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संस्कृत-संशोधन-संज्ञ-पत्रिका

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# Vṛddhagārgīya Jyotiṣa (Part 1)

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## Introduction

The Vedas, the most ancient known literature of India carry interesting astronomical information of historical importance. The *Samhitā*, *Brāhmaṇa*, *Āraṇyaka*, texts of all the four Vedas (Ṛk, Yajus, Sāma and Atharva) describe the visible sky, seasons, lunar and solar phenomena and a variety of natural events including felt effect of precession in either figurative or matter-of-fact language. However, quantitatively speaking, compared to the bulk of Vedic corpus which is esoteric, religious, ritualistic, and philosophical the amount of material that is retrievable as astronomy in the modern sense of the term is not large, but is still too precious and significant for delineating the cultural history of greater India and countries influenced by Vedic culture. A particular topic that is often invoked, discussed and meditated upon by the Vedic seers is Time, both the abstract and the concrete, in its various ramifications. This preoccupation with Time, it may not be wrong to claim, must have been closely related with *ṛtam* the natural rhythm associated with the visibility cycles of celestial bodies and their spatial location in the visible sky as seen from earth. That Time is continuous like a flowing river but experienced in terms of discrete elements such as *nimeṣa*, *muhūrta*, *ahorātra*, *pakṣa*, *māsa*, *ṛtu*, *ayana*, *samvatsara*, *yuga* is well described in several Vedic texts. It appears some of the rituals in the Vedas were originally designed to measure or demarcate time periods whereas some others were prescribed to be observed on specific dates like the New Moon, the Full Moon and solstice days, predicted as correctly as possible in advance.

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The inclusion of the subject of *jyotiṣa* (or *jyautiṣa*) among the canonical six *vedāṅga* or the six ancillaries of the Vedas points to the coexistence of time measurement based on sky observations in the Vedic *Samhitā* and *Brāhmaṇa* texts that for us appear cryptic and at times unintelligible whereas for the ancients such style might have been just a scientific symbolism or convention. Any measurement would demand an instrument, either natural or manmade. The natural supports for marking time in the earliest period were obviously the Sun and the Moon gradually encouraging naked eye observation of the night sky out of curiosity and wonder. The Ṛgveda in many places unambiguously refers to the visible sky although the description of the celestial picture may not always be clear without further analysis with the help of the ancillary texts denoted by the generic word *vedāṅga*. For example, the Ṛgvedic *soma* stationed in the sky can be a reference to the visible moon and not necessarily always mean a drink of that name to be extracted from a herb of the same name during a Vedic ritual. This follows quite clearly from the *Nirukta* of Yāska which is one among the traditionally recognised *vedāṅga* texts. *Soma* as one of the names of moon is widely listed in Sanskrit lexicons and is also prevalent in several regional languages of the subcontinent. This brings up the question whether by *vedāṅga* one should refer to the subject proper including all later developments or to those particular texts that were prevalent among the Vedic people before the Common Era. While one may debate this question in view of the practice of oral transmission of knowledge from generation to generation, for historical purposes it is preferable to take the period of *vedāṅga* textual tradition to have closed around 500 BCE.

This corpus, it is reasonable to infer, was for the first time written down in script form during the early centuries straddling the beginning of the Common Era. Since writing on perishable medium needs to be rewritten afresh every 200-300 years, the Indic knowledge manuscripts available now, even when their contents originated before CE, may contain conflated information contemporaneous with the period of the redactor, which present day readers at this distance in time, may believe to be the teachings of the original expounder of the *Vedāṅga*. Thus, comparative analysis of available manuscripts is essential to sift the relatively modern elements in a text from the clearly more ancient. For example, the tradition of a manuscript that refers to auspiciousness of a date based on the *tithi*, *nakṣatra*, *vāra* (weekdays) can be treated as being later in comparison with the ones assigning such properties based only on *tithi* and *nakṣatra*. This brings up the larger question of what should be the meaning of chronology as far as ancient Sanskrit texts are concerned, in relation to

history of science, observation of nature, mathematical concepts and overall growth of Indic knowledge systems.

## Vedāᅅga Astronomy

Texts with their authorship assigned by tradition to Parāśara, Garga, Kaśyapa, Nārada, Lagadha, Vasiᅅᅡᅡha, Viśwāmitra and many other Sages were orally transmitted and later copied in different scripts several times. Hence it would be futile to assign a specific date for the purported ancient author (other than the copier who might have written his date) or to argue that all the contents of the currently available text must belong to the original author of an unknown ancient date. A well-known case in point is the Vedic ancillary calendar text attributed to Lagadha available widely in print<sup>2</sup>. This is popularly known as the *Vedāᅅga-jyotiᅅa* a misnomer, since this may not be the only unique astronomical work formulated in the *vedāᅅga* period before CE. This text enunciates the Vedic five-year cyclic calendar starting with the winter solstice day occurring when Sun together with Moon occupies the first point of asterism *dhaniᅅᅡhā*, traditionally identified with star β-Delphini. It can be demonstrated that such a condition was astronomically valid *circa* 1300-1400 BCE and hence existence of such Vedic tradition should also be dated to the same period. However, the same text also refers to planet Jupiter in the *mīna-rāᅅi* which name is typically used to denote the division (330°-360°) of ecliptic longitude, by authors of a later period starting from around the beginning of CE. This apparent contradiction can be explained only by accepting that such a tradition of calendar (not as a finished scholarly text) originated around the third quarter of 2<sup>nd</sup> millennium BCE but this oral tradition attributed to Lagadha was fixed and frozen nearly a thousand years later by unknown scholars interested in the subject of *jyotiᅅa*, by adding some information valid for their own period. Such an explanation finds support by textual evidences transmitted by Varāha-Mihira (VM) in the *Bᅡhat Samhitā* (BS), by Bhaᅅᅅotpala and Bhāᅅkarayogī in their respective commentaries on BS and by Ballālasena in the *Adbhuta Sāgara* (AS) for the above winter solstice marker. However, these historically known authors, with the exception of Bhāᅅkarayogī, do not refer to Lagadha but cite two other sages

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<sup>2</sup> Sastry T.S.K (Ed.), *Vedāᅅga Jyotiᅅa of Lagadha*, *Indian Journal of History of Science*, 19.4. Supplement, pp 1-74. INSA; New Delhi, 1984.

Parāśara and Vṛddha-Garga. Parāśara states the six season solar zodiac starting from winter solstice at the first point of *dhanīṣṭhā*. With the help of the seasonal visibility of stars stated in the *Parāśara Tantra*, this tradition is found to be observationally valid for 1350-1130 BCE<sup>3</sup>. Vṛddha-Garga perhaps knew this older tradition as recounted in the chapter *ādityacāra* of the *Vṛddha-Gārgīya Jyotiṣa* (VGJ) to be discussed later.

However, as mentioned earlier, scripted material available for our analysis on the work of Parāśara and Vṛddha-Garga is mixed with data that can sometimes be shown to belong to the early centuries of CE. Nevertheless, it is only proper to recognize the above chronological marker of *c* 1400 BCE as valid evidence for the existence of *Vedāṅga-jyotiṣa* as a scientific discipline of astronomical observation and calendar, sprouting out of the already existing Vedic culture. Verifiable chronological memory of this culture goes back to 3<sup>rd</sup>-4<sup>th</sup> millennium BCE, as can be demonstrated from the *Taittirīya Āraṇyaka* of the Yajurveda, which commands great respect in the continuing oral tradition of the Vedas and in Hindu cultural practices. This text available in print with several commentaries, describes the fixed Pole Star *abhaya-dhruva* in the constellation *śiśumāra* with fourteen stars, which in terms of modern astronomical knowledge correlates with the epoch of *c* 3000 BCE when star  $\alpha$ -Draconis (Thuban) in constellation Draco was looking fixed at the north celestial pole in the night sky to be literally named *Dhruva*<sup>4</sup>. The *Maitrāyaṇīya Samhitā* and the corresponding *Āraṇyaka* allude to the shifting of this fixed *Dhruva*, a first order anomaly of deep philosophical significance to the Vedic people, which could have been experienced only due to the inviolable effect of precession of the rotational axis of the earth<sup>5</sup>. Thus, to treat the available Vedic corpus in its present form as a group of texts composed in a particular time period of a few centuries would be naïve and simplistic. At the present time we can only perceive the Vedas as a culturally inherited and well preserved Indic knowledge cloud, the central part of which had already nucleated in the Bronze Age. This body due to its inherent momentum grew organically over time manifesting many other limbs, as we see them now, at later periods. In such a panoramic scenario the formal

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<sup>3</sup> *Parāśaratantra (Reconstructed Text)*, by R.N. Iyengar. Jain University Press, Bangalore, 2013.

<sup>4</sup> R.N. Iyengar, Astronomy in Vedic Texts, (Ch. 5, pp.107-169) in *History of Indian Astronomy-A Handbook* (Ed. K.Ramasubramanian *et al.*) Publ. Sandhi; IITB & TIFR, Mumbai, 2016. (ISBN 978-81-923111-9-7)

<sup>5</sup> *Maitrāyaṇīya Samhitā* 4-6-6, *Maitrāyaṇīya Āraṇyaka* Upaniṣad 1-4.

school of *Vedāṅga* Astronomy germinated *c* 1400 BCE with questions and explanations about Creation taken from known Vedic celestial descriptions, mysticism and metaphors but followed by scientific observation of the sky and associated natural events.

## Vṛddha-Garga, Gārgya, Kroṣṭuki

Textual materials in the name of Parāśara, Vṛddha-Garga and Lagadha have been inherited by various Hindu intellectual schools as belonging to the Vedic tradition. Such inherited texts on astral sciences of the first and the third authors are available in print. Sage Garga the originator of the second school is famous as an astronomer quoted and cited in many places. Large number of Sanskrit manuscripts ascribed to the general authorship of Vṛddha-Garga and/or Garga is available in specialized libraries within the country and abroad. For tracing history of natural sciences in India, as also to understand the roots of Hindu astronomy and astrology before Kautīlya, Āryabhaṭa and VM, it is necessary to critically review the contribution of the school of Vṛddha-Garga (VG) with the help of such manuscripts.

A sage by name Garga is well known as a composer of several Vedic hymns, the most famous one being the *Nakṣatra Sūkta* of the Atharvaveda. Equally well known is the *Garga-samhitā*, a purāṇa style text available in print, attributed to the authorship of Gargācārya the family priest of Nandagopa and Yaśodā, the foster parents of Kṛṣṇa during his childhood days in Gokula. It should not be surprising to find several other texts on widely different topics under the authorship of some Garga, which is a family name. In the broad field of astral sciences, we find *samhitā*, *jyotiṣa*, *horā*, *praśna*, *śakuna*, *muhūrta*, *siddhānta* works attributed to either VG or Garga styled as *vṛddhagārgīya*, *vṛddhagārgya*, *gārgīya*, *gārgya* listed in manuscript catalogues. In current parlance, the word *jyotiṣa* is usually taken to mean astrology in India. However, in the Vedic period *jyotiṣa* as *vedāṅga* encompassed observation of celestial bodies, time keeping, computation, calendar, seasons, atmospheric phenomena, omens, correlated effects on earth including rainfall, earthquakes and prognostication. It was only after mathematical methods got continuously refined for proposing a theory for eclipses and planets in the early centuries of CE, *jyotiṣa* came to be treated under three different heads, namely, *samhitā*, *horā* and *siddhānta*. *Samhitā* texts as the name indicates are collection of information on any or all aspects of *jyotiṣa* over a period of time prior to their final redaction. *Jyotiṣa* works attributed to VG and Garga have existed in the country

since a long time. Usually these works are broadly denoted as *Vṛddha-Garga Samhitā* (VGS) and *Garga Samhitā* (GS) in the literature. Garga's works were known to Mīnarāja (2<sup>nd</sup> cent.), Varāhamihira (6<sup>th</sup> cent.), Somākara (7<sup>th</sup> cent.), Bhaṭṭotpala (10<sup>th</sup> cent.), Ballālasena (11<sup>th</sup> cent.), Bhāskarayogi (13<sup>th</sup> cent.) and Nīlakaṇṭha (15<sup>th</sup> cent.). These authors have cited or reproduced verses from either VG or Garga or both.

*Atharva-veda-pariśiṣṭa* (AVP), an appendix to the Atharvaveda, is a text fixed before CE. AVP mentions Garga and also his son Kroṣṭuki in the 50<sup>th</sup> chapter *candra-prātipadikam* on description of Moon<sup>6</sup>. In the 61<sup>st</sup> chapter on atmospheric halos AVP reports the opinion of Vṛddha-Garga<sup>7</sup>. But the 70<sup>th</sup> chapter on *utpātalakṣaṇa* is completely ascribed to Gārgya that means son of Garga<sup>8</sup>. This gives the impression that AVP may refer to the same person as Garga in some places but qualifies him as *Vṛddha* or Senior in a few other places. This may be because AVP knew both the Senior Garga and his son Kroṣṭuki, who in some places might have been cited as Gārgya. The Mahābhārata (MB) in the *śalya-parvan* refers to the Senior Garga as a specialist in interpreting celestial anomalies<sup>9</sup>. In another place Gārgya directly says that he was given the knowledge of the subject of *Jyotiṣa* of 64-*aṅga* (limbs/sections) by Śiva on the banks of River Sarasvatī<sup>10</sup>. The *Nirukta* of Yāskācārya cites a grammarian by name Gārgya and also an interpreter of Vedic hymns by name Kroṣṭuki (Krauṣṭuka). Śaunaka's *Bṛhaddevatā* (4.137) also knows Kroṣṭuki as an interpreter of the Ṛgveda. Probably, this same seer is reverentially cited by Piṅgalanāga in his *Chandaḥsūtra* (3.29) to say that the Vedic meter *nyāṅkusārīṇī* is called *skandhogrīvī* by Krauṣṭuki, as further explained by the commentator Halāyudha<sup>11</sup>. Gārgya as a name can refer to any progeny of Garga, (e.g. Gārgya Bālāki in the *Bṛhadāranyaka Upaniṣat*) but Kroṣṭuki is unusual and

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<sup>6</sup> गजवीथी नागवीथी यदि गच्छति चन्द्रमाः। गोवीथीति तदाप्याहुः गर्गस्य वचनं यथा ॥

अष्टौ स्थानानि चन्द्रस्य क्रोष्टुकिर्यानि वेद वै । नौस्थायी लाङ्गली चैव तृतीयश्चोत्तरोन्नतः ॥ (AVP 50.4.4;5)

<sup>7</sup> अथातः परिवेषाणां लक्षणं चैव वक्ष्यते । वृद्धगर्गो यथा पूर्वमुवाच मम सुव्रत ॥ (AVP 61.1.1)

<sup>8</sup> गार्ग्योक्तं प्रवक्ष्यामि कृत्स्नमुत्पातलक्षणम् । भूमिकम्पो भवेद्यत्र देवताप्रतिमा हसेत् ॥ (AVP 70.23.1)

<sup>9</sup> यत्र गर्गेण वृद्धेन तपसा भावितात्मना। कालज्ञानगतिश्चैव ज्योतिषां च व्यतिक्रमः ॥ (Śalya Parvan 36.15)

<sup>10</sup> चतुःषष्ट्यङ्गमददात् कालज्ञानं ममाद्भुतम् । सरस्वत्यास्तटे तुष्टो मनोयज्ञेन पाण्डव ॥ (Anuśāsana Parvan 18.25)

<sup>11</sup> स्कन्धोग्रीवी क्रौष्टुकेः ॥ ३.२९ ॥ इयमेव न्यङ्कुसारिणी क्रौष्टुकेः अचार्यस्य मतेन स्कन्धोग्रीवी नाम छन्दो भवति । आचार्यग्रहणं पूजार्थम् ॥



we do not meet this personal name in later literature except in passing in a few early purāṇas and in one instance in a Jaina legend. On the other hand, Kroṣṭuki by name is specially cited in several Vedic ancillary texts, hinting his date to be somewhere in the middle of first millennium BCE.

Even though nothing personal is known about the two Gargas we can confidently say that Vṛddha-Garga and Garga known to Indian astronomical tradition must have been two different persons, the former being earlier in time followed by another author by the same family name Garga. This becomes evident as VM, Utpala, Ballālasena, Nīlakaṇṭha Somayāji, and Bhāskarayogi the famous South Indian commentator on BS, cite VG and Garga and quote their texts that read differently. Nīlakaṇṭha (1444-1544 CE) the celebrated Kerala mathematician in his commentary on the Āryabhaṭīya (NAB) explicitly says that two astronomers by name Garga are famous, the first being Vṛddha-Garga and then again another Garga<sup>12</sup>. He further says that as per Parāśara the second Garga wrote on *jātaka* and also adds that this Garga (*punargarga*) has written on *gaṇita* in his text known as *Garga Samhitā*. From this information we infer that the second Garga should have lived in the early centuries of CE when horoscope astrology (*jātaka/horā*) and mathematical astronomy (*gaṇita/siddhānta*) had gained ascendancy in India. It also indicates that Nīlakaṇṭha had access to an ancient text by name *Garga Samhitā* on mathematical astronomy that was not titled as *Siddhānta*.

Quite realistically Sanskrit manuscript tradition on astral subjects has inherited two broadly different sets of texts in the lineage of Garga as *Vṛddhagārgīya-jyotiṣa/samhitā* and *Garga/Gārgya-samhitā/horā/siddhānta*. But, over the centuries copyists might have brought together different scientific knowledge due to *Garga*, hoping to preserve the essentials of ancient *jyotiṣa* and name such compilation as *Vṛddha-Garga Samhitā* (VGS). This could possibly make a modern reader conclude that there must have been only one astronomer by name Garga. But, such conclusion would be an over simplification since Hindu tradition celebrates ancient

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<sup>12</sup> वृद्धगर्गः पुनर्गर्गश्चेति गर्गद्वयं प्रसिद्धम् । तत्र पुनर्गर्गः कल्यादौ प्रादुर्भूतः ॥ कल्यादौ भगवान्गर्गः प्रादुर्भूय महामुनिः । ऋषिभ्यो जातकं कृत्स्नं वक्षत्येव कलिं श्रितः ॥ इति पराशरोक्तेः । स्वप्रणीते गर्गसंहिताख्ये गणितशास्त्रेऽप्येतत्सिद्धम् ... ॥ (NAB 2-4). The verse attributed to Parāśara, is not found in known works: Parāśaratantra or Bṛhat-Parāśara Horāśāstra.

authors mainly by their family names as linked to the mass of knowledge propounded by them. The moniker *Vṛddha* would have been applied to the older author only after the advent of texts by another Garga a few decades or centuries later. In the intervening period between the time of the first and the second one of the same family, the works and concepts of VG, the earlier Garga, might have been cited simply as *gārgya/gārgīya* that is ascribed to the sons or students of Garga. Thus, it is all the more important to survey several different manuscripts related to Garga, for filtering out later astronomy and astrology and to pin point ancient concepts of the VG school of *vedāṅga-jyotiṣa*. With this in the background we have collected from libraries far and wide apart, manuscripts labeled in the name of either Vṛddhagarga or Garga as source material.

## Primary Source

The following fifteen Sanskrit manuscripts (Mss) prominently titled as either *Vṛddhagarga Samhitā* (VGS) or *Garga Samhitā* (GS), except for minor variations, are collected as the primary source for the present critical study. All the Mss with the exception of no. 6, 9 and 15 are in *Devanāgarī* script.

1. Vṛddhagārgīyajyotiṣa (K1) National Library of India, Kolkata (Th. 319)
2. Vṛddhagargasamhitā (A1) Rajasthan Oriental Research Institute, Alwar (2602)
3. Vṛddhagargasamhitā (A2) Rajasthan Oriental Research Institute, Alwar (2603)
4. Vṛddhagargasamhitā (B1) IGNCA, Bangalore (SLR A-1799-1800, Vārāṇasī S 34)
5. Vṛddhagargasamhitā (U1) Cambridge University Library, UK (R 15.96)
6. Gargasamhitā (F1) Bibl. Nationale de France, Paris (BN 245)  
*Bengali script*

7. Vṛddhagārgīyasamhitā (P1) Bhandarkar Oriental Research Institute, Pune (345)
8. Gargasamhitā (P2) Fergusson College, Pune (399)
9. Vṛddhagārgīyasamhitā (M1) Oriental Research Institute, Mysore (P 4665)  
*Grantha script*
10. Vṛddhagargasamhitā (C1) DAV College, Chandigarh (VVRI 2348)
11. Vṛddhagargasamhitā (N1) National Archives, Kathmandu (5-1099), Nepal
12. Gārgīyasamhitā (P3) Bhandarkar Oriental Research Institute, Pune (210, 1883/84)
13. Gargasamhitā (B2) Central Library, Baroda (9277)
14. Gargasamhitā (K2) Asiatic society of Bengal, Kolkata (8199/2)
15. Gargasamhitā (C2) DAV College, Chandigarh (VVRI 2069)  
*Malayālam script*

There are still more manuscripts available with same or derivative titles. In some cases, there is recognizable difference between the official title and the chapter end colophons. A few of the Mss above are marked *Bṛhadgarga Samhitā* on the frontispiece. This may be because the colophon at the end of the first chapter reads *Bṛhadgarga-kṛte jyotiṣe*. However later chapter endings read as *Vṛddhagārgīye-jyotiṣe* or *gārgīye-jyotiṣe*. The tendency of using the honorific *bṛhad-* and *vṛddha-* as equivalents is seen in the *dharmasāstra* literature also, where the *Vṛddhavāsiṣṭha Smṛti* and the *Bṛhadvāsiṣṭha Smṛti* refer to the same text<sup>13</sup>.

### Attribution of Authorship

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<sup>13</sup> *Vyavahāra-mayūkha*, V.N. Mandalik, Asian Publication Services, Delhi, 1880

While going through the manuscripts that have come down to us as VGS, a doubt arises; whether the work belongs to a unique school of Garga/VG or are there other contributions finding place in the Mss. This question is natural since although several chapters start in the form of a conversation between Garga/VG and Kroṣṭuki as scholarly sages sitting in a typical ancient hermitage, there are several exceptions to this narrative style. There are verses that read like opinion of Garga/VG inherited from unknown sources, which perhaps got added at a different period to the main thread. Such changing style and retelling of the same information in different words appear in some chapters with specified astral phenomena. Also there are chapters attributed to Śukra in response to questions by Nārada. The *ādityacāra* chapter is presented as a conversation between Garga and Nārada. The chapter *vātacakra* is attributed to a not so well known teacher Śyāmacandra, as a lecture by him in an assembly of seven kings. In the chapter *śukracāra* on Venus, after stating interesting astronomical visibility numbers, a portent that causes distress to King Dhruvasena is mentioned. A few verses further, another Venus related portent is said to indicate death of the king of Saurāṣṭra. From the context and reference to *yavana*, *hūṇa*, *tukhāra* warriors, one can surmise that the above reference to Dhruvasena is to a ruler of the Maitraka dynasty (5<sup>th</sup>-6<sup>th</sup> cent CE) reigning at Valabhī, who had to face an attack from outsiders. Another instance of a possible historical footprint is the chapter called *yugapurāṇa* that appears as a conversation between divine personalities Śiva and his son Skanda, and hence marked in some Mss as *Skandapurāṇa*. Notwithstanding such inconsistencies as above, large number of chapter colophons connects the content with VG or Garga. Thus, before embarking on a detailed study of VGS and GS it is necessary at the first level to match the chapter contents with the text mentioned in the colophon. A preliminary survey indicates that the topic name mentioned at the chapter end matches well with the content. About the attribution to an author or to his school, doubts persist since all combinations of Garga, Gārgīya, Gārgya with and without the prefix *Vṛddha* and suffixes *jyotiṣa* and *samhitā* occur in the Mss. This situation is a pointer to accretion of material over time with no conscious effort by the copyists at sequencing the contents chronologically. At this stage it would be advantageous to group the above 15 Mss as per their broad contents with a view to find some discriminating characters between VGS and GS that could provide a basis for further analysis.

## Garga Samhitā, Gārgya Samhitā

There are five Mss in the collection (F1, P2, B2, K2, C2) that are listed as Garga Samhitā and one as Gārgya Samhitā. Mss no. 13 (B2) is wrongly shown as Garga Samhitā in the official catalogues, but it is Gārgya Samhitā as seen inside the manuscript. It is noted here that the difference between the use of expressions Garga and Gārgya is getting diluted over years. One can easily make out Mss no. 12 (P3) and no. 13 (B2) above are almost identical but written by different hands. The contents are same starting from the benedictory verse<sup>14</sup> followed by a promise to explain knowledge of Rainfall following Garga. Both (P3, B2) know the twelve rāśi (meṣa, vṛṣabha etc.) zodiac and also the seven weekdays. This Garga/Gārgya-samhitā (GS) is a typical horā and phala-jyotiṣa text. After briefly listing the five planets and Rāhu with their transit period in a rāśi, the seventh verse of this GS declares that the beginning of meṣa and tulā are the viṣuva (equinox); beginning of karka and makara are the dakṣiṇa- and uttara-ayana (solstice)<sup>15</sup>. This condition was valid around 300 CE and hence this GS is probably connected with the second Garga mentioned by Nīlakaṇṭha. This text has emerged out of the antecedent VG tradition as can be easily made out from the contents, colophons and the nakṣatra, tithi, karaṇa, muhūrta characterization. The nakṣatra list starts from aśvini and not from kṛttikā as in the ancient tradition of VGJ. In addition to the four astral elements of VGJ a fifth one namely vāra is included to define the pañcāṅga. A critical comparison between VGJ and GS (P3, B2) with list of contents will be provided in a future publication.

Among the remaining four GS texts no. 6 (F1) and no. 8 (P2) should be more appropriately referred to as VGS, since they have chapters in common with other VGS texts.

Manuscript no. 14 (K2) is a short incomplete text haphazardly assembled with many missing chapters but it has some folios matching with the GS and VGS texts. Manuscript no. 15 (C2) in Malayalam script with four missing folios is a *siddhānta* text perhaps attributable to the second Garga as mentioned by Nīlakaṇṭha. Mss no.

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<sup>14</sup> सर्वलोकाधिनाथाय सर्वप्राणिहिताय च । सर्वभूताधिवासाय सर्वज्ञाय नमोस्तु ते ॥

वृष्टिज्ञानं च वक्ष्यामि गार्ग्यशास्त्रानुमार्गतः । मनुष्याणां हितार्थाय जगतःसर्वदेहिनाम् ॥ (GS v.1,2)

<sup>15</sup> मेषतौल्यौ तु विषुवौ कुलीरो दक्षिणायनम् । मकरं चोत्तरं ज्ञेयं सर्वसंक्रान्तिरीदृशी ॥ (GS 1.7)

9 in *Grantha* script (M1) and Mss no. 10 in *Devanāgarī* (C1) named after VG are more about astrology with no special information on the astronomy of Vṛddha-Garga. These two texts carry content in common with the spirit of GS texts P3 and B2. The remaining Mss no. 11 (N1) from Nepal is entirely on *vāstu-vidyā* with no relation to other VGS or GS manuscripts on astral sciences. For further work the listed manuscripts 1 to 8 together are referred to as VGJ and occasionally as VGS.

## Database Augmentation

Mss 1 to 8, forming the primary source for further work are broadly identical in their contents with same or similar chapter names and endings. A difficulty, in varying degree, common to all the manuscripts is the orthographic idiosyncrasies of the writer which can be quite taxing to decipher. Another common limitation is the missing word, sentence and occasionally a page which sometimes can be addressed by comparing with other Mss. It is also the case at some places all the Mss may have the same unintelligible text or missing word indicating a common origin for our source material of VGJ. One way of improving the quality of such database is to assemble statements attributed to Vṛddha-Garga and Garga by reputed ancient authors on astral sciences for critical comparison. Thus the *vivṛti* (gloss) of Bhaṭṭotpala (UV) on the *Bṛhat Samhitā*<sup>16</sup>, the commentary titled *utpala-parimala* (UP) on BS by Bhāskarayogi<sup>17</sup>, Somākara's commentary on Lagadha's *Yājñajyotiṣa*<sup>18</sup>, and the *Adbhuta Sāgara* (AS) of Ballālasena<sup>19</sup> containing original texts of Vṛddha-Garga and Garga become important. Several authors cite Garga in a general way; but Bhaṭṭotpala, Ballālasena and Bhāskarayogi quote Vṛddhagarga and Garga separately, attesting the existence of two sets of texts during their time. The above texts on BS and AS are available in print for ready reference. However, caution has to be exercised with these print versions, since the quality of antecedent editions and manuscripts used to prepare them, except for the work of

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<sup>16</sup>*Bṛhat Samhitā with the utpala-vivṛti of Bhaṭṭotpala*, (Ed.) K.C. Dvivedi, Sampurnanda Sanskrit Univ. Varanasi, 1996.

<sup>17</sup>*Bṛhat Samhitā with the utpala-parimala of Bhāskarayogi*, (Ed.) K.V.Sarma, Rāṣṭriya Sanskṛt Sansthān, N.Delhi, 2007.

<sup>18</sup>*Vedāṅgajyotiṣam* (Ed.) S.A. Kouṇḍinyāyana, Chaukamba Vidyābhavan. Vārāṇasī, 2005.

<sup>19</sup>*Adbhuta Sāgara*, Muralidhara Jhā (Ed.) The Prabhakari & Co, Varanasi, 1905.

Bhāskarayogi, are not known. An important case in point is the half-verse that reads in the second chapter *āṅgasamuddeśa* in all our VGS Mss as:

साम्राज्यं पौर्णमासश्च ज्योतिषामयनात्परम् ॥ (VGJ 2.21)

The word *sāmrājyam* meaning empire/sovereignty does not fit with the context, but it has the required three syllables suited to the metre of the verse. Hence all copies seem to have taken the same word irrespective of the contextual meaning of carrying out prescribed Vedic rituals such as the New Moon-Full Moon rites on earth, based on specific positions of celestial bodies in the sky. The quarter-verse *jyotiṣāmāyanātparam* is also not very apt, since the same partial text appears three verses before. In such cases reference to independent versions is essential. Fortunately, a group of sixteen verses including the above ascribed to VG is quoted by Utpala in his gloss. Reference to the print version of K.C. Dwivedi, which in turn is based on an earlier edition brought out by Pt. Sudhākara Dwivedi leads to:

साम्राज्यं पौर्णमास्यं च पितृदैवततर्पणम् ॥

This reading is better, but retention of the word *sāmrājyam* fits the metre but still not the context. In order to address such situations, we have added two Mss of BS with UV and one of the *Adbhuta Sāgara* into our collection. For the above half-verse the BSUV manuscript VVRI-2602<sup>20</sup> has the most appropriate reading:

साम्राज्यं पौर्णमास्यं च पितृदैवततर्पणम् ॥

Here the word *sānnāyyam*, an astronomical term with Vedic ritualistic connotations<sup>21</sup> refers to the alignment of Moon with Sun, known as *amāvāsya* in popular parlance. On similar lines a few more ancient texts, wherever appropriate, are referred in preparing the present critical edition of VGJ.

## Organization and Sequencing

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<sup>20</sup> <http://www.dav.splrarebooks.com/collection/view/Brihatsamhitatika>

<sup>21</sup> आमावास्यं वै साम्राज्यम् ॥ साम्राज्यभाजना वाऽमावास्या (Śatapatha Brāhmaṇa 2.4.4.15 & 2.4.4.20)

The VGS text in its content, style and organization as it appears within a given manuscript, is neither homogenous nor internally consistent. One gets the feeling that considerable addition has taken place at different periods onto a smaller, Vedic Brāhmaṇa type text that was mainly in prose. Correspondingly there must have been deletions also to the original version. Basically, the work as it stands is a compilation of astral information spread over centuries. Among such compilations BS is the best known *samhitā* work that claims to preserve the ancient tradition of Parāśara, Garga, Asita Devala and a few others. VM acknowledges his debt to the above sages although he is more matter-of-fact in his treatment. In the first chapter of BS, the ancient origin legends of celestial bodies are alluded to but are ignored as mere stories to keep the students amused. However, Utpala in his commentary profusely quotes from the *Parāśaratantra*, the questions raised by the students of Parāśara and in some cases the answers also. Authors such as VM were not interested in exploring the chronological connections that might exist between the above student-teacher legendary dialogues and the more ancient Vedic sky pictures and creation legends. It needs no emphasis to point out that scientific enquiry is essentially to raise questions about nature and seek answers, within the constraints of contemporary society, from available traditions and by independent intellectual efforts. Students of history of science including astronomy cannot afford to ignore such ancient questions and answers unique to India however strange and obscure they may sound to the modern man influenced by Western models of history. VGS retains many such portions either in original diction or in reworked verses, but placed without proper sequence. All Mss contain scattered passages in prose that read archaic, in terms of ancient legends and observations about celestial bodies. The section *Mahāsalila* with long questions and answers is probably the most ancient content going to the beginnings of Vedāṅga astronomy proper. So also are the chapters about Moon and Rāhu. We can infer that the prose parts are the originals due to the school of VG not only in spirit but also in letter.

The sequence of presentation of the subject matter including colophons is nearly same in all the eight scripts, except for missing verses and incomplete assembly. None of the manuscript copies now available are older than 1500 CE. Notwithstanding recognizable differences due to copying errors and accretion of textual material, it can be made out that the Mss owe their origin to a medieval school of *jyotiṣa* interested in preserving ancient inherited information in whichever form that was available readily. We conjecture that various VG and Garga/Gārgya related texts and oral material in vogue were redacted in script form sometime after



VM (6<sup>th</sup> cent.) but before Bhaṭṭotpala (10<sup>th</sup> cent.) and later copied multiple times in different regions by different hands eventually reaching modern libraries. The text is made up of about 4000 verses of 32 syllables each, with further prose text equivalent in bulk to about 2000 verses. All Mss begin with the same benedictory verse<sup>22</sup> with the first chapter (*sāmvatsara-nirdeśa*) narrated in prose emphasizing *tithi*, *nakṣatra*, *muhūrta*, *karāṇa* without mention of *vāra* (weekdays). The second chapter titled *aṅga-samuddeśa* lists the contents of the proposed work sequentially in 64-*aṅga* (64 limbs/sections/parts) made up of 24-*aṅgas* and 40-*upāṅgas* (sub-sections). However, there are important differences between the list of contents and the actual text found in the manuscripts. The most conspicuous one being the *yugapurāṇa* text found in all Mss but not listed in the contents and also unknown to the traditional list of 18 *mahā-* and 18 *upa-purāṇas*.

## Yugapurāṇa (YP)

The 41<sup>st</sup> chapter of 115 verses is the *yugapurāṇa* also referred to as *skāndapurāṇa* in some Mss with no verifiable relation to the famous *Skāndapurāṇa* of the same name with 84,000 verses. This chapter is of historical importance as noted by Mankad<sup>23</sup> and Mitchiner<sup>24</sup> among a few others. YP narrates briefly the story of attack of Śakas (Scythians) on the Magadha Kingdom in an attempt to characterize the classical four *yugas* in a fashion different from mainstream Purāṇa texts. Mitchiner has prepared a critical edition of YP chapter from out of a collection of VGS manuscripts several of which are in our database also. He dates the contents of the YP chapter to a period before 25 BCE. He argues in the introduction to his book that YP is an integral part of an ancient astral text that he denotes as *Gārgīya-jyotiṣa* (GJ) belonging to the same period as above. While the dating of YP based solely on external evidences may be reasonable, considering it to be an integral part of the astronomical tradition of the VG-school does not stand scrutiny. The major inconsistency is about the absence of *yugapurāṇa* in the *aṅgasamuddeśa* chapter but existence of a text called YP as a section between the *tulākośa* and

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<sup>22</sup> जगद्विधात्रे तमसान्निहन्त्रे गोप्त्रे प्रजानां फलसम्प्रदात्रे । मन्त्रेक्षणस्रोतसि भावकर्त्रे तस्मै नमो धीविधये सवित्रे ॥

<sup>23</sup> *Puranik Chronology*, D.R. Mankad, Gangajala Prakashan, Anand, 1951.

<sup>24</sup> *Yuga Purāṇa*, J.E. Mitchiner, The Asiatic Society, Kolkata, 1986.

*sarvabhūtaruta* chapters which are specifically authenticated in the list of contents. Mitchiner's interpretation of the phrase *bhavaśṛṅgī*, between the above two *aṅgas*, as *worldly affairs* and hence as a reference to YP is not convincing. There is no astral portent or event, or passing information in YP that has any type of link with other chapters. The word *yuga*, has many popular connotations but in VGS *yuga* is used in the sense of Vedic five-year cycle, the eclipse cycle (*Rāhu yuga*) and the Jupiter cycle of 12 years (*Bṛhaspati yuga*). The meaning of the word *yuga* in YP is different as it attempts to relate the longer Purāṇic *Kṛta*, *Treta*, *Dvāpara* and *Kali yuga* concepts to a historical socio-political upheaval *circa* 200 BCE.

Varāhamihira in BS, as pointed out previously, follows older traditions closely. A comparison between BS and VGJ brings out this fact. VM includes a chapter each on *Saptaṛṣicāra* and *Agastyacāra* that is the movement of the stars of constellation U.Major and of star Canopus, knowing well that these celestial bodies are not planets. VM categorically states that *Saptaṛṣicāra* is as per Vṛddha-Garga and explains the artifice of linking the Śaka Era with the time of MB when *saptaṛṣi* constellation was with star *maghā* (Regulus). Bhaṭṭotpala in his commentary quotes VG and Kaśyapa to highlight the more ancient nature of this tradition. Many of the earlier Purāṇas such as the Brahmāṇḍa, Vāyu, Matsya texts support this method of linking MB, Kaliyuga, and genealogy of Indian Kings *c* 600 BC onwards. This theory of movement of *saptaṛṣi* was an attempt by VG to provide a temporal link between King Parīkṣit of MB and the Nanda Kingdom of Pāṭalīputra. This was done by starting an era supposedly dependent on the station of the Seven Sages for 100 years with each *nakṣatra*. Here we are not concerned with the correctness or otherwise of this artifice. However, it should be noted that the YP text is also an attempt to create a link between MB and the Magadha Kingdom of a later period, but without any astral reckoning of the type in BS and the original Purāṇas. In the VGJ manuscripts, although not listed in the *aṅgasamuddeśa*, a chapter on *agastyacāra* which originated due to Parāśara as per BS and Bhaṭṭotpala is available. A comparison shows that all the first 24 chapters of BS are closely reflected in the Mss of VGJ except for the *saptaṛṣicāra*, which appears to have been substituted by YP. Thus, there is a strong case to treat YP as not integral to the most ancient Vṛddha-gārgīya or Gārgīya. Inclusion of contents not intended by the original author is a pointer to a relatively later date for our *samhitā*-type assembled manuscripts (not to their content) in comparison with the text of VG quoted by authors such as VM and Bhaṭṭotpala. This also indicates the possibility of more layers added over the original prose work by students and followers of VG making

the text to be known as *Vṛddha-gārgīya*, which otherwise would have had a more compact structure before the *graha-karma-guṇa* on week days and the *yugapurāṇa* with no astronomy got added.

There are still other differences and peculiarities between the stated contents and the actual material in the manuscripts. In a few Mss a stray word *that reads like kendra* without any contextual need or meaning appears in the colophon of a short section in prose that has questions about the nearness of moon with the *nakṣatras*. This word supposedly of non-Sanskrit origin, does not figure within the body of the concerned chapter or elsewhere in any of the manuscripts. The corresponding word for the listed content from the second chapter is *nakṣatrendusamam*.... The language of VGS is not refined classical Sanskrit. The compound word *nakṣatrendu-samam* that sounds unusual seems to have been read by the early copyist as *nakṣatrendra-samam* and further mechanically altered to *nakṣatra-kendra-bham*<sup>25</sup>, since in his time the word *kendra* was popular in Hindu astronomy and astrology. The alleged existence of this spurious word *kendra* of Greek origin in VGJ, as claimed in the introductory note on Mss U1 of Cambridge University, U.K. has no basis.

## Title of the Text

The attribution of authorship in the Mss is too varied as already noted. This brings up the difficult question of what should be the appropriate title for the natural science content in the Mss which reflects cultural history in a fair and reasonable framework of Vedic, Vedāṅga and Siddhānta astronomy. The natural choices are between *Vṛddhagārgīya Jyotiṣa* and *Gārgīya Jyotiṣa*. Mitchiner in his work on YP (f.n. 23) argues for the text to be called as *Gārgīya-jyotiṣa* in the name of Garga but not in the name of Vṛddha-Garga. His main argument is that whereas VM and Utpala quote both VG and Garga, the Mss under study contain only the Garga quotes of the above famous authors. But a careful reading of the Mss shows that such conclusion is not correct. References to Garga are more numerous than to VG, but many quotations attributed to VG by Utpala, Ballālasena and Nīlakaṇṭha are

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<sup>25</sup> नक्षत्रेन्दुसमं->नक्षत्रेन्द्रसमं->नक्षत्रकेंद्रसमं->नक्षत्रकेंद्रभं

found in our manuscripts. A complete list of these will be presented later. Also, there is no strong evidence to indicate that the prefix *Vṛddha-* might have been added to the colophons at a later period. In fact, a few of the starting verses in the chapter *aṅgasamuddeśa* of our text, are found in the text quoted by Utpala in his commentary of BS (Ch.1 v.11) where the name of VG occurs as the speaker of the subject. In two chapters towards the end of the Mss the colophons read *Vṛddha-gārgīye-tantre*. Thus, it is likely the text has come down to us with different names in different places. As with any *samhitā* text, VGS is expected to contain most ancient, later and modern material. This is indeed the case. A simple count shows that the name of VG occurs 13 times, Kroṣṭuki 18 times and Garga 54 times in the text proper not including the colophons. Kroṣṭuki is clearly said to be the eldest son of Vṛddha-Garga in the chapter on *Rāhucarita*<sup>26</sup>. The name Garga theoretically can refer to another person of the same name of a later period; but equally well at least in a few cases Garga may be a short form reference to VG only. The principle of minimum assumption would dictate us to consider the archaic prose parts of the Mss to be the earliest teachings of the VG School, where the name of Vṛddha-Garga as the teacher is explicit. This over a few centuries could have accumulated further contemporaneous material in verses, added by a later Garga, to be reckoned as *gārgya*, *gārgīya* or *vṛddha-gārgīya*. Hence, our preference is to name the present text as *Vṛddha-gārgīya-jyotiṣa* (VGJ).

It is not necessary to insist that there must have been 64 *aṅgas* from the very beginning in the VGJ text to be considered it to be complete. The MB quote (f.n.9) refers to Gārgya, the son of Vṛddha-Garga (f.n.8), who inherited the subject and developed it further. The original astronomical content was perhaps limited to 24 primary sections into which more chapters were added later. The 40 secondary sections are not all astronomical. It is likely several of these are from the popular *64-kalā* list similar to the ones available in Buddhist texts and added to the Mss at a later period by successors of VG<sup>27</sup>.

## Chronological Markers

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<sup>26</sup> अथ भगवन्तं अमिततपसं आश्रमस्थमासीनं महर्षिपरिवृतं वृद्धगर्गं ज्येष्ठः पुत्रः क्रोष्टुकिर्नाम संशयं पप्रच्छ ॥

<sup>27</sup> *The Kalās*, Venkatasubbiah, A., The Vasanta Press, Madras, 1911.

VGJ has two specific sections stating the seasonal position of Sun in particular *nakṣatra* segments. The first is the *ādityacāra* in which the six seasons start with *śiśira ṛtu* extending from the first point of *dhaniṣṭhā* to middle of *revatī*. Each of the other five seasons sequentially span four-and-half *nakṣatra* segments. This is same as the six season solar zodiac of Parāśara that can be shown to have been valid for 1350-1130 BCE<sup>28</sup>. VGJ states that Sun not reaching star *dhaniṣṭhā* at winter solstice is a bad omen. VG should have been obviously aware of the traditional Vedic year starting with the winter solstice. It is quite likely during his period the *dhaniṣṭha* condition was not valid. Besides the versified version of the seasonal zodiac of Parāśara, towards the latter half of VGJ appears another chapter titled *ṛtusvabhāva* (nature of seasons). This chapter states the names of the twelve months (*madhu, mādhava* etc.) in the six seasons and also the *nakṣatra* expected to be transited by Sun. One can easily make out that this second set of solar stations is different from the first one. Taking into consideration effect of precession the stated season description would be valid for 800-300 BCE. This figure is too wide as a date, but considering the vagueness of the text, at present this is the best possible approximation. Significantly as in a long held tradition, both the above chapters (*ādityacāra; ṛtusvabhāva*) are included in the original promised contents of the *aṅgasamuddeśa* chapter and hence are integral to the tradition of VGJ. Thus, it would be reasonable to take the school of VG to have branched *c* 500 BCE out of the then existing discipline of Natural Sciences including astronomy. In *ketucāra*, the chapter on comets, it is found that VGJ lists *gadāketu* in detail, which is an addition to the list of twenty-six comets of Parāśara. Similarly, VGJ has long chapters on Moon, definition of the synodic month, time spent by moon with each *nakṣatra*, explanation of *Tithi* and other astronomical topics not explained or ascribed by tradition to *Parāśara*. VG extols importance of both *gaṇita* (computation) and *darśana* (observation) as important to find the conjunction of moon and the stars<sup>29</sup>, whereas Parāśara remained mainly observational. This again points in the direction of the original VGJ being later than the *Parāśara Tantra* but antecedent to the *Garga/Gārgya Samhitā* (P3, B2) which, in turn precedes the better known *Brhat Samhitā* by two to three centuries.

केतुमाला

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<sup>28</sup> Iyengar, R.N., Parāśara's six season solar zodiac and heliacal visibility of star Agastya in 1350-1130 BCE. Indian Journal of History of Science, 49.3 (2014); pp. 223-238.

<sup>29</sup> न हि सर्वत्र गणितं न हि सर्वत्र दर्शनम् । दर्शनं गणितं चैव युगपद्योगसाधकम् ॥ (VGJ Ch. चन्द्रमार्गः)

## Provenance

As far as Garga or Vṛddha-Garga traditions about astronomy, astrology and meteorology are concerned, these are fairly wide spread all over India. However, it may be noted here that the GS and VGS manuscripts from South India are not same as the astronomical VGJ that is being studied here. For understanding pre-siddhāntic astronomy, the collected Mss that are about 500 years old are valuable in pointing out the beginning of VG-School to the middle of the first millennium BCE. The place of origin of this school must have been closely connected with a Garga, who later became famous as Vṛddha-Garga. Holy places, villages, temples, hermitages in the name of Sage Garga are found all over India. But, the ancient textual information available to us from the MB<sup>30</sup>, says that VG was living on the flood plains of River Sarasvatī, the place being known as *gargasrota*. A forest habitat by name Gargāraṇya finds mention in several Purāṇas as the hermitage of Garga. A bilingual inscription of 1501 CE mentions Gargāraṇya as Gāguraṇa<sup>31</sup> which is now identifiable as Gagron (24.63° N, 76.18° E) famous for its water fort in the Jhalawar district of Rajasthan. Thus, based on available geographical evidence one can take the school of VGJ to have originated in the present day Rajasthan region. About the mode of transmission of the VGJ tradition we can only speculate that this must have been oral over a period of time, like with Vedic texts. It is likely the observational approach of the sky and physical happenings on earth was known by the technical term *Tantra*, or procedure. In the second chapter the word *graha-tantram* is used in the sense of a procedure for characterizing planets, but *graha* are not just five but one-hundred and eight as explained in the chapter *ketumālā* (Comet-strand). This *tantra* was not just limited to physical observation

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<sup>30</sup> गर्गस्रोतो महातीर्थमाजगामैककुण्डली। यत्र गर्गेण वृद्धेन तपसा भावितात्मना ॥

कालज्ञानगतिश्चैव ज्योतिषां च व्यतिक्रमः। उत्पाता दारुणाश्चैव शुभाश्च जनमेजय ॥

सरस्वत्याः शुभे तीर्थे विहिता वै महात्मना। तस्य नाम्ना च तत्तीर्थं गर्गस्रोत इति स्मृतम् ॥

तत्र गर्गं महाभागमृषयः सुव्रता नृप। उपासां चक्रिरे नित्यं कालज्ञानं प्रति प्रभो ॥ (MB Śalya Parvan 36.14-17)

<sup>31</sup> Barnett, L.D. Inscription of Sthiratatva at Khajuri, Bull. School of Oriental Studies, Univ. of London, V.3, No.4,1925, pp.669-74.

but included Vedic mysticism, rituals, divination, and when necessary *śānti-karma* (appeasement rites) for the benefit of the community.

## Format of Presentation

The present effort, is to prepare a working edition of the text of VGJ to bring out the outlines of astral science that was taught by VG to his early followers as one of the *vedāṅga* of the Vedas before CE. The presentation follows the collected manuscripts closely, pointing out variant readings in the foot notes. The text is organized chapter wise, following the topic as indicated in the Mss colophons when they match with the contents. The chapter titles are given by us for easy reading. It is pointed out here that the colophons in the Mss are neither organized uniformly nor numbered properly. In some places these are based on the *aṅga* classification subdivided into further *adhyāya* (chapter) that seems to be the original pattern. However, in several colophons no such principle is detectable. An additional difficulty is the variation in the colophon readings. In the edited text no end colophons are shown except for the chapter numbers. But all the hundred and odd Mss colophons will be presented with variant readings as an Appendix, in the hope that some pattern may emerge in the way copyists from different places have attributed the authorship of the text. The prose text, wherever it appears, is organized into numbered paragraphs followed or preceded by verses sequentially within every chapter. VGJ being a technical text transmitted from the BCE period with additions and modifications, we have not attempted any emendation of the language. In places where the meaning is not clear and where an alternate better version is available from a well-known past author, we have used the latter in the main text giving all variants in the foot notes. When such preferred alternates are not available and the overall meaning is clear, we have added a letter or a word mainly to overcome a scribal mistake or as a help in punctuation of a long prose text. Such editorial interventions are always prominently shown within square brackets. In a few places, VG text as attested by ancient authors, is added for sake of completeness and for comparative study. Such parts are preceded by editorial statements in the main text on the sources.

The work will be presented serially in parts, following the order of the topics in the Mss even though this is not the natural order in which the VGJ manuscript tradition has achieved its present size. It may be highlighted here that a first reading of the Mss shows that the prose section titled *Mahā-salila*, with a long list of questions

and answers forms the earliest part of the VG tradition. The prose part distributed over the text provides a conceptual frame work of appreciating the evolution of Indian astronomy from the early Vedic cosmological questions, legends, speculations and observations leading to counting, recognition of pattern through numbers and *Gaṇita* over time. Apart from collating the manuscripts to arrive at a readable text, the aim is to bring out a coherent picture of the scientific contributions of VG who is hailed as one of the founders of Hindu astronomy leading to the various mathematical *siddhāntas*. Hence it would be necessary to critically compare VGJ with BCE texts such as the *Parāśara-tantra*, the *Vedāṅga-jyotiṣa* of Lagadha, the early *Purāṇas* and also the astronomical texts of the Jaina and Bauddha traditions.

In what follows, the first three chapters of the *Vṛddhagārgīya Jyotiṣa* are presented with a brief summary covering only such points that are essential to the narrative.





## ॥ वृद्धगार्गीयज्योतिषम् ॥

॥ श्रीगणेशाय नमः ॥<sup>1</sup>

जगद्विधात्रे तमसां निहन्त्रे गोप्त्रे प्रजानां फलसंप्रदात्रे ।  
मन्त्रे<sup>2</sup>क्षण-स्रोतसि<sup>3</sup> भावकर्त्रे<sup>4</sup> तस्मै नमो धीविद्यये<sup>5</sup> सवित्रे ॥

१ ॥ सांवत्सरनिर्देशः<sup>6</sup> ॥

अथातः संवत्सरनिर्देशं व्याख्यास्यामः ।

तत्र संवत्सरो नाम सूर्या-चन्द्रमसोः<sup>7</sup> ग्रह-नक्षत्र-ताराणां<sup>8</sup> च उदयास्तमय-कालाभि<sup>9</sup>-निर्वर्तकम्<sup>10</sup> । निमेष-क्षण-काष्ठादि-त्रुटि-लव-मुहूर्ताहोरात्र-पक्ष-मासर्त्यन-विषुवत् इत्येवमादि-प्रवृत्तस्य भूत-भव्य-भविष्यत्-कालाभि<sup>11</sup>-निर्वर्तकस्य<sup>12</sup> जरायुज-अण्डज-स्वेदज-उद्भिज्ज-उपपत्तिकस्य चतुर्विधस्य भूतग्रामस्य जन्मनिधनकर्मगुणाभि<sup>13</sup>-निर्वर्तकस्य<sup>14</sup> शीतोष्ण-वर्षानिलानलाभि-धानकस्य<sup>15</sup> साङ्ख्य-योग-गतगन्तव्यस्य [वेत्ता] लक्षणविदितसंवत्सर-अतीत<sup>16</sup>-उपस्थित-वर्तमानेषु अर्थेषु आदेशान्<sup>17</sup> अधिकुरुते इत्यधिकारादपि सांवत्सरः<sup>18</sup> ॥ १ ॥

<sup>1</sup> B1 नमः श्रीसूर्याय; K1 *ex* गुरुनृसिंहो विजयतेतरां

<sup>2</sup> A1 गात्रे; A2, B1, F1, P1 गंत्रे

<sup>3</sup> F1 -स्रोतरि

<sup>4</sup> F1 नभावकर्त्रे; B1 तावकर्त्रे

<sup>5</sup> F1 धीविद्यये

<sup>6</sup> B1 संवत्सरनिर्देशः

<sup>7</sup> F1 चेदगमसो

<sup>8</sup> A2, K1, P2 -वाराणां; P1 -चाराणां

<sup>9</sup> *em*; *all*-काला

<sup>10</sup> A1, B1, F1, P2 -निर्वर्तकं; K1 -निर्वर्तकं

<sup>11</sup> B1 -काला

<sup>12</sup> A1, A2, B1 -निर्वर्तकस्य; F1 -निवृत्तकस्य

<sup>13</sup> B1 जन्ममरणाभि; F1 जन्मनिबन्दनकर्मगुणाभि

<sup>14</sup> A2 -निबन्दनस्य; B1 -निवर्तकस्य; P2 -निवृत्तिकस्य;

F1 -निदत्तकस्य

<sup>15</sup> F1 -घातकस्य

<sup>16</sup> A2, P1 अतीव

<sup>17</sup> A1, B1, F1, K1 देशान्

<sup>18</sup> F1, P1, P2 संवत्सरः

तथा लौकिक-वैदिक-आध्यात्मिकानामर्थानां कर्मगुणानां प्रयोग<sup>1</sup>कालसिद्ध्यर्थं तिथि-नक्षत्र-मुहूर्त-करणानां च प्रयोक्ता । तथा संवत्सर-परिवत्सर-इदावत्सर-अनुवत्सर-इद्वत्सराणां पञ्चानां वत्सराणां<sup>2</sup> लक्षणाभिगमनार्थं संवत्सरज्ञानमधिकृत्य संवत्सर-परिवत्सरादीनां प्रजानां च सर्व-कार्य-क्रिया-सिद्धि-संयोजनार्थम् आदौ अभिगमनीयो भवति ॥ २ ॥

यथा<sup>3</sup> च मन्त्रः अग्निमुखमपिच<sup>4</sup> सुराणां च । तथा सांवत्सरमुखाः पार्थिवाः पार्थिवमुखाश्च प्रजाः । तस्मात् विजिगीषुणा पार्थिवेन इह च अमुत्र च श्रेयः अवाप्तुकामेन सांवत्सरः<sup>5</sup> अधिगन्तव्यः । पुरोधश्चेति ॥ ३ ॥<sup>6</sup>

पुराह्यसुरविग्रहे यदा न [अ]शक्नुवन् जेतुम् असुरान् तदा ते सुराः पितामहमधिजग्मुः । अभिगत्वा<sup>7</sup> प्रणिपत्य ऊचुः । अनेक-ऋतुलक्षणस्य<sup>8</sup> धर्मस्य कथं<sup>9</sup> नु<sup>10</sup> स्यान्नाश इति अस्मान्<sup>11</sup> व्यवपद्यस्वेति ॥ ४ ॥

ततो मुहूर्तमनुचिन्त्य ब्रह्मा सुरानब्रवीत् । गच्छध्वं बृहस्पतिमुखा देवाः शुक्रम् आर्त्विज्ये सांवत्सरिके चज्ञाने<sup>12</sup> वरयध्वम् इति । ततः ते देवा ऋक्-साम-यजु<sup>13</sup>-अथर्व-प्रवृत्तैः मन्त्रैः अभिसंस्तूय शुक्रं सर्वरत्नाधिपत्यं च सृज्य<sup>14</sup> आर्त्विज्ये सांवत्सरे च ज्ञाने अवृण्वन्<sup>15</sup> ॥ ५ ॥

<sup>1</sup> F1 यथोग

<sup>2</sup> F1 संवत्सराणां

<sup>3</sup> A1, A2, F1, P2 तथा

<sup>4</sup> F1 क्षणाभिगमनार्थं

<sup>5</sup> A1, A2, F1, P1, P2 संवत्सरः

<sup>6</sup> cf Parāśara Tantra 2.3

<sup>7</sup> irr, F1 अतिगत्य

<sup>8</sup> A1 -सृणुलक्षणस्य; U1 -ऋतुलक्षणस्य; K1 -

ऋतुलक्षणस्य; P2 -ऋतुलक्षणस्य

<sup>9</sup> A1 वर्षकथं; F1 धर्मकथनस्य

<sup>10</sup> A1, A2, B1, F1, K1, U1 तु

<sup>11</sup> K1, F1, P1, P2, A1 अस्मर

<sup>12</sup> K1 चक्राने; P1 वक्राने; A1, P2 संवक्रनै; B1 mt;

U1 संवत्सरकतौ

<sup>13</sup> irr

<sup>14</sup> irr

<sup>15</sup> F1 ज्ञातेवरा

ततः तानुवाच । सुराः! यदि ग्रहाः सर्व एव ममानुवर्तन्ते यदि च मय्यायत्तं प्रजानां शुभं भवति यदि मे यज्ञभागः स्यात्, इति च । काममेवास्मिन् ऊचुः देवाः । ततः प्रभुत्वं सर्वताराग्रहाणां<sup>1</sup> योगक्षेमं प्राधान्यं च आधाय शुक्रे सुरास्ते<sup>2</sup> तं च अवरं यज्ञभागं<sup>3</sup> कल्पयन्तः<sup>4</sup> ॥ ६ ॥

ततः प्रीतमनाः शुक्रः शान्तिं स्वस्त्ययनं बलिहोम<sup>5</sup>माङ्गल्यं प्रायश्चित्तानुकल्पकः योगक्षेमादिभिः तेजौज-बल-सत्त्व-रूप-वर्ण-द्युति-पराक्रमैः अतिवरयामासुः<sup>6</sup> देवाः । स[ह]बृहस्पतिना<sup>7</sup> ततस्ते देवाः तान् असुरान् अवजित्य च स्वर्गलोकम् उपाश्रुवुः<sup>8</sup> । एवमेव खलु पार्थिवो भवति<sup>9</sup> । तौ<sup>10</sup> सांवत्सर-पुरोहितौ आसाद्य पृथिव्यां शाश्वतराज्यम्<sup>11</sup> अवाप्नुवन्ते<sup>12</sup> इति ॥ ७ ॥

भवति चात्र ।

<sup>13</sup>वनं समाश्रिता येऽपि निर्धना निष्परिग्रहाः । अपि ते परिपृच्छन्ति ज्योतिषां ज्ञानकोविदम्<sup>14</sup> ॥ ८ ॥

अप्रदीपा यथा रात्रिरनादित्यं यथा नभः । तथासांवत्सरो राजा भ्रमत्यन्ध इवाध्वनि<sup>15</sup> ॥ ९ ॥

मुहूर्ततिथिनक्षत्ररहतवश्यायनादि च । पर्वाण्ये<sup>16</sup>वाकुलानि स्युर्न स्यात्सांवत्सरो यदि ॥ १० ॥

तस्माद्राज्ञाधिगन्तव्यो विद्वान् सांवत्सरोऽग्रणीः । जयं यशः श्रियं भोगान् श्रेयश्च महदीप्सता<sup>17</sup> ॥ ११ ॥

<sup>1</sup> *em*; A1, A2, K1, P1, P2, U1 प्रभुत्वे सर्वताराग्रहे त्वं; B1 प्रभुत्वे सर्वताराग्रहत्वं

<sup>2</sup> A2, P1 सुरास्ते; K1 सुरश्छे

<sup>3</sup> A1, B1, F1, P2, U1 चरमज्भागं

<sup>4</sup> A1, A2, F1, P1, P2 अकल्पयन्तः; B1 *snC*; U1 अकल्पयज्ञः

<sup>5</sup> B1 चत्विहमेव

<sup>6</sup> A1, A2, P1, U1 अतिवरयामासुः; K1, B1 अतिचरयामासुः

<sup>7</sup> *irr all* सबृहस्पतिना

<sup>8</sup> *irr*; B1 अपाश्रुवुः

<sup>9</sup> U1 *mt*

<sup>10</sup> A1, A2, B1, K1, P1, P2 *mt*

<sup>11</sup> B1 सारस्वतराज्यम्

<sup>12</sup> P2 आप्नुवन्ति

<sup>13</sup> Verses 8-12 are found in BS (2.7-11) as original to VM with minor variations. The oft-quoted BS (2.14) ह्येच्छा हि यवनास्तेषु sometimes mistakenly ascribed to Garga is not found in any VGJ Mss.

<sup>14</sup> *em*: A1, A2, B1, K1, P1, P2, U1 ज्ञानकोविदां; F1 शास्त्रकोविदां

<sup>15</sup> B1 इवात्मनि; F1 इवाद्युनि

<sup>16</sup> A2, U1 सर्वाण्ये

<sup>17</sup> F1 महदीक्षिता

नासांवत्सरके देशे वस्तव्यं भूतिमिच्छता । चक्षुर्भूतो हि यत्रैष पापं तत्र न विद्यते ॥ १२ ॥

<sup>1</sup>[भास्करयोगिकृतायाम् उत्पलपरिमलारव्यबृहत्संहिताव्याख्यायां सांवत्सरसूत्राध्याये उद्धृतानि वृद्धगर्गवचनानि ।]

तथा च वृद्धगर्गः ।

अथ दैवज्ञवरणं व्याख्यास्यामः । राज्ञः अभिषेकात् पूर्वमेव कुर्यात् । कुलीनम् आचारवन्तम् अविकलावयवम् अनसूयकं प्रियदर्शनं स्वदेशजातं व्रतोपवास-निरतं परीक्ष्य कुर्यात् । स्वतन्त्राङ्गकुशलं स्कन्धत्रयावगतबुद्धिं ग्रहाणाम् उदयास्तमय-कारणाभिज्ञं सूर्याचन्द्रमसोः प्रग्रहण-मोक्ष-विमर्द-कारणाभिज्ञं षोडश-कर्माध्याय-कुशलं सर्वेषां प्रसादबुद्धिं परीक्ष्य पूर्वपक्षं कुर्यात् ॥ १३ ॥

राजा शुचिः स्वगृहे नानालङ्कारालङ्कृते मण्डपे उपोषितं कृतस्नानं प्राञ्जुखमासीनं दैवज्ञम् आसाद्य वस्त्र-माल्यानुलेपनैः नानाभरणैः सौवर्णैः सम्पूज्य दक्षिणहस्तम् आलम्ब्य मन्त्रम् उच्चारयेत् 'हंसोऽहं लोकपालो भवामि । यूयमपि तथा प्रभावाः शुभवक्तारो भवन्तु' इति त्रिः उच्चार्य दैवज्ञं विसर्जयेत् । अनेनैव पुरोहितवरणं विज्ञायते ॥ १४ ॥

आचार्यः शुचिर्भूत्वा दैवज्ञावेदितकाले राजानम् अभिषेचयेत् । ततो दैवज्ञपुरोहितयोः वित्तानुसारिणीं दक्षिणां दत्त्वा वास्तु-वाहन-शिबिका-च्छत्र-चामरादिभिः सम्पूजयेत् । अनेनैव सांवत्सरिको जन्मनक्षत्रे आयुःसूत्रं बध्नीयात् येन यस्यायुः प्रबद्धम् । स तस्य गुरुरेव भवति । तस्मात् तं नावमन्येत । तस्य वचनं शुभकरं भवति । तस्य क्रियानुपपत्तौ पुरोहितः तदनुमतो भूत्वा उक्तेनैव कुर्यात् 'आयुष्यम् आरोग्यं साम्राज्यं च भवति' इति ॥ १५ ॥

[प्रथमोऽध्यायः]

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<sup>1</sup> Extra text of VG quoted by Bhāskara

Yogi in his commentary on BS

## २ ॥ अङ्गसमुद्देशः<sup>1</sup> ॥

<sup>2</sup>देवर्षिश्रेष्ठमासीनमाश्रमे देवदर्शनम् । वृद्धगर्गम्<sup>3</sup> ऋषिश्रेष्ठं मुनिभिः परिवारितम् ॥ १ ॥  
 अभिगम्योपसङ्गृह्य विनयात् संशितव्रतः । क्रोष्टुकिः परिपप्रच्छ प्रश्नं लोकहितैषया ॥ २ ॥  
 भगवांश्च पुराणज्ञ आत्मज्ञानरहस्यवित् । पुराणं ज्योतिषं चापि ग्रहाणां चरितार्थवित् ॥ ३ ॥  
 तदिच्छामो वयं त्वत्तो ग्रहतन्त्रं सुविस्तृतम्<sup>4</sup> । श्रोतुं श्रुतवतां श्रेष्ठ परं कौतूहलं हि नः ॥ ४ ॥  
 ज्योतिषज्ञानमुत्पन्नं<sup>5</sup> कथमेतदनुत्तमम् । केन वा पूर्वतः<sup>6</sup> प्रोक्तमृषिणा दैवतेन वा ॥ ५ ॥  
 कस्माच्च चतुःषष्ट्यङ्गं<sup>7</sup> कालज्ञानमिहोच्यते । नामतश्चानुपूर्व्यां च कान्यङ्गान्यस्य चैव हि ॥ ६ ॥  
 एवमुक्तस्तु मुनिना<sup>8</sup> वृद्धगर्गो<sup>9</sup> महायशाः । प्रोवाच तानृषीन् सर्वान्<sup>10</sup> क्रोष्टुकिप्रमुखस्थितान् ॥ ७ ॥  
 श्रूयतां स्वर्गमायुष्यमृतं पुण्यं यशस्करम् । ज्ञान<sup>11</sup>विज्ञानसम्पन्नं ज्योतिषां ज्ञानमुत्तमम् ॥ ८ ॥  
 पूर्वोत्पन्नेषु देवेषु<sup>12</sup> प्रजानिर्माण-कर्तृषु<sup>13</sup> । पश्चादुत्पद्यते चैव नक्षत्रग्रहसञ्ज्ञितम् ॥ ९ ॥  
 सुरासुरान्<sup>14</sup> प्रजाश्चापि सृष्ट्वा लोकहिते रतः । द्विधा स्वम्भूरात्मानं कृत्वा सोमार्कसम्मितम्<sup>15</sup> ॥ १० ॥  
 द्वीपानां द्योतनार्थं च हितार्थं चापि देहिनाम् । कालस्य च प्रसिद्ध्यर्थं क्रियाणां<sup>16</sup> चापि सिद्ध्यै ॥ ११ ॥  
 प्रदक्षिणातीर्णं सततं<sup>17</sup> सनक्षत्रौ महौजसा । परिगच्छतः शैलेन्द्रं सरत्नं वायुवेगिना ॥ १२ ॥

<sup>1</sup> A1, U1 समुद्देशः; K1 समुद्दिशः

<sup>2</sup> In BS (Ch 1) of UV (1.11) these preliminary verses appear in slightly different fashion. Notably the phrases आत्मज्ञानरहस्यवित् & ग्रहतन्त्रं (v 3 & 4) are not found in UV. Some of these verses are in UP (2.12) also.

<sup>3</sup> B1, K1 वृद्धगर्गः; A1, A2, F1, P1, P2 वृद्धगर्गः; U1 वृद्धं गर्गं

<sup>4</sup> F1, U1 सुविस्तृतम्

<sup>5</sup> F1 ज्योतिज्ञानसमुत्पन्नं; U1 ज्योतिर्ज्ञानसमुत्पन्नं

<sup>6</sup> K1, U1 पूर्वतत्

<sup>7</sup> U1 चतुःषष्ट्यङ्गं

<sup>8</sup> em as in UV; all विधिना

<sup>9</sup> B1 वृद्धगर्गो

<sup>10</sup> K1 सर्वान्; A1, F1, U1 गर्गः

<sup>11</sup> F1 ज्ञान

<sup>12</sup> A1, A2, P1, P2, U1 देशेषु, F1 पूर्वोत्पन्नेषु; K1 देवेषु

<sup>13</sup> K1 कर्मसु

<sup>14</sup> em; all सुरासुराः

<sup>15</sup> F1 सोगवितमिता

<sup>16</sup> B1 त्रयाणां

<sup>17</sup> U1 संततं

तस्यामपि च पक्षाभ्यां तेजस्वी ज्योतिषां वरः। प्रभुः प्रतिष्ठ<sup>1</sup>प्रभवः प्रधानस्थोऽपि<sup>2</sup> भास्करः ॥ १३ ॥  
 सर्वस्येति<sup>3</sup> पुरोगन्ता<sup>4</sup> कालज्ञानसुदर्शकः<sup>5</sup> । सकालः प्रसृतेनापि<sup>6</sup> कालज्ञानं च तन्मनः<sup>7</sup> ॥ १४ ॥  
 स मेरुमुक्तो<sup>8</sup> दिवसमितश्चेतश्च शर्वरीम्<sup>9</sup> । एतेन कुरुते भानुः पर्यायेण यथाक्रमम्<sup>10</sup> ॥ १५ ॥  
 कालज्ञानमिदं पुण्यमाद्यं हि ज्ञानमुत्तमम् । ब्रह्मणा सृजता वेदानतः<sup>11</sup> सृष्टं महात्मना ॥ १६ ॥  
 यदङ्गमाद्यं<sup>12</sup> वेदानां क्रियाणां च प्रमाणकम् । ज्योतिषं सर्ववेदानामतो वेद्यं<sup>13</sup> विदुर्बुधाः ॥ १७ ॥  
 ज्योतिश्चक्रे हि सर्वस्य लोकस्योक्तं शुभाशुभम् । स वेदस्तस्य नयने स वेत्ति<sup>14</sup> परमां गतिम्<sup>15</sup> ॥ १८ ॥  
 चन्द्रनक्षत्रताराणां ग्रहाणां भास्करस्य च । <sup>16</sup> ज्योतिषामपि यज्ज्योतिर्ज्योतिषामपि पावनम् ॥ १९ ॥  
 तद्भावभाविनं<sup>17</sup> युक्तं तं देवा ब्राह्मणं विदुः । तस्मात् पूर्वमधीयेत ज्योतिषामयनं द्विजः ॥ २० ॥  
 धर्मसूत्रं<sup>18</sup> ततः पश्चाद्यज्ञकर्मविधिक्रियाः । यज्ञाद्यायुष्य<sup>19</sup> होमाश्च मन्त्रोपनयनानि च ॥ २१ ॥  
 सान्नाय्यं<sup>20</sup> पौर्णमास्यं च पितृदैवततर्पणम्<sup>21</sup> । सर्वारम्भाश्च जगतो<sup>22</sup> लोके च विविधाः क्रियाः ॥ २२ ॥  
 न ज्योतिषं विना<sup>23</sup> तासां प्रवृत्तिरुपलभ्यते । आप्यायनार्थं देवानां यज्ञाः प्रोक्ताः क्रियाश्रयाः<sup>24</sup> ॥ २३ ॥

<sup>1</sup> A2, B1, K1 प्रविष्टः; P2 प्रतिष्ठा

<sup>2</sup> A1, F1 प्रज्ञानस्तोपि

<sup>3</sup> A1, A2, F1, K1, P1, P2 सर्वस्य त्वं

<sup>4</sup> U1 पुरेगन्ता

<sup>5</sup> A1, A2, F1, P2, U1 सुदर्शनः; K1 सुवर्तकः, K1 सुवर्तकः B1 सुवर्षुकः

<sup>6</sup> K1 सकालस्य धृतेनापि; B1 सकालाय धृतेनापि; U1 - प्रच्छृतेनापि

<sup>7</sup> A1, A2, B1, K1, P1, P2, U1 तन्मनः

<sup>8</sup> A2 सुमेरुमुक्तो, K1 समेरुमुक्ते

<sup>9</sup> em; all शर्वरी

<sup>10</sup> F1 यथाश्रुतम्

<sup>11</sup> A1 वेदानततः; U1 वेदानेतत्

<sup>12</sup> B1, U1 पदांगमाद्यं; A2, K1, P1, P2 यदांगमाद्यं

<sup>13</sup> em as in UV वेद्यं; all वेदं

<sup>14</sup> K1 चेति

<sup>15</sup> B1, K2, U1 परमा गतिः

<sup>16</sup> v 19.b em as in UV; all ज्योतिषामयनज्ञो हि ज्योतिषामयनात् परम्

<sup>17</sup> em as in UV; A1, A2, F1, K1, P1, P2, U1 उद्भावभावितं; B1 उद्भावभाविसं

<sup>18</sup> em as in UV; all धर्मस्तत्र

<sup>19</sup> F1 यज्ञात्पूर्वश्च

<sup>20</sup> em as in UV Mss. M2602; all साम्राज्यं

<sup>21</sup> em as in UV; A1, A2, F1, K1, P1, P2 ज्योतिषामयनात् परं; U1 ज्योतिषामयनात्मकं; B1 snc

<sup>22</sup> em as in UV; all भागतो

<sup>23</sup> em as in UV; all न ह्येते ज्योतिषां

<sup>24</sup> em as in UV; all क्रियाश्च याः

यज्ञार्थमपि च प्रोक्ताः<sup>1</sup> स्वयं वेदाः स्वयम्भुवा । न ते च सम्प्रवर्तन्ते<sup>2</sup> कालाज्ञानात् कथञ्चन ॥ २४ ॥  
यज्ञक्रियाग्निहोत्रं च क्रियाश्चान्या जगद्धिताः । तस्मात् पुण्यं समं<sup>3</sup> वेदैर्यज्ञचक्षुः<sup>4</sup> सनातनम् ॥ २५ ॥  
स्वर्गमध्येमव्यग्रैर्ब्राह्मणैः संशितव्रतैः<sup>5</sup> । तत्र कालप्रसिद्ध्यर्थं राशयः पूर्वमीरिताः ॥ २६ ॥  
अहोरात्रविभागश्च तिथीनां च क्रियाविधिः । सोमसूर्यविलग्नानामुक्षाणां च विनिश्चयः ॥ २७ ॥  
आधानयोगभोगाश्च<sup>6</sup> विसर्गश्चार्कसोमयोः । दिनर्तुपक्षमासानां चन्द्रार्काणाञ्च निश्चयः ॥ २८ ॥  
कर्मोपभोगमानानां लेख्यप्रश्नविधिस्तथा<sup>7</sup> । एवमाद्या बहुविधाः क्रिया ज्योतिषसंश्रिताः<sup>8</sup> ॥ २९ ॥  
<sup>9</sup>स्वयं स्वयम्भुवा सृष्टं चक्षुर्भूतं मखार्थिना<sup>10</sup> । वेदाङ्गं<sup>11</sup> ज्योतिषं ब्रह्म समं वेदैर्विनिर्मितम् ॥ ३० ॥  
मया स्वयम्भुवः प्राप्तं क्रियाकालप्रसाधकम् । वेदानामुत्तमं शास्त्रं त्रैलोक्यहितकारकम्<sup>12</sup> ॥ ३१ ॥  
मत्तश्चान्योर्षयः प्राप्ताः पारम्पर्येण पुष्कलम् । तैः तपोदृष्टिभिर्भूयो<sup>13</sup> ग्रन्थैः स्वैः स्वैरुदाहृतम् ॥ ३२ ॥  
यथैव वेदस्याङ्गानि षडुक्तानि मनीषिभिः । चतुःषष्टिस्तथाङ्गानि ज्योतिषस्य विदुर्बुधाः ॥ ३३ ॥  
योगक्षेमप्रसिद्ध्यर्थं प्रजानां च हिताहितम्<sup>14</sup> । सम्यग्विजयमारोग्यं क्षेमं वैरविनिश्चयः ॥ ३४ ॥  
राज्ञां हितार्थं नियतं चतुःषष्ट्यङ्गं<sup>15</sup>मुत्तमम् । ज्योतिर्ज्ञानमयं कुर्वन् कालज्ञानोपबृंहितम् ॥ ३५ ॥  
तस्मात् कुलीनो मतिमानव्यङ्गोऽव्यसनी शुचिः । कृत्वोपनयनं<sup>16</sup> वेदचीर्णो वेदव्रतो<sup>17</sup> द्विजः ॥ ३६ ॥  
कालज्ञानमधीत्येह गणितेनोपपादयेत् । न हि सङ्ख्याविहीनस्य भवत्येतद्विबोधकम् ॥ ३७ ॥

<sup>1</sup> A1, A2, K1, U1 प्रोक्ता; P2 प्रोक्तः

<sup>2</sup> *em* as in UV; A1, A2, B1, P1, P2  
तेचरत्नेप्रवर्तते; K1 चरत्नेप्रवर्तते; U1 तेचप्रवर्तते

<sup>3</sup> A1, A2, P2, U1 तत् पुण्यं च समं; B1 *snc*

<sup>4</sup> F1 यदब्रह्म; U1 वेदचक्षुः

<sup>5</sup> *em* as in UP; A1, F1, B1 संशितव्रतैः; A2, U1  
संज्ञितव्रतैः

<sup>6</sup> *em* as in UV Mss. M2602; A1  
दानयश्चविभागश्च; A2, F1 दानयोगभोग; B1 *snc*; K1  
स्नानदानाद्यागभाग; P1 --दानयागविभाग; P2  
दानयोगविभाग; U1 दानयागविभागश्च

<sup>7</sup> *em* as in UV; *all* कर्मप्रयोगो मानानां  
लेखप्रश्नविधिस्तथा

<sup>8</sup> *em* as in UV; All याज्योतिषश्रयाः

<sup>9</sup> *v* 30,31,32 is found in NAB & MD *att*  
VG; UV & UP *att* G, with extra half-verse  
वेदानामुत्तमं शास्त्रं त्रैलोक्यहितकारकम्, also in MD.

<sup>10</sup> F1 मखान्विना

<sup>11</sup> *em* as in NAB; P1, F1 उदग्र्यं; A2, B1, K1  
उदग्रं; A1, P2, U1 उदग्र्यं

<sup>12</sup> added half verse from UV

<sup>13</sup> B1 तथा दृष्टिभिर्भूयो

<sup>14</sup> A1, A2, F1, P1, P2, U1 हिताहिते

<sup>15</sup> *Em*; All चतुःषष्ट्यङ्गं

<sup>16</sup> A2, B1, P1, K1 कृत्वोपसदनं

<sup>17</sup> A2 वेदवार्ण



तस्माद्गणितविद्वीरः<sup>1</sup> कालज्ञानविनिश्चितः । दाने<sup>2</sup> यज्ञेऽग्निहोत्रे च सदसत्वमवाप्नुयात् ॥ ३८ ॥  
क्रियाश्च ता यथाशास्त्रं गणितेनोपपादयेत् । ज्योतिषा चाप्नुयाल्लोके द्विजः पूजां च राजसु ॥ ३९ ॥  
तस्मात् कृच्छ्रमधीत्याग्रे वेदाङ्गं कालबोधनम् । ज्योतिषामयनाङ्गानि चतुःषष्टिस्ततः पठेत् ॥ ४० ॥  
येषामग्रे कर्मगुणाश्चन्द्रमार्गास्त्वनन्तरम् । नक्षत्रेन्दुसमं<sup>3</sup> चैव भवर्गः<sup>4</sup> प्रथमः स्मृतः ॥ ४१ ॥  
राहौ बृहस्पतौ शुक्रे धूम्रकेतौ शनैश्चरे । अङ्गारके बुधेऽर्के च चारानष्टौ ततः पठेत् ॥ ४२ ॥  
चक्रेष्वन्तरचक्रं च मृगचक्रं तथैव च । श्वचक्रं वातचक्रं च चक्राङ्गेषु चतुष्टयम् ॥ ४३ ॥  
वास्तुविद्याङ्गविद्या च वायसानां तथैव च । ज्ञेयास्तिस्त्रस्तु विद्यैता वृद्धगर्गमताः शुभाः ॥ ४४ ॥  
स्वातियोगमथाषाढा रोहिण्यां योगमेव च । कृत्स्नान्येतान्विजानीयात् त्रीन् योगान् वै विशेषतः<sup>5</sup> ॥ ४५ ॥  
त्र्युत्तरेषु च नैष्ठिकं प्रविशं सलिलं ततः । रहस्यं चेत्यथाङ्गानि चतुर्विंशतिर्दर्शिताः ॥ ४६ ॥  
अत ऊर्ध्वं प्रवक्ष्यामि उपाङ्गानीह नामतः । आनुपूर्व्याद्विधानेन चत्वारिंशतिमेकतः ॥ ४७ ॥  
ग्रहकोशो ग्रहयुद्धं ग्रहशृङ्गाटकं तथा । कृत्स्नं ग्रहप्रमाणं<sup>6</sup> च ग्रहपाकास्तथैव च ॥ ४८ ॥  
यात्रा चाप्यग्निवर्णाश्च<sup>7</sup> सेनाव्यूहस्तथैव च । मयूरचित्रोपनिषदुपहाराः प्रशान्तयः ॥ ४९ ॥  
तेषामन्ते<sup>8</sup> तुलाकोशो भवश्चङ्घोपधारयेत्<sup>9</sup> । सर्वभूतरुतं<sup>10</sup> चैव तथा पुष्पलतां विदुः ॥ ५० ॥<sup>11</sup>  
उपानहां तथा छेदो वस्त्रच्छेदस्तथैव च । कृत्स्नं भुवनकोशं च गर्भाधानं दकार्गलम्<sup>12</sup> ॥ ५१ ॥  
निर्घाता भूमिकम्पाश्च परिवेषास्तथैव च । ऋतुस्वभावाः सन्त्येव<sup>13</sup> तथोक्ताश्चोपधारयेत् ॥ ५२ ॥

<sup>1</sup> *Em*; A1, A2, B1, K1, P1, P2, U1  
गणितविद्वीरः; F1 गणितवद्वीरः

<sup>2</sup> B1 क्रिया

<sup>3</sup> A1, A2, P1, P2 नक्षत्रकेन्द्रसं; B1 नक्षत्रकेंकसं; F1  
नक्षत्रकेन्द्रसं; U1 नक्षत्रकेंद्रभे

<sup>4</sup> A2, P1, P2, U1 द्विवर्गः; F1 द्विवर्गः

<sup>5</sup> F1 विशासनः

<sup>6</sup> A1, A2, P1, U1 ग्रहेश्वराणां; B1 ग्रहपुराणं

<sup>7</sup> *Em* as per *all* Ch यात्रालक्षणम्; A1  
नियथाश्चानिवर्षाश्च; A2 नित्वयाश्चाग्निवर्षाश्च; F1, P2,  
U1 नियथाश्चाग्निवर्षाश्च; K1, B1 नित्वयाशमग्निवर्षाश्च;  
P1 नि-याश्चाग्निवर्षाश्च

<sup>8</sup> *ed.em*; A1, A2, B1, K1, P1, P2 त आंतिके; F1  
ते मान्तिके; U1 ते आतिके

<sup>9</sup> A1, A2, P2, U1 भवश्चं चोपकारयत्; B1 *snc*; F1  
भवस्तवं चोदकारयत्; P1 भवश्चं वोपकारयत्

<sup>10</sup> F1 सर्वभूतहितं

<sup>11</sup> A1 v59b, 51, 52a *mt*

<sup>12</sup> *em* as in BS Ch 53; A1 *mt*; A2 दृणार्गलं; K1  
दृगार्गलं; B1 दशांगुलं; P1 दृगार्गतुं; P2 दृश्यगाद्यांतुं;  
U1 दृश्यगांघागतुं

<sup>13</sup> F1 सत्यं; U1 सत्येवं

सांवत्सरस्तथा युक्तः शास्त्राणां देशमादिशेत् । बलाबलं तु विज्ञाय<sup>1</sup> बहु यत्तद्वलं वदेत् ॥५३॥  
चतुःषष्ट्यङ्गमेतत्तु<sup>2</sup> सांवत्सरमुदाहृतम् । ज्ञानं प्रजाहितं राज्यं चतुरङ्गं<sup>3</sup> क्रियाहितम् ॥५४॥  
तस्माद्राज्ञाधिगन्तव्यो विद्वान् सांवत्सरोऽग्रणीः । जयं यशः श्रियं भोगान् प्रेयश्च महदीप्सता ॥५५॥<sup>4</sup>  
नासांवत्सरके देशे वस्तव्यं भूतिमिच्छता । चक्षुर्भूतो हि यत्रैष पापं तत्र न विद्यते ॥५६॥  
न सांवत्सरपाठी<sup>5</sup> च नरकेषूपपद्यते । ब्रह्मलोके प्रतिष्ठां<sup>6</sup> च लभते दैवचिन्तकः ॥५७॥  
नाशिष्याय ददेच्छास्त्रं<sup>7</sup> गर्गस्य वचनं यथा । विज्ञानरहितो विप्रो युक्तो भावान् न विन्दते ॥५८॥

[द्वितीयोऽध्यायः]

### ३ ॥ परिभाषा ॥

अथातस्तिथिनक्षत्रमुहूर्तकरणात्मकम् । चतुर्व्यूहं कर्मगुणं गर्गेणोक्तं यथाविधि ॥ १ ॥  
तिथिनक्षत्र-करणं<sup>8</sup> मुहूर्तानां च सम्पदः । तस्माच्चतुर्णामेतेषां सम्पदा कर्म कारयेत् ॥ २ ॥  
तिथिभिः पञ्चदशभिः ऋक्षैश्च त्रिनवात्मकैः । करणैरैकादशभिर्मुहूर्तैस्त्रिदशैरपि ॥ ३ ॥  
साध्यमानानि कार्याणि नृणां सिद्ध्यन्त्यसंशयः । कर्मणो हि शरीरं<sup>9</sup> स्यान् नक्षत्रं<sup>10</sup> सोम-संहितम्<sup>11</sup> ॥ ४ ॥  
योनस्थितिः कर्मगुणाः श्रेष्ठान्न करणं स्मृतम् (?) । फलं मुहूर्तं विज्ञेयं चतुःसम्पदतो वरा<sup>12</sup> ॥ ५ ॥  
कर्मणो हि चतुर्थांशः तिथियोगात् प्रसिद्ध्यति । तिथ्यृक्षयोगाच्चांशोऽत्र<sup>13</sup> योगश्च करणैः सह<sup>14</sup> ॥ ६ ॥

<sup>1</sup> A1 विज्ञेयं

<sup>2</sup> F1 षष्टं गमेनस्त; B1 एतत्तत्ते सांवत्सर

<sup>3</sup> Em; A1, A2, B1, P1, P2, U1 चक्षुरग्र्यं; K1 चतुरग्र्यं

<sup>4</sup> v 55-57 are found in BS (2.7-11) as original to VM with minor variations. v 55-56 are same as v 1.11-12 in Ch 1 in all Mss.

<sup>5</sup> B1 संवत्सरपाठी

<sup>6</sup> B1 प्रविष्टं

<sup>7</sup> irr ददेत्

<sup>8</sup> B1 -करणे

<sup>9</sup> K1 शरः

<sup>10</sup> A2, U1, P2 नक्षत्रे

<sup>11</sup> K1 -समितं; P1, U1 -सहितं; A1, B1 -समितं; A2, P2 -संहिताम्

<sup>12</sup> A1, A2, U1 वरः; K1 धरा

<sup>13</sup> K1 ऋक्षयोगाद्वशोयत्र; A2 तिथ्यृक्षयोगाद्वशो योगो; A1 तिथ्यृक्षयोगाद्वशोयत्र; B1 ऋक्षयोगाद्व-योगोत्र; P1 तिथ्यृक्षयोगाद्वशोयत्र; P2 तिथ्यृक्षयोगाद्वशोयत्र; F1 तिथ्यृक्षयोगाद्वशोयत्र; U1 तिथ्यृक्षयोगाच्चांशोत्र

<sup>14</sup> A1 योगकरणंसमृतं; A2 योगकरणैःसह

चत्वारस्तिथिनक्षत्रमुहूर्तकरणैरतः । त्रीणि कर्माणि सिद्ध्यन्ते तस्मात् कार्याणि सम्पदा<sup>1</sup> (?) ॥ ७ ॥  
सुरभेदे(?) चतुर्थांशे कर्म कार्यं नृसम्पदा<sup>2</sup> । मुहूर्ततिथिनक्षत्रकरणं हि बलीयसाम्<sup>3</sup> ॥ ८ ॥  
करणानामनियतः कालस्तु तिथिसंश्रयात् । अहोरात्रेषु भिन्नेषु तिथिरादिः समासितः ॥ ९ ॥  
मासे मासे समा षष्टिः करणानामिहोच्यते । एकान्तरेण मासेषु शिष्यते<sup>4</sup> करणद्वयम् ॥ १० ॥  
कर्म कार्यं मुहूर्तं च दिनादावेव<sup>5</sup> जायते । तिथ्यक्षयोरसम्पत्त्या कुर्यान्नक्षत्रयोगतः ॥ ११ ॥  
सोमसंयोगतो<sup>6</sup> ह्यत्र कालश्रेष्ठोऽतिसंयतः<sup>7</sup> । जन्मजं सुखदुःखं हि नृणामायुर्व्यागमौ ॥ १२ ॥<sup>8</sup>  
नक्षत्रे चन्द्रसंयुक्ते सर्वारम्भाश्च लौकिकाः । तस्मादग्रे कर्मगुणाः कृत्तिकाग्रेष्वहरहम्<sup>9</sup> ॥ १३ ॥  
प्रवक्ष्ये ज्योतिषाङ्गानामङ्गं ह्येतदिहोदितम् ॥ १४ ॥

[तृतीयोऽध्यायः]

## Abbreviations

G	Garga
GS	Garga Samhitā
VG	Vṛddha-Garga
VGJ	Vṛddhagargīya Jyotiṣa
BS	Bṛhat Samhitā
UV	Utpalavivṛti commentary on the BS
UP	Utpalaparimalā commentary on the BS
VM	Varāhamihira
MD	Muhūrtadīpikā of Viṣṇusūri
YP	Yuga Purāṇa
NAB	Nīlakaṇṭha's Āryabhaṭīya Bhāṣya
PT	Parāśara Tantra

<sup>1</sup> F1 सम्पदा

<sup>2</sup> A2 नसम्पदा; K1 भृसम्पदा; F1 नसम्पदा

<sup>3</sup> K1 कलीयसां; F1 बलायसा

<sup>4</sup> F1, P1 शस्यते

<sup>5</sup> Em; F1 दिनंनादेव; K1 दिनंनादेश; A1, A2, B1,

U1, P1, P2 दिनंनादेव

<sup>6</sup> A1 सोपिसंयोगतो; K1, P1 सोपसंयोगतो

<sup>7</sup> F1 संयुतः

<sup>8</sup> F1 v 12b, 13a mt

<sup>9</sup> em; P1 -हहं; A1, U1, P2 -हंरहं; K1 -हंगृहं; F1 -चहं रहम; B1 -हर्गणं; A2 -हर्गहं

## Editorial notation

<i>all</i>	All except defective Mss
<i>att</i>	Attributed to
Ch	Chapter
<i>cf</i>	Compare with
<i>em</i>	Emended
<i>irr</i>	Irregular usage
<i>mt</i>	Missing text
<i>snc</i>	Script not clear
<i>v</i>	Verse
[..]	Editorial addition

## Brief Summary

### 1. Sāmvatsara-nirdeśa

The chapter begins by explaining what is meant by *saṃvatsara*. This subject is about *kālaññāna* (knowledge of **Time**) which involves observation and study of Sun, Moon, *nakṣatras* and planets in order to measure time in terms of *nimeṣa*, *kṣaṇa*, *kāṣṭhā*, *kalā*, *truṭi*, *lava*, *muhūrta*, *ahorātra*, *pakṣa*, *māsa*, *ṛtu*, *ayana* and *viśuvat* for finding suitable time to carry out various vedic rites. This would also lead to a calendar comprising of *tithi*, *nakṣatra*, *muhūrta* and *karaṇa* for day to day activities. These concepts lead to the five-year cycle: *saṃvatsara*, *parivatsara*, *idāvatsara*, *anuvatsara* and *idvatsara*. The legend of Śukra (Venus) and Bṛhaspati (Jupiter) respectively becoming the *sāmvatsarika* (astronomer) and *purohita* (priest) to the *devās* (gods), is briefly described.

### 2. Aṅga-samuddeśa

This chapter starts with Kroṣṭuki questioning his father VG sitting in an assembly of sages. VG enumerates the list of primary and secondary topics of the subject of *Jyotiṣa*. The primary topics: *karmaguṇa*, *candramārga*, *nakṣatrendusama*, *rāhucāra*, *bṛhaspaticāra*, *śukracāra*, *ketucāra*, *śanaiścāra*, *aṅgārakacāra*, *budhacāra*, *ādityacāra*, *antaracakra*, *mṛgacakra*, *śvacakra*, *vātacakra*, *vāstuvidyā*,

*aṅgavidyā, vāyasavidyā, svātiyoga, āṣāḍhayoga, rohiṇīyoga, naiṣṭika, praviśa and salila.*

After this a list of secondary topics are given. Upāṅgās: grahakośa, grahayuddha, grahaśṛṅgāṭaka, grahapramāṇa, grahapāka, yātrālakṣaṇa, agnivarna, senāvyūha, mayūracitropaniṣad, upahāra, praśānti, tulākośa, bhavaśṛṅgī, sarvabhūtaruta, puṣpalatā, upānahaccheda, vastraccheda, bhuvanakośa, garbhādhāna, dakārgala, nirghāta, bhūmikampa, pariveśa and ṛtusvabhāva.

### 3. Paribhāṣā

This chapter emphasizes that activities must be done in accordance with the knowledge of *tithi, nakṣatra, karaṇa* and *muhūrta*. Work done with the full knowledge of the characteristics of 15 *tithis*, 27 *nakṣatras*, 11 *karaṇas* and 30 *muhūrtas* will be successful. The text continues in the next chapter explaining the nature of the activities to be carried out in each *nakṣatra*. The meaning of some of the verses is not very clear.

## Appendix

The author-attribution in the end-colophon of each chapter are symbolically shown in tabular form.

Ch	A1	A2	B1	U1	F1	K1	P1	P2
1	BGkJ	BGkJ	BGkJ	BGkJ	BGkJ	BGykJ	BGykJ	BGkJ
2	VGiJS	NA	VGiJS	NA	NA	NA	NA	NA
3	NA	VGiJSSm	BGkJ	NA	NA	NA	NA	NA

Legend:

B = *Bṛhad*, V = *Vṛddha*, G = *Garga*, Gk = *Gargakṛte*, Gy = *Gārgya*; Gyk = *Gārgyakṛte*; Gi = *Gārgiye*, J = *Jyotiṣe*, S = *Śāstre*, Sm = *Samhitāyam*, NA= No attribution.

Examples:

B1, Ch 2, VGiJS = वृद्धगार्गीये ज्योतिःशास्त्रे

A2, Ch 3, VGiJSSm = वृद्धगार्गीये ज्योतिःशास्त्रे संहितायां  
(To be continued)

\*\*\*

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