजयावहम्। यस्य वा स्निग्धैः सर्वाङ्गस्थैः सन्नाहानुकारं तु विभवराष्ट्रविजयावहम्। अधिकैर्दन्तैः स्वामिनो धनक्षयं विद्यात्। उपर्यधिकैः स्वामिनां संग्रामे वधं ह्रस्वैः करालैः विसृमरैः भर्तुरनर्थं विनाशं च॥ गजाश्वयमलप्रसवे तत्स्वामिविनाशं विन्द्यात्॥

[ऊर्ध्वमधश्च मध्यदन्तचतुष्टयाग्रस्थौ दन्तौ दृष्ट्वा पराशरः॥]

योऽजातवृषणः कर्णौ यस्य कराङ्गुष्टपर्वप्रमाणौ कर्णमलयोः शङ्खे स्यातां सोऽश्वो राष्ट्राद्बहिः कार्यः॥

21.2 On Horses

[This section specifies fairly well the height, breadth and length of horses of three different types. The life span of a healthy horse is said to be 30 years, which is quite realistic. Diagonising the health of the animal by inspecting its teeth is stated.]

२१.३ ॥ हस्तिलक्षणम्॥

परिणाहो दशसमो नवायामः स उच्छ्रयः।
सप्त ज्येष्ठप्रमाणस्य नागस्य समुदाहृतः॥
ज्येष्ठात् सप्तमभागोनो मध्यमो मध्यमाद्रजः।
अन्त्यः षड्भागहीनः स्यादतोऽन्यो न स पूजितः॥
मुखादपेचकं दैर्घ्यं पृथु पार्श्वोदरान्तरम्।
आनाह उच्छ्रयः पादा विज्ञेयो यावदासनम्॥
विंशत्यष्टौ दश नखाः स्थिराः कूर्मसमाहिताः।
गजानां पूजिता पादा ये च स्युरकचाविलाः॥

[अद्भुतसागरे हस्त्यद्भुते]

दन्तिनां श्रीपुष्टिकरमदप्रादुर्भावः प्रहर्षो विजयाय। हस्तिनां हस्तेन स्कन्धविलेखनं आहारेषु प्रद्वेषः। प्रकम्पनं उत्तमाङ्गानां पादैः पादप्रघर्षणं वेपथुः मुष्काक्षिमुण्डेभ्यो वा स्रक्प्रवर्तनं निशि भैरवो निनादो विभिन्नकांसस्य बृंहणं वित्रस्तपरिधावनं मदप्रणाशः पांशुकलुषग्रासाभिषङ्ग-प्रकीर्णता अप्रकीर्णानां प्रधावनं अश्रुप्रवर्धनं प्रवेदनं प्रदत्तकवलाप्रतिग्रहः शिरोऽवध्वननं आर्तानुनादो बहिर्दन्तशकलावपतनं विषाणभङ्गः पराजयाय। मूलात् पार्थिवस्य। मध्यतः कुमाराणाम्। अग्रतो नायकस्य। सेनापतेरुभयतः। बहुधा च राज्ञः सेनायां हस्त्यश्वानां वधाय। शुक्लपीतमाञ्जिष्ठलोहित-नीलवर्णानां दन्तानां भङ्गे तु पुष्पाणां प्रादुर्भावो विजयाय। सुरभिर्मनोज्ञो

नागदन्तस्रावो विजयाय। दुर्गन्धबहलपूयशोणितस्रावो विषाणाभ्यां भयाय॥

21.3 On Elephants

> [Here the physical features of elephants are described including their different sizes. Special characteristics of elephants such as trumpeting, getting into heat, dislike for food and other bodily actions are described to understand the psychology of the animal.]

२१.४ ॥बिडालशुनकादि॥

अथ बिडालो दीप्तायां एकस्वरो व्याहरन् शस्त्रकोपं भयं च करोति। दीप्तायां भयमेवाशु। मुक्तः कान्तारे तु स्त्रीजनक्षयाय। स्वरोऽनुप्रधावन् ग्राममध्ये घोरस्वरो भयाय। उच्चैर्नदन् भैरवं नर्दति अकस्मात् श्रेष्ठभयाय महते॥

अथ श्वा श्वेतलोहितपीतकृष्णो ब्राह्मणक्षत्रियवैश्यशूद्राणां क्रमशो निमित्तमभिदधाति। किञ्चित् भक्षयन् परस्य गृहं प्रविशेत् तस्य वृद्धये। आर्द्रामिषमादाय विशेच्चान्नपानलाभाय। गृहं समारुह्य लिखति पुरुषक्षयं स्वामिनः। कलहायमानः श्वाऽनिमित्तकलहाय। संदधत् सन्धये। द्वारि चैलं गृहीत्वा परिक्रीडन् परिक्लेशाय। वस्त्रखण्डं रज्जुं वा नयत्यग्निभयम्। चेल्लवणं वा धनक्षयम्। दधि तु भार्यायाः। पलायमान उपानहं प्रेष्यायाः। आनयने तु फलादिषु एतेषु लाभम्। शुष्कमल्पफलं कण्टकिनं स्वक्षीरं वा वृक्षमवमूत्रयति अरिप्रादुर्भावम्। अतो विपरीते धनलाभम्। तमेव खनति धनलाभम्। नवामन्नपूर्णां वा स्थालीमवमूत्रयति कन्याप्रदः। पुराणं स्त्रियाः। शय्यां भार्याया अथवा कुटुम्बिन्या मृत्युम्। शिरस्त्राणं स्त्रियं नरं वा तस्यैव धनलाभं सौभाग्यं वा। दधिपूर्णं कलशं चौरमुपस्थितं वा उदकुम्भं चौरमेव च। नवं चेच्छकटं कम्पयन् यानोद्यच्छकटं याति यानोपयुक्तं वा स्वामिनो वधम्। ग्राममध्ये ऊर्ध्वमुखो नदन् नखैर्भूमिं च लिखेद्भयम्। तूर्णम्भूतं धावेयुः अभीक्ष्णमुपद्रवम्। निशि शुनां सङ्घशः सततमभिक्रन्दनं

पुरविनाशाय। बहुषु पथिषु नदत्सु परचक्रेणाशरीरयाताः समेत्यैकश्चेत् बहुशः पांशुं नयब्दिः क्षिप्त्वा वैकस्मिन् जलपात्रे क्षिपत्यविषममेव च भूमिं लिखत्यन्येषु च तृणैराच्छाद्य अवतिष्ठमानेषु अम्भोभयम्। पर्वसु भूमिं पन्थानमूर्ध्वं वा प्रेक्षमाणेषु राहुदर्शनाद्ग्राममध्ये ऊर्ध्वमुखो नदन्मुखैर्भूमिं विलिखेब्दयम्। ग्रामाद्बलाहकान् वा समादाय गच्छेब्दयं विन्द्यात्। सूर्योदये प्राङ्मुखं नर्दत्यग्निभयम्। अपरसंध्यायां गवेडकप्रवेशे वा रथ्यासु धावन्तः सारमेयाः सन्ध्ययोरूर्ध्वमुखा बहवः समं नदेयुर्भयम्॥

अथ प्राच्यादिदिक्षु दीप्तासु शिवा व्याहरन्ती स्त्रीहरणं कुर्यात्। पूर्वदक्षिणस्यां दिशि गृहपतेर्घातमग्निदाहं वा। दक्षिणस्यां वैश्यवधमागन्तुं वधं वा। दक्षिणपश्चिमस्यां राजतो भयम् शत्रोर्गणस्य च। पश्चिमायां सलिलघातं शूद्रोपद्रवं च। पश्चिमोत्तरस्यां दीर्घार्ति ब्राह्मस्य पीडां वा। उत्तरस्यां व्याधिम्। उत्तरपूर्वस्यां दुष्टपुंसः प्रवेशनम्॥

नैर्ऋत्यां वायव्यां वारुण्यां च व्याहरेत् शरीरघातः स्यात्। दक्षिणतो मेघसंनादाः कष्टाय। पश्चिमतः श्रेष्ठामात्यवधाय। भेरीमृदङ्गघोषाभा चेदुत्तरतो द्विर्वहेत् भूमिकम्पाय। त्रिर्महोल्कापाताय। फेरुण्डकस्य त्रिचतुःसप्तकृत्वा इति रुतेषु आनुपूर्वात् फलं विद्यात्। प्राच्यां तावद्दिशि कन्याहरणं आग्न्युत्पातं क्षत्रियसन्नाहं ग्रहस्य केतोरुदयमिति। दक्षिणपूर्वस्यां दिशि गोयुगप्रणाशं गवां च सह पालैः सात्मघातं महब्दयं अग्न्युत्पातमिति। दक्षिणस्यां पलायनं राजदण्डयोगं स्वचक्रदोषं मारकमिति। नैर्ऋत्यां फेरुण्डकक्रीडितं न गुणाय केनचित् कस्यचित् वृकाद्यारोहणं ब्रूयादुब्धरणं च। तथैव चतुष्पदकीटानां वचनशून्यस्य शूलादवपतनं मृतस्य चिन्ता कार्यादुब्धरणम्। वारुण्यां केनचित् कस्यचित् हर्षविनोददानं हस्तग्राहं पुंसो वधं श्रेणीशानग्रहणनैगमैर्बन्धनं भेदनं वातोद्भ्रमणमिति। वायव्यां राहुणा चन्द्रग्रहणं अनिलप्रादुर्भावं जरामरणं उल्काप्रपतनं राष्ट्रस्यानयमिति। उत्तरस्यां दुष्टपुंसो निग्रहणं सन्धिच्छेदं ग्रामघातं पुररोधं स्त्रीहरणमिति। ब्राह्म्यां वर्षाश्मपाताशनिप्रादुर्भावं महार्घ-वर्षभूचलनदुर्भिक्षमिति। अष्टकृत्वः प्रतिसर्वतो वाशितं योगक्षेमाय। सर्वत्र

घोरप्रणादिनी सर्वतो ग्रामं परिगच्छन्ती च शस्त्रोत्पातान्। भृशं स्वरे ह्युद्धृष्टकान्यभिधाय पीडाशस्त्राभिघाताय प्रमाणीकुर्यात्॥

अथेन्द्रादि दिक्पतङ्गावरोधने राजापनयबलप्रकोपरोगपरचक्रागमगोपवध-शस्यक्षयरोगगोगजवधमादिशेत्। भेका अतिपीताभाः सुभिक्षाय । अतीव नदन्तो वर्षाय। स एव अनावृष्टिभयं ब्रूयाद्बहुशीर्षादिदर्शने॥

21.4 Cats, Dogs and Others

[This is taken from AS. Here, some peculiarities of cats, dogs and jackals are described. These are mostly stated in the form of omens. In the last paragraph, mention is made of locusts and frogs. It is said that frogs of bright yellow colour indicate good food production. If they are happy, it indicates copious rainfall. Frogs with two or more heads are said to portend failure of rains.]

२१.५ ।खड्गलक्षणम्॥

तेषां प्रमाणानि। जघन्यमङ्गुलानि पञ्चविंशतिः। मध्यमं त्रिंशत्। उत्तमं चत्वारिंशत्। अतो हीनमतिरिक्तं वा न धारयेत्। पूर्णात् प्रत्यङ्गुलान्तरितेषु व्रणेष्वनाकृतिषु यावत्त्रिंशदङ्गुलं तावत्क्रमत् फलनियमः। पुत्रनाशोऽर्थनाशोऽर्थसञ्चयो गृहदाहो मित्रलाभो व्याधिभयं सुखाप्तिर्ज्ञातिबन्ध आज्ञाप्राधान्यं विपक्षोत्पत्तिर्वाहनलाभः शोकः प्रव्रज्यासुतज्ञातिकुलच्छेदो माहात्म्यबललाभसन्तापः क्लेशः पुत्रलाभो धनागमः शोकः प्रामाण्यमाधिपत्यं उपभोगो भयं दौर्भाग्यमैश्वर्यं राजपूजेति। परतः सर्वमप्रशस्तं विन्द्यात् इति। अथ पायनानि क्षीरपायितमरिवधार्थी धारयेत्। तिलतैलारालाभ्यां अर्थार्थी। पुत्रार्थी उदकेन। सर्पिषा श्रीकामः। साहसिकः शोणितेन। हस्त्यश्वोष्ट्रक्षीरैः शिलासारच्छेदकामः। अजाक्षीरेण तालवसया मत्स्यवडवाहरिणपित्तेन द्विरदस्कन्धच्छेदकामः। नित्यं चैनं धूपपुष्पगन्धोपहारैः अर्चयित्वा

शिरस्यपशायिनं कुर्यात्। नावमन्येत न चोच्छिष्टः संस्पृशेत्। नादर्शकी कुर्यात्। नानिमित्तं विवृणुयात्। न क्रीडनायास्य मूलं विवृणुयात्॥

21.5 Swords

[This section is from Utpala's commentary on BS. Dimensions of a good sword are described here along with religious beliefs prevalent in ancient times.]

२१.६ ।जलाशयः॥

नोपयोग्यानां नदीकूपपल्वलानां अपक्रमं परिशोषणमपां वैरस्यं पुरनाशाय सरितां प्रतिस्रोतोऽभिगमनं क्षीरस्नेहमधुसुरापूयशोणितकुणपमांसविण्मूत्र-गन्धविलुलितसलिलप्रवणमहीयूकं अपां गाधागाधपरिवर्त्तनं उच्छोषणं च परचक्रागमनाय नरपतिभयाय वा॥

21.6 [This text is from AS. The text states possible anomalies in water sources such as lakes, rivers and reservoirs.]

२१.७ ।वृक्षलतादि॥

वृक्षाणां रोदने व्याधिर्हसने देशविद्रवम्।
शाखाप्रपतनेऽकस्मात् संग्रामे योधघातनम्॥
स्थानात् स्थानान्तरगमे देशभङ्गभयं भवेत्।
बालानां मरणं प्राहुर्बालानां फलपुष्पयोः॥

पतितपादपानां स्वयमुत्थानं जनमारभयाय। पादपेष्वन्यफलपुष्पप्रादुर्भावः परचक्रागमाय॥

क्षीरेस्रवति गोपीडां स्नेहे दुर्भिक्षमादिशेत्।
वाहनापचयं मद्ये शोणिते शस्त्रजं भयम्।
व्याधिं मधुनि तोये तु विन्द्याद्वर्षविनिग्रहम्॥

पूज्यपादपानां पतनं अवनिपतिविनाशाय। तरुगुल्मौषधिशस्यानां नातिपुष्पफलसंभवः। संभवो वाऽनृतौ जनमारभयाय॥

अथ शस्यं पश्य नृपतिहिताहितं तरुकुसुमसंपदोऽनुव्याख्यास्यामः। तत्र अशोकाश्वत्थशालतिन्दुकक्षीरिकाशशाशिरीषचिरबिल्वनीलाशोकेङ्गुद-दर्भदूर्वाकुसुमबदरीकुन्दजंबूसिन्दुवारवेतसन्यग्रोधसप्तपर्णद्राक्षाभि-मुक्तापारिजातमधूकभिल्वोटजवासककिंशुकशिंशुपानां शस्यकुसुमैश्च रक्तशालिसर्वधान्यकलमशालिषष्टिकयावकसर्षपमुद्गमसूरकशणेक्षुमूलक-प्रियङ्गुकुलत्थकार्पासयवकमुष्ठकसतिलकलायकगोधूमगौरकराजमाष-कोद्रवशाकसंपदं विद्यात्। तथा लोध्रनन्द्यावर्त्तकुरवकचम्पकबन्धु-जीवसिन्दुवारार्ककरञ्जकुसुम्भखर्जूरपिप्पलैः ताम्रवैडूर्यवज्रकनक-प्रधानमौक्तिकहिरण्यविषपिप्पलीतगराणां संपदमभिनिर्दिशेत्। रक्तोत्पल-कमलसितकुमुदशतपत्रकुमुदसौगन्धिकस्वर्णयूथिकामलकपटोलशम्या-कवृद्ध्या अतिवृद्धिः। नृपतिमन्त्रिद्विजर्त्विक्चमूपतिश्रेष्ठिचतुष्पादपक्षिगजानां तथा लोध्रनिचुलकुसुम्भनिम्बगजतुरगकर्णपाटलार्जुनशिंशपानां वृषिभयं शङ्काकारुकसुभिक्षकरितुरगगोषु वृष्टीनां सम्पद्भवति। चोपघातः पौर्णमासीषु उल्कानिर्घातकम्पग्रहोपरागोपतप्तासु। तत्र माघे सुगन्धिमधुरलवणद्रव्याणाम्। फाल्गुने शङ्कचन्दनकृमिबन्धकीनाम्। चैत्रे कार्पासफलचित्रभाण्डानाम्। वैशाखे कुसुमफलतरुत्वङ्निर्यासादीनां पण्यानाम्। ज्येष्ठे सर्वशस्यानाम्। आषाढे क्षिप्तबीजानाम्। श्रावणे लाक्षालोध्रहरिद्रामाञ्जिष्ठानाम्। भाद्रपदे हयगजखरकरभचर्मशिल्पिनाम्। आश्वयुजे अश्वोष्ट्रखरमाहिषहस्तिनाम्। कार्त्तिके कुसुमभाण्डानां ग्रैष्मिकाणां च शस्यानाम्। मार्गशीर्षे कनकमणि-फलवस्त्रविषाणिनाम्। पौषे पुष्पेक्षुमणिभाण्डानाम्॥

शस्यनिचयेषु अकस्मात् वृद्धिक्षयौ तिलेष्वतैलं भयाय। यद्युत्पलकुमुदपुष्पसम्भवे यवव्रीहिष्वेककाण्डे द्वित्रिरन्तःशिरःप्रादुर्भावे तत्स्वामिनाशं विन्द्यात्॥ अथ येषां सिद्धमन्नस्य विरसदौर्गन्ध्यं अत्यन्तमभीक्ष्णं प्रतिपद्यते अन्धःस्थाल्यादयो वा विपद्येरन् उत्पातोक्तविकाराणि वा लक्षेरन् तेषां वधाय स्यात्॥

21.7 Trees and Creepers

[This section from AS gives a long list of trees, flowers and a few minerals that were considered as wealth of a kingdom. Bad omens indicated by abnormalities in trees and creepers are stated.]

२१.८ ॥वस्त्रोपानहादि॥

अथ वाससां शुभाशुभैष्यत्फलसूचकम् अकस्मान्मषीकर्दमाञ्जनरुधिरगोमयैः उपरागः तथा आखुकीटगोजन्तुभिरवभक्षणं पाटनं च काष्ठकण्टकैर्दाहो वा वह्निना भवति तद्विज्ञानलक्षणमुपदेश्यामः। तत्र प्रादेशं प्रत्यक्पाशं नवधा वस्त्रं विभजेत् त्रिवंशम्। तदंशेषु तेषु क्रमात् फलनियमः। अर्थहानिरर्थागमो धनक्षयः स्त्रीविनाशः पुत्रपीडादुहितृमरणं स्वशरीरव्याधिः व्यसनसमागमश्चेत्यष्टासु। नवमे अध्वगमनं अर्थागमः कर्मसिद्धिश्च। कुम्भादर्शकर्णशस्त्रपदत्रिकूटेन्द्र-रुचकहलगृहतोरणच्छत्रचन्द्रमेखलसुगुपवेदीपद्मशङ्खश्रीवत्सस्वस्तिकमत्स्य-नन्द्यावर्ताकारैस्तु क्रमाद्विपुलोऽर्थागमः कुक्षिरोगो नेत्रपीडा विरोधोऽध्वगमनं अनारोग्यव्यसनं ऐश्वर्यमभिषेकागमः। प्रार्थितोत्पत्तिः वेश्मलाभो धनागमो राज्यलाभः स्त्रीसङ्गमः सोमपानं क्रतुदीक्षा यज्ञफलावाप्तिः विपुलार्थसम्पत्तिवेदनं स्त्रीलाभः सौख्यं काञ्चनागमोऽर्थसम्पच्च। कबन्ध-श्येनकेदारसर्पसूचीपशमुद्गरलाङ्गलपीठिकाकारैर्मरणम्। द्विरदरथतुरगसदृशैः यानपुत्रधनैश्वर्यावाप्तिः। हयगजभुजगतुलचषाकारैः संयुगः। दशासु मूले भार्याविनाशो मध्याग्रयोरर्थानाम्। पाशान्ते स्त्रीणाम्। सकलवस्त्रमध्यविनाशे मरणं उत्तरे पत्नीविनाशः। दक्षिणेऽपत्यापायः। तथा प्राग्भागे कुटुम्बविनाशाय। पूर्वदक्षिणे नारीणाम्। दक्षिणे सुहृदाम्। दक्षिणापरे पशूनाम्। पश्चिमे प्रेष्याणाम्। पश्चिमोत्तरे ज्ञातिवर्गस्य। पूर्वोत्तरे मध्यमे सर्वसम्पदाम्॥

नवे वस्त्रे यथोक्तं स्यात् फलम् जीर्णे तु नेष्यते।
न रक्ते न पुनर्धौते न स्वयं दग्धपाटिते॥

अथाखुभक्षणोपानच्छेदलक्षणं व्याख्यास्यामः॥

तत्र विंशतिश्छेदाः तेषां सप्त पूजिता विगर्हिताः शेषा भवन्ति। अङ्गुष्ठादिकनिष्ठान्तं वैश्वानरदेशे प्रभक्षिते अन्नपानस्त्रीवस्त्रलाभं विन्द्यात्। प्रदेशिन्यां स्त्रीवस्त्रलाभम्। मध्यमायां वधबन्धम्। अनामिकायां मातृमरणं स्वसृप्रजननं वा। कनिष्ठिकायां पितृमरणं भ्रातुर्वा। नासातः स्त्रीधनलाभम्। अङ्गुष्ठाङ्गुलिमूले व्याधिभयम्। चूलायां वैमनस्यम्। ग्रीवायां शिरश्छेदनम्। मूलादर्थयानपर्याप्तिम्। कर्णिकासकलभक्षणे सन्धिच्छेदनम्। असकले कलहोऽसत्प्रवृत्तिं च। पार्ष्णिबन्धेऽध्वगमनम्। पार्ष्णिस्थाने वाहनागमम्। बाह्यपदपुटच्छेदने भक्षणे तु सुहृद्भ्रातृविनाशं विन्द्यात्। मध्यमस्य विपुलमर्थागमनम्। उत्तमस्य भूलाभम्। पदमध्ये शोकागमनम्। पार्श्वयोः पार्श्वरोगः। सकलोपानद्भक्षणे मरणविभ्रमप्रवासा भवन्ति॥

21.8 Clothes and Footwear

> [The first paragraph is entirely about divining tears and marks in a new garment worn by men. The second paragraph is about portents due to bite marks and parts eaten away by rats in footwear. The above texts are taken from AS. These appear in Utpala's commentary on Chapter 70 of BS with minor variations.]

२१.९ ।शाकुनम्॥

कौशिक उवाच। भगवन् सर्वविरुतेङ्गितज्ञानमिति यदुक्तं पुरस्तात् कथमज्ञातानां इङ्गितैः विरुतैर्वा ज्ञानमिति। तमाह भगवान् पराशरः॥ न हि खलु सौम्य कालविहितं चराचरस्य भूतग्रामस्य भावाभावमिति यदुक्तमग्रे तदेव भगवान् परमात्माऽक्षरश्च सर्वगो अतीतभूरीश्वरश्च तत्प्रचोदितं जीवाजीवमित्यलं सूचकं च निमित्तमाचक्षते मुनयः। मत्तविस्रस्तव्याधित-व्यङ्गकलहामिषासक्तविद्रुतानि प्रमाणानि न प्रमाणीकुर्यात्॥

अथ शकुनेषु कोकिलमयूरजीवजीवकप्रियपुत्रराजपुत्रीगोदापुत्रशतपत्र-दात्यूहमदनसारिका वर्षाभूकोयष्टिकमहामुक्तकमषकदण्डिमाणवकवायस-कुक्कुटबकोत्क्रोशशार्ङ्गप्लवकचित्रकपोतपुष्परथोष्ट्ररथादीनां वसन्तो मदकालः। शतपत्रोत्क्रोशभृङ्गराजमयूरकोकिलबकबलाहकाप्लववाकधन्व-चातकसारङ्गाणां वर्षाः। चकोरकदम्बमदनशारिकाकीरपुष्करचातकहंसचक्र-वाकसारसकुररक्रौञ्चकारण्डवभ्रमराणां शरत्। श्येनकुररक्रौञ्चसारसादीनां हेमन्ते शिशिरे एवमादयः शकुनानां मदकालाश्च। मृगाणां पुनः पुरुषाणां च शिवाशशजम्बूकसृमरचमरवानरमार्जारनकुलगजगवयसिंहव्याघ्रकूर्म-वराहादीनां प्रायः सर्वेषां मदकालश्च विशेषतश्च सारससृमरसिंहव्याघ्रादीनां ग्रीष्मे। हरिणगजवृषभादीनां प्रावृट्। वृषभरुरुमहिषगवयसृमरचमराणां शरत्। गोगवयवृषादीनां हेमन्तः शिशिरः इति॥

21.9 Bird Portents

[In answer to the question of his student Kauśika, Parāśara says that the sages denote the normal time-wise situations of living and non-living beings as fashioned by the Universal Spirit as portents. He cautions however that sounds of birds and animals during their mating season should not be considered as valid portents. He states the mating seasons of different birds and some animals during which period the divination based on the portents will not be valid. The above text is reported in Utpala's commentary as well as in AS, with slight differences.]

२१.१० ।।वायसाद्भुतम्॥

प्रथमं यस्याग्रत आममांसं छर्दयंस्तस्य धनागमं वेदयति। गुडं गुडभक्तं वा धनस्य। पायसं दधि वा स्त्रियाः पुत्रस्य सुहृदो नार्या वा। शर्करा सहिरण्यमन्नं वा बालान् कीटान् कृमिं वा छर्दयन् शस्यलाभं पापसमागमं वा स्त्रीलाभम्। मृत्तिकामन्यत्र आहृत्य शयने कोष्ठागारे वा पूर्णभूमिलाभाय। अन्यं शकुनिमग्रतो वस्त्रलाभाय। आममांसं सुवर्णलाभाय। पद्भ्यां तृणानि

देशान्तरस्थस्य सर्पिषः पयसो वा लाभाय। अग्रतः पांशुकर्दमं चाश्नाति तत् प्रवासाय वा। भक्तं गुडं वा धनागमाय। तुण्डेन जलं प्रियधनावाप्तये। वामतो दधिसर्पिषी गवामन्नस्य च लाभाय। अग्रतः फलं वैभवस्य लाभाय। शुक्लं चैलं स्त्रीलाभाय। गृहद्वारि चेद्गतागतं कुर्यादागन्तूनां समागमं कुर्यात्। यस्य वेश्मन्यार्द्रलेखं पातयेत् तस्य विद्यागमो भवेत्। आर्द्रकाष्ठलाभाय आर्द्रपक्षो वाऽन्नमुखोऽप्यतिस्त्रीलाभाय। चैलं परामृष्य गृहे तिष्ठन् क्षेमाय। तुण्डेन व्रीहीन् गोऽश्वकुञ्जरवेश्मसुपुत्रलाभाय। पक्षानुत्सार्यानुनीय पुच्छमञ्जसा रुतिं कुर्वन्तः तुण्डैर्वा अन्योन्यं स्पृशेयुः स्त्रीलाभः स्यात्। परस्परमारोहयेयुः पूर्वेण भूमिलाभः स्यात्। अन्नामिषं छत्रमुपानहौ वा तुण्डैरवकुष्टयन् स महाभयाय। शयने श्रीकाण्डं विनाशाय। दूर्वाकेशांश्च कुलविनाशाय। ताल-पत्रमशीवल्कलश्रेष्ठचर्माक्तप्रदेशान् चतुष्पदान् शयने विलिखन् नाशाय एव। शुष्ककाष्ठजीर्णचैलं विनाशाय। यस्य शयनमवमूत्रयेत् तस्य भार्यां दुष्टां विद्यात्॥

शुष्कगोमयराशौ पादौ विलिखेन्नवपालाशभूर्जपत्रं वा गृहीत्वा उत्सर्पेत् तस्य वस्त्राणां लाभः स्यात्। यस्य कर्षेत् नाशस्तेषामेव। प्रेष्ये चेत् प्रेष्यमाणे दृषदि काको निपतेत् तस्य व्याधिभयं मरणभयं वा ब्रूयात्। सुमनोदामवेष्टनं वस्त्राणि वा हरन् प्रदक्षिणीकुर्वन् कामाप्तिम्। यस्याग्रतो भुवि रज्जुं पातयेत् तस्य सर्पचौरागमाय। पथि सपत्रां शाखां वेलयन् नाशाय। रज्जुमग्रतो विकर्षन् सर्पतः तस्करेभ्यः (भयमावेदयति)॥

शिरो विकम्पयन्तो वाशमानाः सशर्करदीप्तस्थानाद्व्रणशो ग्रामाभिमुखं धावन्तोऽग्निमाशंसन्ति। तृणरज्जुकार्पासतन्तूंश्चाग्निभयाय। शुष्ककाष्ठं चौरभयाय। विततपक्षा गृहे किञ्चिद्विलिखेयुः भवेत् कुटुम्बिनी दुष्टा। वामेन मण्डले निलीयमाना तदा सैव विधवा। बहवश्चेत् परस्परं भ्रमेयुः स्त्रीविनाशाय स्युः। परस्परमाहन्युः स्वजनो दुष्येत्। गृहेषु पुनरुत्पतेयुः राजागमनम्। अथ एकश्चेज्जीवन्तमाखुमादाय गृहे निपातयेत् श्रीनाशाय। तमेव मृतं कलहाय। प्रतिवाश्य पुच्छं प्रचालयन् सर्वस्वहरणाय॥ निश्यन्तरिक्षे सङ्घशः सशब्दं

चरेयुः नृपजनपदयोर्भयम्। सन्ध्यायां सर्वे उपरिक्रम्य निलीना अन्नभयम्। धान्ये शिरो निधाय कम्पयन् पुरीषं वा भक्षयन् दुर्भिक्षाय॥

वित्रस्तत्वात् तत्सधूमास्तु उड्डीनाश्चोर्ध्वं वायसाः क्रोशन्त्यारुदन्तः सर्वे सव्या युद्धागमनाय च। अथ वाश्यमानो अग्निगेहस्थो रूक्षं वाहरेत् कुलश्रेष्ठविनाशं विन्द्यात्। प्राकारेषु कुलश्रेष्ठविनाशम्। शयने कुटुम्बविनाशम्। घटस्थे कुटुम्बिनीं दुष्टाम्। लोहितद्रवे ताम्रागमः। कृष्णे आयसः। श्वेते रजतस्य। इन्द्रध्वजपताकावाहनायुधेषु दीनस्वरैः तिष्ठेयुः चमूवधः। परस्परं पक्षान् योजयेयुः वस्त्रागमम्। दक्षिणमण्डलानि कुर्युः स्वपक्षागमम्। वामान् परचक्रागमम्। वृक्षपत्राणि लक्षयेयुः भक्ष्यानुबन्धः। मध्याह्ने शिरोग्रीवामूर्ध्वतो व्याहरेयुः शस्त्रोत्पातः। परिवृत्तेऽह्नि पुराट्टालकेषु व्याहरेयुः पुरनाशः। दीप्ता दीप्तस्वराः पुरत उड्डीयेरन् सेनाग्रामसामर्थ्यघातम्। आग्नेय्यां अग्निभयम्। याम्यायां मरकभयम्। नैर्ऋत्यां वारुण्यां च भयम्। वायव्यां वातवेगम्। उदीच्यां शस्त्रकोपाय। ऐशान्यां वर्षम्। दीप्तायां दिशि मण्डलानि कुर्वन्त आगच्छेयुः यथादिशं वर्णोपद्रवः। ऊर्ध्वमुखा मण्डलिनो निलीयेरन् वातोद्भवो वा वर्षं वा। पुरुषादूर्ध्वं अन्तरिक्षगतानां व्याहरतां चेष्टां न प्रमाणीकुर्यात्। पुरस्तात् पूर्वेण क्षीरपुष्पफलाहववृक्षेषु नीडीकरणं क्षत्रियजयाय शुष्कविपरीतेषु पराजयाय। बाहुल्यात् प्राच्यां नीडीकरणं क्षेमसुभिक्षाय। आग्नेय्यां चाल्पवृष्टये। दुर्भिक्षं दक्षिणस्यां विद्यात्। नैर्ऋत्यां व्याधिं अयोगक्षेमं च। वारुण्यामवर्षणम्। वायव्यां कालोपद्रवमतिवर्षं च। ब्राह्म्यां उच्चेषु वर्षं निम्नेष्ववर्षमेव। मृदुदृष्टेषु च प्रावृट्सम्पच्छस्यसम्पच्च। पूर्वोत्तरेण क्षीरवृक्षेषु निवसन्तः क्षेमाय। प्रासादाट्टालध्वजक्षेत्रेषु नीडानि चेत् कुर्युः तत्स्वामिनो विनाशं विद्यात्। वृक्षकोटरस्थलेषु वर्षाः। द्वित्रिचतुःशावप्रादुर्भावे योगक्षेमम्। एकशावतायां निरपत्यतापां च दुर्भिक्षम्। सर्वश्वेतः सामुद्रः सर्वजनपदे दृश्यतेऽयोगक्षेमाय स्यात्॥

21.10 Crows

[This text is taken from AS. Here, a detailed description of the

portents is given based on an equally detailed description of the behaviour of crows, single and in groups. Interesting nesting patterns are described to state the corresponding portents. Chapter 94 in BS is about Crows. But Utpala has not quoted any part of the above text as given in AS.]

२१.११ ॥खञ्जरीटः॥

अथ शार्ङ्गकः तद्यथा। समन्तभद्रः प्रभद्रश्चानुभद्राकाशभद्रश्चेति भेदाः। यस्योरःशिरोग्रीवा अञ्जनाभास्तं समन्तभद्रं विद्यात्। शिरोरसि यस्य कृष्णं तं प्रभद्रम्। कण्ठोरसी यस्य तमनुभद्रम्। कण्ठगतमात्रं यस्य तमाकाशभद्रमिति। अगस्त्योदयादिशरद्येते दृष्टे क्रमात् ब्राह्मणादीनां शुभाशुभमावेदयन्ति सर्वेषां वा समन्तभद्र इति। तटागोदपाननदीतीरक्षीरपुष्पवृक्षाग्रतोरणनगगोपुरा-रामाट्टालकशयनासनवनपद्मोत्पलकुसुमामरभवनगोमयकरीषदूर्वासु स्थितं प्रहृष्टं भक्षयन्तं खञ्जनकं अभिसमीक्ष्य अन्नपानप्रियगोऽश्ववस्त्रप्रियाप्तिं च विन्द्यात्। पिबत्यम्भः पानागमं गोष्ठमध्ये गृहलाभं परसंदर्शिते अन्यस्त्रीसमागमं फलविलिखिते क्षेत्रे पाणिग्रहणम्। गोऽश्वाजाविकमहिषपृष्ठे पृथ्वीधनधान्यागम इति। महिषीपृष्ठव्यतिरिक्तान्यावयवेषु अशोभनं तत्फलमशुभदेशे प्रशस्तमिति वक्ष्यामः। वृषभककुदि सेनापत्यं गजशिरस्यातपत्रे राज्यागमम्। कृष्ण-भुजङ्गममस्तकारूढो महदविकलं सकलवसुधाधिपत्यम्॥

अपां समीपे गजमस्तके वा सूर्योदये ब्राह्मणसन्निधौ वा।
पुण्येऽवकाशे गहने वने वा पश्येत्तु यः खञ्जनकं स धन्यः॥

शुष्ककाष्ठपलालदग्धास्थिभस्मतृणतुषाङ्गारभग्नगृहयूपशङ्कुशून्यकुम्भ-कण्टकिवल्लीशकटस्तम्भप्राकारशिखरपाषाणसिकतासु अप्रहृष्टं दृष्ट्वा व्याधिकलहानर्थागमान् विन्द्यात्॥ मृते मरणम्। बन्धे बन्धम्। अशुचौ व्याधिम्। खरकरभपृष्ठे मरणं प्रवासं वा। युध्यमाने कलहम्। पक्षपातने मृत्युं स्मशाने वा। येन येन प्रकारेण नरः पश्यति शार्ङ्गकं स स प्रकारो विज्ञेयो यथा तस्य तथाऽऽत्मनि॥

21.11 Wagtails

[This section is taken from AS. In BS, Chapter 44 titled *khanjanakalakṣaṇam* is about Wagtails. But Utpala in his commentary has not quoted Parāśara. Wagtails which are endemic to the Indian subcontinent are classified into four groups. The one with head, neck and breast of dark colour is called *Samanatabhadra*. Wagtail with head and breast of black colour is known as *Prabhadra*. If the head and neck are black it is called *Anubhadra*. The fourth is *Ākāśabhadra* which has only its neck black. Appearance of this bird especially *Samantabhadra* in autumn at the rise of star Agastya is said to be a good omen. Both good and bad results are attributed to the place, time and action of the bird.]

Index

a, A, Ā

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Errata

P. v
Line 5 *Abbrevation read as Abbreviation*

P. xix
Line 1 Abbrevations *read as* Abbreviations
Line 27 *anusvāra read as bindu* (ं)
Line 32 1499 *read as* 1501
Line 32 -1351 *read as* -1349
Line 33 1199 *read as* 1201

P. 38
Line 21 PT, AVP *read as* PT, VJ, AVP

P. 41
Line 20 list other *read as* list of other

P. 65
Last line शिशिरो *read as* शिशिरे

P. 98
Line 19 1495 *read as* 1497 BCE
Line 20 1491 *read as* 1493 BCE
Line 21 1441 *read as* 1443 BCE
Line 21 1437 *read as* 1439 BCE

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Fig 12.2 .....1299 BCE *read as* 1301 BCE

P. 159
Fig 12.3 .....1199 BCE *read as* 1201 BCE

About the Author .

R. .N. Iyengar B.E., M.Sc(Eng)., Ph.D., *(b. 1*
is renowned for his contributions to Earthqu
Engineering, Random Vibrations, Mathema
Modeling, Structural Dynamics and Nonli
Systems. As faculty at IISc, till his retirement in 200
KSIDC Chair Professor, Iyengar has published ne
200 papers and technical reports, apart from wri
general articles and books. He has lectured extensi
in India and abroad by invitation. Recipient of
Visvesvaraya award of the Govt. of Karnataka
several other honours, Iyengar is Fellow of the In
National Academy of Engineering, Indian Academ
Sciences, the National Academy of Sciences, India
the Alexander von Humboldt Foundation, Germ
He held the Distinguished Schmidt Chair at
Florida Atlantic University in 1995. He was Dire
of CBRI-CSIR during 1994-2000. At present, he h
the Centre for Disaster Mitigation at Jain Univer
with a unique Fire Engineering Laboratory. He
been instrumental in the establishment of both
Centre and the Laboratory.

Brought up in a family where Sanskrit was a rev
language, Iyengar received basic training in San
from a very young age. His interest in the langu
given its cultural importance propelled him to bec
an avid reader of ancient texts in the original. He
developed, combining textual evidences with mo
methods, a new line of studies on ancient In
chronology, including that of the Mahābhārata.
findings on comets, eclipses, earthquakes, na
disasters and the Pole Star Dhruva in ancient
have attracted worldwide attention.

Although we have some knowledge of Vedic astronomy, it is desirable, indeed necessary, that more systematic studies are undertaken .....Realizing the importance of such studies and their historical value, Prof. R.N. Iyengar, hailing from a family of Sanskrit scholarship and himself trained in Sanskrit, though an engineer by profession, has been a pioneer in these studies over the past three decades. His meticulous studies have brought to light the knowledge of comets (dhūmaketu) and meteoritic showers even during the Ṛgvedic times..... Now, Prof. Iyengar has ably brought out a reconstructed text titled: Parāśaratantra compiling the Sanskrit passages attributed to Parāśara.....The Introduction by Prof. Iyengar is scholarly and lucid alike. All those who are interested in the history of Indian astronomy are grateful to him for bringing out this valuable text which has enriched our knowledge of Pre-Āryabhaṭan astronomy.

Dr. B.V.Subbarayappa
(Science Historian, Bangalore)

Prof. R N Iyengar is a learned and meticulous scientist by training..... He applies these practices to one of the least understood aspect of ancient Indian sciences - astronomy.....This book is one of the most reliable and authentic work on the subject in recent times that should become an important source material for researchers for generations to come. With detailed analysis of each observable planet, comet, important stars as well as ritualistic astronomy and more he makes the reading truly informative. All interested Indians should be grateful to Prof. Iyengar for his.....writing, which has made us aware of the level of observational and theoretical science that existed in India from ancient times.

Prof.M.Vahia
(Astronomer, TIFR, Mumbai)

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