

Report of the Research Project:
Studies in Traditional Cultures in the Context of Ancient Indian and Indo-European Societies

A Study of the Nīlamata
— Aspects of Hinduism in Ancient Kashmir —

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Calendar and Related Subjects in the *Nilamatapurāṇa*

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1. Introduction

Determination of the date of festivals, *pūjās*, and *vratas* was one of the important concerns of ancient Indian ritualists. The study of calendar making (*jyotiṣa*) had its origin in ritualism and it was one of the six branches (*aṅga*) of the study of the Veda. The essential framework of the Indian calendar was formed in the *vedāṅgajyotiṣa*.¹ The calendar is classified as luni-solar, because the month is the cycle of lunation, while the year is that of the sun's rotation along the ecliptic. Since a lunar year consisting of 12 lunar months is shorter than a solar year by about 11 days, intercalary months are necessary. In the *vedāṅga* period the cycle of intercalation was five years (*pañcābdayuga*) during which two months were inserted. It was after Hellenistic astronomy was transmitted to India in the beginning of the first millennium of the Christian era, that the cycle of seven intercalations in every 19 solar years (so-called Metonic Cycle) was known.

The parameters for the length of a solar year and of a synodic month were gradually improved during the *siddhānta* period of astronomy, and some of them are still used in some of the popular almanacs (*pañcāṅga*).

The *siddhānta* texts of astronomy provide calendrical constants in terms of the sidereal rotations of the sun and moon in a *yuga* or *kalpa* as well as general rules for the computation of calendar, but they give no information about how a calendar was actually made for a specific year at a specific locality. Different astronomical schools (*pakṣa*) had different sets of constants and different rules were applied for determination of the beginning of the year and month, naming of the month, etc. Even the same set of constants found different applications in different places. It is impossible for us, therefore, to reconstruct a universal 'Indian calendar' valid for all the historical periods and for all the localities.²

Information about the reality of the calendar is sometimes found in the date of inscriptions and colophones of manuscripts, but, since they do not specify on which calendar they were based and which set of parameters they used, to find the equivalent Western date has always involved controversial problems.³ It has usually been the case that the same Indian date was equated with a variety of

Western dates.

The aim of the present article is to analyze information concerning the calendar and related subjects in the *Nilamatapurāṇa* and to find the reality of the calendar and calendar-based life in the Kashmir valley at the time of the *Nilamatapurāṇa*.

2. Knowledge of Astronomy, Astrology, and Calendar in NM

That *jyotiḥśāstra* (astral science) was well studied in Kashmir can be surmised from the text of the *Nilamatapurāṇa* (NM) itself. The cosmogonical time units *Kalpa* and 14 *Manvantaras* are mentioned in NM 568. Further units are enumerated in NM 573–575: the greater *yuga* of 4,320,000 years,⁴ the five-year *yuga* beginning with *saṃvatsara*, half year (*ayana*), six seasons (*ṛtu*), twelve months, half month (*pakṣa*) consisting of 15 *tithis*, and *karaṇa* (half *tithi*).

Astrologers who were versed in this astral science were called *daivajña* ('knower of divine order'). They chose the sacrificial ground (NM 540), conducted propitiation rites (*grahaśānti*, *nakṣatrapūjā*) at the beginning of the year (NM 566, 567), and told about the [auspicious and inauspicious] planets, [proper] month, and weekday (NM 626). Especially important was their role in the royal court. *Agastyapūjā*, one of the important rites where the king should receive the star *Agastya* (Canopus) at its first appearance, was lead by astrologers (NM 740–749). It was also astrologers and *purohitas* who performed the ceremony of royal ablation (*rājābhiṣeka*), monthly (NM 802) and annually (NM 804ff.). After the ceremony they were to be properly rewarded (NM 826).

An astrologer's status in the royal court seems to have been similar to that of *purohita*. This is also the case in Varāhamihira's *Bṛhatsaṃhitā* where they are sometimes mentioned side by side.⁵ The NM does not give any reference to that kind of astrology which was practiced by the common people, and the astrological elements in the NM such as *janmarkṣa* (*nakṣatra* of one's birthday, NM 803) seems to have been intended only for the king.

3. Calendar in NM

The NM abounds in information about the calendar which was in use in Kashmir. The dates of the festivals, *pūjās*, and *vratas* are in most cases given by the luni-solar calendar. The only exception is the date of the *agastyapūjā*. For this topic see section 4 below.

(1) Year and Year-beginning

According to Sanskrit astronomical texts the beginning of the solar year is at the sun's entry into the zodiacal sign *meṣa* (*meṣasaṃkrānti*), and the beginning of the lunar year is the first day of the bright half (*śuklapakṣa*) of the lunar month Caitra. But this is rather a new custom belonging to the period of *siddhānta* astronomy, which began roughly around the third century of the Christian era by the influence of Hellenistic astronomy. In the *vedāṅgajyotiṣa* the year begins with the first day of the bright half month of Māgha, a month which in the Vedic period contained the beginning of the *uttarāyaṇa* (winter solstice).

In some parts of India the beginning of the year was the first day of Kārttika *śuklapakṣa*, and in others, Āṣāḍha, Āśvayuja, Bhādrapada, or Jyaiṣṭha. Some of such variations are found even today.⁶

The NM begins the description of annual festivals with the full moon day (*Kaumudī*) of the month Āśvayuja (NM 377), and after going through the year, it ends with the same day (NM 846). One might imagine, therefore, that the year in Kashmir in the time of the *Nīlamata* began with the first day of the *kṛṣṇapakṣa* of Āśvayuja. According to NM 560–561, however, the end of the year (*pañcadaśiṃ ... antyāṃ saṃvatsarasya*) is the last day of Phālguna, and the beginning of the year is the commencement of the bright half of Caitra (*caitraśuklārambha*). In fact, the large framework NM 561–643 concerns the rites of so-called *navasaṃvatsarārambha* ('beginning of the new year').

NM 564–564 reads;

tasminn evāhni kartavyā pūjā kālasya Kāśyapa /
tasmin kālasya gaṇanā pravṛttā pūrvam eva tu //
tasmin ahani vai sṛṣṭaṃ Brahmaṇedaṃ jagat purā /
sūryodaye dvijaśreṣṭha ity evam anuśuśrūma //

'On that very day the reception of time is to be made, oh Kaśyapa. On that [day] the reckoning of time began in the ancient time.

On that day this world was created by Brahmā in the olden time, at the time of sunrise, oh the best of the twice-born. Thus we have heard.'

We had better admit, therefore, two different types of years: one which begins with Āśvayuja *kṛṣṇapakṣa* was deeply rooted in social life, while the other beginning with Caitra *śuklapakṣa* was rather of astronomical and religious nature. This is somewhat similar to the difference between our calendar year and academic year.

(2) Month, *nakṣatra*, and *nakṣatra-devatā* (NM 804)

Month names in the NM are the commonest ones, namely, those derived

from the name of the *nakṣatra* with which the full moon is in conjunction. The number of *nakṣatra* is 27 and each *nakṣatra* has an equal coverage of 13°20' along the ecliptic.

Not all the *nakṣatra* names are given in the NM but those attested in the text are traditional ones. They are sometimes called by the derivatives of the name of the *devatā* which presides over them. For instance, *vaiśvadevaṃ nakṣatram* (NM 707) = *uttarāṣādhā*. I have given in Table 1 the most popular names of the 27 *nakṣatras* and their *devatās*. The underlined *nakṣatra* names contribute to the month names listed in Table 2.

The lunar month Caitra is defined as the month during which *meṣasamkrānti* occurs. The full moon in this month is usually located in *citrā*. Likewise, the month Vaiśākha contains *vṛṣasamkrānti* (sun's entry into the zodiacal sign *vṛṣa*), with the full moon in *viśākhā*, and so on. If a lunar month does not contain any *samkrānti*, the month is called *adhimāsa* ('additional month'), namely, intercalary

Table 1.

<i>nakṣatra</i>	<i>devatā</i>
1 aśvinī	Aśvin
2 bharanī	Yama
3 <u>kṛttikā</u>	Agni
4 rohiṇī	Prajāpati
5 <u>mṛgaśīras</u>	Śaśi
6 ārdrā	Rudra
7 punarvasu	Aditi
8 <u>puṣya</u>	Bṛhaspati
9 āśleṣā	Sarpa
10 <u>maghā</u>	Pitṛ
11 pūrva-phālgunī	Yoni
12 <u>uttara-phālgunī</u>	Aryaman
13 hasta	Sūrya
14 <u>citrā</u>	Tvaṣṭṛ
15 svāti	Vāyu
16 <u>viśākhā</u>	Indrāgnī
17 anurādhā	Mitra
18 <u>jyēṣṭhā</u>	Indra
19 mūla	Nirṛti
20 <u>pūrva-āṣādhā</u>	Āpas
21 <u>uttara-āṣādhā</u>	Viśvedeva
22 <u>śravaṇa</u>	Brahmā
23 dhaniṣṭhā	Viṣṇu
24 śatabhiṣaj	Varuṇa
25 <u>pūrva-bhādrapadā</u>	Ajapāda
26 <u>uttara-bhādrapadā</u>	Ahīrbudhnya
27 revatī	Pūṣan

Table 2.

month
Caitra
Vaiśākha
Jyaiṣṭha
Āṣādhā
Śravaṇa
Bhādrapada
Āśvayuja
Kārttika
Mārgaśīrṣa
Pauṣa
Māgha
Phālguna

month. If, on the other hand, a lunar month contains two *saṃkrāntis*, the month name which is related to the second *saṃkrānti* has no role and thus is omitted (*kṣayamāsa*). Neither *adhimāsa* nor *kṣayamāsa* is mentioned in the NM.

Since the *nakṣatra* coordinates are sidereally fixed, this method of naming a month is a very clever device. Even though the relation between month-name and season may change in the course of years due to the precession of the equinoxes, the position of the full moon against the background of the *nakṣatra* does not show any remarkable shift. Thus, this system works quite well in the *nirayaṇa* calendar where the motion of the equinoxes is not taken into account. Conversely speaking, this is the reason why Indian people could not, and cannot,

Table 3.

(amānta)		moon's yoga with <i>nakṣatra</i>																	(pūrṇimānta)	
		tithi	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15			
		n a k ṣ a t r a																		
		(k)	13,	14,	15,	16,	17,	18,	19,	20,	21,	22,	23,	24,	25,	26,	27	Caitra		
Caitra	(s)	27,	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14				
	(k)	15,	16,	17,	18,	19,	20,	21,	22,	23,	24,	25,	26,	27,	1,	2	Vaiśākha			
Vaiśākha	(s)	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16				
	(k)	17,	18,	19,	20,	21,	22,	23,	24,	25,	26,	27,	1,	2,	3,	4	Jyaiṣṭha			
Jyaiṣṭha	(s)	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18				
	(k)	19,	20,	21,	22,	23,	24,	25,	26,	27,	1,	2,	3,	4,	5,	6	Āṣāḍha			
Āṣāḍha	(s)	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18,	19,	20				
	(k)	21,	22,	23,	24,	25,	26,	27,	1,	2,	3,	4,	5,	6,	7,	8	Śrāvaṇa			
Śrāvaṇa	(s)	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18,	19,	20,	21,	22				
	(k)	23,	24,	25,	26,	27,	1,	2,	3,	4,	5,	6,	7,	8,	9,	10	Bhādrapada			
Bhādrapada	(s)	11,	12,	13,	14,	15,	16,	17,	18,	19,	20,	21,	22,	23,	24,	25				
	(k)	26,	27,	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13	Āśvayuja			
Āśvayuja	(s)	14,	15,	16,	17,	18,	19,	20,	21,	22,	23,	24,	25,	26,	27,	1				
	(k)	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16	Kārttika			
Kārttika	(s)	16,	17,	18,	19,	20,	21,	22,	23,	24,	25,	26,	27,	1,	2,	3				
	(k)	4,	5,	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18	Mārgaśīrṣa			
Mārgaśīrṣa	(s)	18,	19,	20,	21,	22,	23,	24,	25,	26,	27,	1,	2,	3,	4,	5				
	(k)	6,	7,	8,	9,	10,	11,	12,	13,	14,	15,	16,	17,	18,	19,	20	Pauṣa			
Pauṣa	(s)	21,	22,	23,	24,	25,	26,	27,	1,	2,	3,	4,	5,	6,	7,	8				
	(k)	9,	10,	11,	12,	13,	14,	15,	16,	17,	18,	19,	20,	21,	22,	23	Māgha			
Māgha	(s)	23,	24,	25,	26,	27,	1,	2,	3,	4,	5,	6,	7,	8,	9,	10				
	(k)	11,	12,	13,	14,	15,	16,	17,	18,	19,	20,	21,	22,	23,	24,	25	Phālguna			
Phālguna	(s)	25,	26,	27,	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12				
	(k)	13,	14,	15,	16,	17,	18,	19,	20,	21,	22,	23,	24,	25,	26,	27				

s...śuklapakṣa k...kṛṣṇapakṣa
nakṣatra is indicated by the ordinal number of Table 1

throw away the *nirayaṇa* system.

Once the *nakṣatras* of the full moon day are thus fixed, the rest of the *nakṣatras* can also be mechanically allotted to the rest of the *tithis*, on the assumption that the moon moves one *nakṣatra* in one *tithi*. A table of such an artificial allotment of *nakṣatra* to each *tithi* of 12 lunar months is found in the *Hsiu Yao Ching* (宿曜經),⁷ a Chinese version of Indian astrology composed by Pu-k'ung (不空 Amoghavajra) in AD. 759–764. With a slight modification I have reproduced the table in Table 3.

Since the number of *nakṣatras* is 27 and that of *tithis* in a lunar month is 30, it is inevitable in such a scheme that the same *nakṣatra* sometimes falls on the two consecutive *tithis* around the new moon day (*amāvāsyā*), as is found in the table (there are nine such cases⁸ which are indicated by the waved underlines). Another shortcoming of this mechanical table is that the intercalary month is not taken into consideration. Since, however, the possible deviation of the tabulated *nakṣatra* from the true lunar position is at most three *nakṣatras* around new moon days, such a kind of handy table seems to have been commonly used in place of a correctly computed table of *nakṣatras*.⁹

Here is a list of all the occurrences of *nakṣatras* in the NM with reference to the moon's position. The month names in this list are based on the *amānta* system, of which reason I shall discuss shortly. In this list the *tithi* numbers in the square brackets are not directly stated but can be inferred from the context.

	Month (<i>amānta</i>)	<i>tithi</i>	<i>nakṣatra</i>
NM 435	Kārttika	s 15	<i>kṛttikā</i> (3)
NM 471	Pauṣa	s 15	<i>puṣya</i> (8)
NM 492	Pauṣa	k 15	<i>śravaṇa</i> (22)
NM 506	Māgha	k 12	<i>śravaṇa</i> (22)
NM 685	Vaiśākha	[s 7]	<i>puṣya</i> (8)
NM 689	Vaiśākha	[s 9]	<i>maghā</i> (10)
NM 701	Āṣāḍha	[s 10]	<i>svāti</i> (15)
NM 707	Āṣāḍha	[s 15]	<i>uttarāṣāḍhā</i> (21)
NM 710	Āṣāḍha	[k 11]	<i>rohiṇī</i> (4)
NM 715	Śrāvaṇa	[s 15]	<i>śravaṇa</i> (22)
NM 723	Śrāvaṇa	[k 15]	<i>maghā</i> (10)
NM 774	Bhādrapada	s 12	<i>śravaṇa</i> (22)
NM 779	Āśvayuja	[s 2]	<i>svāti</i> (15)
NM 784	Āśvayuja	[s 5]	<i>jyēṣṭhā</i> (18)

In addition to these the worship of the moon god (Candra) is prescribed in NM 456, and that of Aryaman in NM 526, because they are the deities of the *nakṣatra* of the corresponding *tithi*.

Nakṣatras play a very important role in astrology as well as in ritualism. In the NM *nakṣatra śravaṇa* is most frequently mentioned. The reason is that it is, along with *puṣya*, one of the most auspicious *nakṣatras* according to astrological theory. Auspicious and inauspicious days can be partly explained by the association of the *nakṣatra-devatā*.

(3) *amānta* or *pūrṇimānta*?

The Indian calendar is divided into two types, *amānta* (new moon ending) and *pūrṇimānta* (full moon ending). In the former the bright half month (*śuklapakṣa*) precedes the dark fortnight (*kṛṣṇapakṣa*), while in the latter the dark fortnight is regarded as the first half. As is clear from Table 3, the month name of the bright half month of both types is identical, while in the dark half, the month name of the *pūrṇimānta* calendar appears one month earlier than that of the *amānta* calendar. Thus, when one wants to find the Western date corresponding to a given date of the dark half month in the Indian calendar, one has to know whether the calendar is *amānta* or *pūrṇimānta*. When, and only when, both the month name of a *kṛṣṇapakṣa* day and the *nakṣatra* and /or weekday are given, we can decide which type of calendar was used, as is evident from the table.

Generally speaking, in modern times, the calendar of northern India is of the *pūrṇimānta* type, and that of southern India is based on *amānta*. This was also the case in ancient India. In fact, a passage of the *Rājatarāṅgiṇī* suggests that the *pūrṇimānta* calendar was used at the time of Kalhaṇa:

*sa caturthasam āṣāḍhaprārambhāhe mahīpatiḥ /
harirājābhidhaṃ putram abhiṣicyāstam āyayau //* (RT 7.127)

...

*dvāviṃśatim ahāny urvīm sa rakṣitvā kṣamāpatiḥ /
kṣayaṃ yayau śuciyaśāḥ śuciśuklāṣṭamīdine //* (RT 7.131)

‘This king (viz. Saṃgrāmarāja) passed away on the day of the beginning of Āṣāḍha in [the year Laukika 41] 04 after consecrating (his) son whose name was Harirāja ...

The king (viz. Harirāja) endowed with great fame died on the eighth of the bright half month Śuci (= Āṣāḍha) after ruling the earth for 22 days.’

It is only in the *pūrṇimānta* system that 22 days are counted from the ‘beginning of Āṣāḍha’ to ‘the eighth’ of the *śuklapakṣa* of the same month.

But there is an evidence to show that the *amānta* system was also used in Kashmir. Bhaṭṭotpala, a Kashmirian astronomer, states in the colophone of his *Brhatsamhitāvivṛti*:¹⁰

phālgunasya dvitīyāyām asitāyām guror dine /

vasvaṣṭāṣṭamite śāke kṛteyaṁ vivṛtir mayā /

‘This *Vivṛti* was composed by me on Thursday, the second *tithi* of the *kṛṣṇapakṣa* of Phālguna, in Śaka 888.’

If weekday were not mentioned there would be two possible candidates for the corresponding Western date. But, thanks to the words *guror dine* (‘on Thursday’), we can safely say that the date corresponds to Thursday, February 28, AD 967. If Bhaṭṭotpala’s calendar were *pūrṇimānta*, the date would be January 30, AD 967. But the day is Wednesday. Therefore, this colophone must have been dated in the *amānta* system.

Another evidence is found in the Bhaṭṭotpala’s commenatry on the *Brhatsamhitā* (abbr. BS). In BS 104.6 Varāhamihira records an old tradition of the *rūpasattravrata* (*vrata* for obtaining handsome body parts) to be performed on ‘the eighth [*tithi*] of the dark fortnight of the month Caitra, when the moon conjoins with the [*nakṣatra*] *mūla*’:

caitrasya bahulapakṣe hy aṣṭamyām mūlasamyute candre /

According to the ‘artificial scheme’ of Table 3, the moon is only one *nakṣatra* off from *mūla* (no. 19) on the *Caitrakṛṣṇāṣṭamī* in the *pūrṇimānta* system, while it is four *nakṣatra* off in the *amānta* system. The latter case is almost impossible even if we take into account the crudeness of this artificial scheme. Bhaṭṭotpala interprets the phrase ‘*mūlasamyute candre*’ as ‘on Monday’ (*candravāsare*). It is evident that Bhaṭṭotpala offered this forced interpretation so that this passage might not be contradictory with his *amānta* system.

It is clear, therefore, that there was a shift from *amānta* to *pūrṇimānta* in Kashmir somewhere between the days of Bhaṭṭotpala and Kalhaṇa. Now we are tempted to know on which system the NM is based, so that we might give the lower or upper limit of the date of the work. The NM does not give any decisive testimony, but there are several passages which are more naturally interpreted according to the *amānta* system than otherwise. However, in this respect the

author of the NM is not very explicit, and rather it seems as if the ambiguity were intentional.

First of all, when the festivals during the *kṛṣṇapakṣa* are described, the NM never explicitly mentions the month name. Instead, it simply says, for example,

kārttikāyāṃ samatītāyāṃ samprāpte prathame 'hani / (NM 450ab)

‘When the first day comes after the [full moon day of] Kārttika passed’.

So the day intended here can be either the first day of *kṛṣṇapakṣa* of Kārttika (*amānta*) or that of Mārgaśīrṣa (*pūrṇimānta*). It is noteworthy that in such cases the *Ādipurāṇa* and the *Kṛtyakalpataru* never fail to mention articulately the month name according to the *pūrṇimānta* system. For other similar cases see NM 482, 548, 698, 710, and 716 together with corresponding passages in the *Ādipurāṇa* and the *Kṛtyakalpataru*.

In the NM there are two passages where the names of *nakṣatra* and *tithi* in *kṛṣṇapakṣa* appear together:

	<i>tithi</i>	month (<i>amānta</i> / <i>pūrṇimānta</i>)	<i>nakṣatra</i>
NM 492	k 15	[Pauṣa/Māgha]	<i>śravaṇa</i>
NM 506	k 12	[Māgha/Phālguna]	<i>śravaṇa</i>

As mentioned above, the month name in the *kṛṣṇapakṣa* is not expressly given, so both *amānta* and *pūrṇimānta* months are equally possible. In this respect, NM 710 gives us important information. The verse says:

*Āṣādhāyāṃ samatītāyāṃ yadā syād dvija Rohiṇī /
tadā tu Kaśyapaḥ pūjyo deśasyāsyā pravartakaḥ //*

‘After the full moon day of Āṣāḍha has gone, oh twice-born, [and on the day] when Rohiṇī is [the day’s *nakṣatra*], then Kaśyapa, the founder of this country, should be worshiped.’

This passage undoubtedly refers to so-called *rohiṇīpūjā*. The verse implies that just as Prajāpati, the creator of the world, is worshiped when the moon is conjoined with Rohiṇī, so Kaśyapa, the founder of the land of Kashmir, should be worshiped on the same day. According to Varāhamihira’s *Br̥hatsaṃhitā* 24.4 it is in Āṣāḍha *kṛṣṇapakṣa* that the *rohiṇīpūjā* is to be performed. That the *Br̥hatsaṃhitā* was well read in Kashmir can be proved by the fact that the commentator, Bhaṭṭotpala, whom we have just mentioned, hailed from Kashmir

and that *Rājatarāṅgiṇī* 1.56 is a quotation from the *Bṛhatsaṃhitā* 13.3. Thus, the *rohiṇīpūjā* mentioned in NM 710 should fall on the *kṛṣṇapakṣa* of Āṣāḍha, around the 11th tithi of the *amānta* calendar as is shown in Table 3. If, on the other hand, the calendar were based on the *pūrṇimānta*, the prescription of *rohiṇīpūjā* must have been made before that of the full-moon day of Āṣāḍha. Thus, this verse gives positive evidence which shows that in the NM the *amānta* system was intended.

Another evidence is given in NM 636, where we find the word:

caitramāsasamārambhe ...

‘At the outset of the Caitra month ...’,

and the description that follows is about the *śuklapakṣa* of Caitra, which means that the month begins with the bright half.

There is one passage in the NM which seems to contradict the *amānta* system. NM 707 states ‘at the end of Āṣāḍha when (the moon) has arrived at *vaiśvadeva* (= *uttarāṣāḍhā*)...’. As is known from Table 3 the moon’s arrival at *uttarāṣāḍhā* (no. 21) in Āṣāḍha is possible only at the end of the *śuklapakṣa*. If this were really ‘the end of the month’ the system must be *pūrṇimānta*. In order to consistently keep the *amānta* system, we must interpret this passage as ‘at the end [of *śuklapakṣa*] of Āṣāḍha’. In fact NM 703 explicitly says *āṣāḍhaśuklapakṣānte* and all the five verses NM 703 to 707 prescribe *pūjās* for several days toward the end of Āṣāḍha-*śuklapakṣa*. After these verses comes the *rohiṇīpūjā* of Āṣāḍha-*kṛṣṇapakṣa* just mentioned above.

According to the *amānta* scheme, the lunar month Āṣāḍha is defined as the synodic month which contains *karkāṭa-saṃkrānti* (sun’s entry into the zodiacal sign *karkāṭa*), namely, the beginning of *dakṣiṇāyana*. Thus, it is natural that the *pūjā* at [the beginning of] *dakṣiṇāyana* is prescribed in this context (NM 709).

Another passage in the NM which one cannot disregard is NM 469–471. After the mention of *kṛṣṇāṣṭamī* (k 8) of the Pauṣa month in NM 469, comes a reference to the full moon day (s 15) of the same month. This passage reminds us of so-called *aṣaṭkātraya* (‘three eighth tithis [of *kṛṣṇapakṣa*]’) which is prescribed in the *Gṛhyasūtras*.¹¹ Commentators on the *Gṛhyasūtras* have different opinions about the names of three *kṛṣṇapakṣas*: those who belong to the *amānta* system interpret them as Mārgaśīrṣa, Pauṣa, and Māgha, while the followers of *pūrṇimānta* take them as Pauṣa, Māgha, and Phālgua.¹² And curiously, it is the latter set that NM 469 refers to. There are two possible ways of interpreting this passage: either that the old *pūrṇimānta* system was preserved in this context or

that a new *pūrṇimānta* system was introduced into this passage.

The above discussion leads us to the following conclusion. At the time of the *Nīlamatapūrāṇa* the calendar in Kashmir was based on *amānta*, but the author of the NM tried his best to prescribe the date of *pūjās* and *vratas* as applicable to both *amānta* and *pūrṇimānta* systems, because the *pūrṇimānta* system was also current in some way or other.

4. *agastyapūjā*

The heliacal rising (the first appearance before dawn) of the star *Agastya* (Canopus) is an important astronomical phenomenon concerned with weather prognostics. With this phenomenon the rainy season comes to an end and the sky clears. *Pūjā* was performed in the dawn of the first appearance of *Agastya*, and the fortune of the kings, individuals, and states were foretold. The *agastyapūjā* is frequently mentioned in Purāṇic literature.

The date of *Agastya*'s first appearance depends on the geographical latitude. Here is a list of Sanskrit texts which give the date of the first appearance of *Agastya*. The dates are usually given by the position of the sun in the zodiacal sign.

*Bṛhatsaṃhitā*¹³ 12.14: when the sun is 7° before (the first point of) *Kanyā* (Virgo), namely, 23° *Siṃha* ($\lambda = 143^\circ$).

*Agnipurāṇa*¹⁴ chap. 206: when the sun is 3° before *Kanyā* ($\lambda = 147^\circ$).

Garuḍapurāṇa,¹⁵ Pūrva-k° 119.1: same as above.

Ādipurāṇa 1343¹⁶: when the sun is 6° of *Kanyā* ($\lambda = 156^\circ$).

*Kṛtyakalpataru*¹⁷ p. 450: same as above.

*Kṛtyaratnākara*¹⁸ p. 297: same as above.

To this list we can add a data from the *Nīlamatapūrāṇa*.

NM 742: when the sun is at the middle of *Kanyā* ($\lambda = 165^\circ$).

One important fact to note is that the solar longitudes mentioned in these texts are based on the *sāyana* coordinate (where precession of the equinoxes is taken into consideration). It seems that the model set by Varāhamihira in his *Bṛhatsaṃhitā* was followed in the later texts.

It is interesting that *agastyadarśana* is also mentioned in the *Rājataranṅgiṇī* 2.140—

*nīlotpalavatīr vāpīr agastyodayanirviśāḥ /
avagāhya harārcābhiḥ śaradaṃ nirviveśa saḥ //*

‘Plunging into the pond which had blue lotus flowers and which was purified by the rising of Agastya, he (the king) enjoyed autumn with the praises of Hara.’

In order to find the relative position in latitude of these texts, I have designed a computer program for finding the solar longitude at the first appearance of *Agastya* for the given terrestrial latitude and in the given year. In Table 4 I have listed the results for the latitudes ranging from 20° to 37° north in the three different periods around AD 500, 1000, and 1500. Of course, the results shown in the table are purely theoretical, but one can get a rough idea about the relation in the geographical latitude of the texts and the date which is derived from the position of the sun.

The locality of the *Agnipurāṇa* is about 2 degrees north of Ujjainī if the text belongs to the same period as Varāhamihira. If we admit the date of the

Table 4. Heliacal Rising of *Agastya* (Canopus)

Geog. lat. (°)	Average of 5 years since					
	A. D. 500		A. D. 1000		A. D. 1500	
	Date (Julian) m d	solar long. (λ°)	Date (Julian) m d	solar long. (λ°)	Date (Julian) m d	solar long (λ°)
20	8.1/2	129.9	7.31	132.4	7.29	134.8
21	8.3/4	131.8	8.2	134.4	7.31/8.1	136.7
22	8.5/6	133.8	8.4	136.6	8.2/3	138.6
23	8.7/8	135.7	8.5/6	137.8	8.4/5	140.6
24	8.9/10	137.6	8.8	140.0	8.6/7	142.5
25	8.11/12	139.6	8.10	142.1	8.8/9	144.4
26	8.13/14	141.7	8.12	144.0	8.10/11	146.5
27	8.16	144.1	8.14/15	146.1	8.12/13	148.5
28	8.18	146.2	8.16/17	148.3	8.15	150.8
29	8.20/21	148.3	8.19	150.8	8.17/18	153.1
30	8.23	150.9	8.21/22	153.1	8.20	155.6
31	8.25/26	153.4	8.24	156.0	8.22/23	158.0
32	8.28	156.0	8.26/27	158.0	8.25	160.7
33	8.31	158.9	8.29/30	161.0	8.28	163.6
34	9.3/4	162.1	9.1/2	164.3	8.31	166.5
35	9.7	165.6	9.5	167.6	9.4	170.3
36	9.11	169.5	9.9	171.5	9.8	174.2
37	9.16	174.8	9.14	176.5	9.13	179.3

Kṛtyakālpataru as being in the 12th century, the place of its composition is around 6 degrees north of Ujjainī.

The solar position given in the NM fits quite well with the modern computation for the latitude 34° when the date is put several centuries around AD 1000. At the latitude of Srinagar (about 34° N) it is not very easy to watch this star of great southern declination ($\delta = -52.5^\circ$). Thus, watching this star must have been a very auspicious event, especially in Kashmir.

The text of the NM shows some confusion in the order of festivals and *vratas* which should be performed around the month of Bhādrapada. In central India the time of *agastyadarśana* was roughly the middle of August in the Julian calendar during several centuries around AD 1000. But in Kashmir it was about half a month later. Although it was established in the central Indian tradition that the *agastyapūjā* was to be performed during the *śuklapakṣa* of Bhādrapada, in Kashmir the same rite must have been put half a month later, namely, during the *kṛṣṇapakṣa* of Bhādrapada, otherwise people could not watch *Agastya's* rising. This is why the description of the *agastyapūjā* in the NM was put after the events in the *śuklapakṣa* of Bhādrapada. But in the course of textual tradition, this seems to have caused some confusion. Probably this is one of the reasons why NM 755–774, which deals with the 5th to 12th tithi of *śuklapakṣa* of Bhādrapada, was shifted from its original place (after NM 729) to the place of our present text, namely, after the *agastyapūjā*. This alteration was probably made by the hand of ritualists who wanted to keep conformity with the central Indian tradition.

NOTES AND REFERENCES

1. For the Sanskrit astronomical texts referred to in this paper, see D. Pingree, *Jyotiḥśāstra* (J. Gonda, *History of Indian Literature*, Vol. VI, Fasc. 4), Wiesbaden 1981, and his *Census of Exact Sciences in Sanskrit*, Series A, Vols 1–4, Philadelphia 1970–81.
For the Indian calendar system, see R. Sewell and S. B. Dikshit, *The Indian Calendar*, London 1896, and Council of Scientific and Industrial Research, *Report of the Calendar Reform Committee*, New Delhi, 1955.
2. I have collected about 40 kinds of calendars, mostly from north India, for the year Śaka 1913. The variety is such that, for example, the same *Jyaiṣṭha śuklapakṣa* has seven patterns of arrangement of *kṣayadina* (omitted day) and *adhidina* (additional day).
3. See, for example, J. F. Fleet, *Corpus Inscriptionum Indicarum*, Vol. III, Varanasi (reprint) 1970.
4. The length is not given in the text but can be inferred from the statement of NM 42, that the length of *sandhyā* is that of *kṛtayuga*.
5. *Brhatsaṃhitā* 47.3, 47.48, 47.80, 52.10.
6. Cf. *Report of the Calendar Reform Committee*, p. 258.
7. M. Yano, 'The Hsiu-yao Ching and its Sanskrit Sources', in *History of Oriental Astronomy* (ed. by G. Swarup et al.), Cambridge, 1985, pp. 125–134.
8. This is inevitable because $360 = 13 \times 27 + 9$.

9. A similar table is found in some of the popular almanacs in modern Japan, where the *nakṣatras* of the new moon day, instead of the full moon day, are fixed, and thus the overlapping of the same *nakṣatra* occurs around the full moon days.
10. Pingree, *Census*, Vol. 4, p. 270.
11. With a modification from k 8 to s 8 of Phālgunā.
12. I owe this information to Mr. M. Fujii. (See, pp. 66ff. in this volume.)
13. *Bṛhatsaṃhitā*, ed with Utpala's vivṛti by Sudhākara Dvivedin as VSS 10, 2 vols., Benares 1895–1897.
14. *Agnipurāṇa*, ed. by Achārya Baladeva Upādhyāya, Kashi Sanskrit Series 174, Varanasi 1966.
15. *The Garuḍamahāpurāṇam*, Nag Publishers 1984.
16. *Ādipurāṇa*, Mss obtained by Prof. Ikari, cf. Ikari & Hayashi, *Ādipurāṇa* p. 100.
17. *Kṛtyakalpataru*, *Niyatakālakāṇḍa* (GOS No. CXI), 1950, p. 450.
18. *Kṛtyaratnākara* (BI No. 237), Calcutta 1925, p. 297.