

SOME CELESTIAL OBSERVATIONS ASSOCIATED WITH KṚṢṢA-LORE

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(Received 23 July 2004; revised 3 January 2006)

The *Mahābhārata* contains, besides eclipse and planetary positions, curious statements about a few stars. Several Purāṇas that deal with the life and times of KṚṢṢa also describe observations of the sky, in the form of eclipses and comets. The present study investigates whether the possible time periods of these observations are harmonious with the date of 1493-1443 BC obtained previously for the eclipse and planetary positions stated in the *Mahābhārata*.

Key words: Eclipses, Comets, Pole Star, *Mahābhārata*, Hari-vaṃśa, Purāṇa

INTRODUCTION

KṚṢṢa as a historical person has been a subject of continued discussion. The belief about his historicity is anchored in an unbroken cultural tradition supported largely by the epic *Mahābhārata* (*MB*), its appendix *Hari-vaṃśa* and a few other Purāṇas. In the absence of archaeological evidences, investigations on the historical aspect of the tradition have heavily depended on the above texts. However, the texts as available now are not even homogenous, having undergone additions and alterations by more than one person at different dates. Several scholars in the past have studied the voluminous textual collection from the perspective of what may be called Purāṇic paleontology. The major effort in this direction has been to trace genealogies of kings and sages of ancient India. Pargiter¹ was perhaps the first to have undertaken this type of work to demonstrate that a historical tradition is embedded in the disordered layers of these texts. Investigation along this line has been pursued by Pusalker², Bhargava³ and Sircar⁴ among others. The second line of work has been to study the relation between archaeological findings and Purāṇic

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texts. This appears to have been successful for the period after 500 BC. Prior to this period, the relationship between the archaeological findings and the ancient texts are not yet unequivocally understood⁵. A third approach to the texts has been through archaeo-astronomy. Vedic literature is rich in celestial information but is couched in a metaphorical language that is not always easy to decode. The epics *MB*, *Rāmāyaṇa* and a few Purāṇas contain statements about eclipses and other phenomena. Study of this type of information continues to attract attention, since some of these are dateable. Recently the present author investigated the eclipse and planetary positions mentioned in *MB*^{6,7}. The effort was to know whether these are internally consistent among themselves to be considered as credible historical observations. The period 501-3000 BC was searched and it was found that the observations are indeed consistent and in all likelihood should have been observed during the epoch 1493-1443 BC⁶. Extending the search period up to 3250 BC did not change the above conclusion⁷. Two comments are possible on this result. One may argue that the identified period may represent only the probable time of the composition of the text and not necessarily that of Kṛṣṇa, who could have lived earlier to the above time window. On the other hand, one can hold the view that the text itself may belong to a much later period with only memories of ancient happenings recounted in a poetic fashion. Both these arguments are sound, but it is easy to observe that in either case the above identified period should have been central to the over all tradition of Kṛṣṇa as a historical person. However, *MB* is not the exclusive source for all that is carried on in the collective memory of the country about the historical Kṛṣṇa. Thus, a natural question would be what relation *MB* has with other texts such as *Hari-vaṁśa (HV)*, *Skānda-purāṇa (SP)*, *Viṣṇu-purāṇa (VP)*, *Bhāgavata-purāṇa (BP)* and a few others, that refer to Kṛṣṇa and his times. The aim of the present study is to see whether the celestial observations given in some of these texts synchronize with the date obtained previously from *MB*, namely 1493-1443 BC. *MB* itself contains references to several obscure sky observations, some of which need not be reconcilable with c. 1500 BC. For example, Kārtikeya's birth in the Pleiades, his subsequent falling on earth as Skanda and a severe famine faced by Viśvāmitra are narrated in *MB*, not as contemporaneous events, but as ancient history (*itihāsam purātanam*). This has been discussed by the present author elsewhere⁸ and hence will not be taken up here.

MAHĀBHĀRATA

Besides the eclipses and planetary positions studied previously by the present author, *MB* contains a few curious statements about some specific stars. The text reads as follows:

abhijit spardhamānā tu rohiṇyāḥ sā kanīyasī |
icchantī jyeṣṭhatām devi tapastaptum vanangatā ||
tatra mudho 'smi bhadram te nakṣatram gaganāt cyutam |
kālantvimām param skanda brahmaṇā saha cintaya ||
dhaniṣṭhādiḥ tadā kālo brahmaṇā parikalpitaḥ |
rohiṇī hyabhavat pūrvam evam sankhyā samābhavat ||
evam uktena sakrena tridivam kṛttikā gatā |
nakṣatram sapta- sīrṣābham bhāti tad vahni-daivatam || (Ara.P.229.8-11)

“Abhijit, is younger to *Rohiṇī*, but competing for seniority (over *Rohiṇī*) she went away to do penance (8). I am perplexed to find a star missing from the sky. Skanda, discuss this time with Brahma (9). Then, as ordained by Brahma, time began with *Dhaniṣṭhā*. *Rohiṇī* only existed previously; this way the numbers became same (10). Being told like this by Indra, *Kṛttikā* went to the sky. That seven-headed star with fire as its deity shines (in the, sky) (11)”.

The above verses appear in all editions of *MB*, including the recognized Bhandarkar Oriental Research Institute, Pune, critical edition⁹ where it appears in Chapter 219. These four verses refer to the four stars *Abhijit*, *Rohiṇī*, *Dhaniṣṭhā* and *Kṛttikā*. The literal meaning of the first two verses is easy. However, what is meant by *Abhijit* and *Rohiṇī* is not clear. In Vedic literature there is ambiguity as to whether the number of *nakṣatras* was 27 or 28. In the much later Siddhantic astronomy whenever 28 stars are mentioned in dividing the ecliptic, *Abhijit* is placed between *U. Āṣāḍa* and *Śravaṇā* and is identified with star Vega (a Lyrae). In *Taittirīya Saṃhitā* (4.4.10) only 27 stars are mentioned, whereas in *Taittirīya Brāhmaṇa* (1.5.1.3) 28 stars with *Abhijit* placed between *U. Āṣāḍa* and *Śravaṇā* are listed. Again, even though *Rohiṇī* is popularly identified with Aldebaran, there is indication in the above text that *Jyeṣṭhā* was once called by the same name *Rohiṇī*. *Abhijit*'s competition with her elder sister *Rohiṇī* and eventual vanishing from the sky should be an allegory for brightening followed by dimming beyond recognition. If we take the traditional position of *Abhijit* as the correct position since ancient times, its

relative brightening would have been with respect to Antares (Ḷyeṣṡhā Rohiṇī). There is an indirect allusion to the missing Abhijit in *Taittirīya Saṃhitā* (*Brāhmaṇa* 3.3.6.4) also. In the available ancient Chinese, records on supernovae, there is reference to a star near Antares that vanished in 1400 BC¹⁰. Could this be the vanishing star referred as Abhijit in *MB*? The statement that this happened when time (year) began with star Dhaniṣṡhā lends support to this possibility. Winter solstice at Dhaniṣṡhā was the period of *Vedāṅga Jyotiṣa*, which has been dated to c. 1400 BC¹¹. The meaning of the last three lines of the above verses, in relation to the previous ones is not clear as noted by S.B.Dikshit¹², a scholar of great repute. The other observations are about U. Major and Pole Star. In Bhīṣma-parvan it is said,

arundhatī tathāpyesa vasiṣṡhaḥ pṣṡhathah kṛtaḥ ||
dhruvaḥ prajvalito ghoram apasavyam pravartate || (Bhī .P. 2.31,3.17)

“Arundhatī has gone ahead of (her husband) Vasiṣṡha.

Dhruva, the pole star blazing and fierce, is moving anti-clockwise.”

Vasiṣṡha is star Mizar, of second magnitude, in the constellation of U. Major. It is presently known that this is made up of four constituent stars, but this fact is not discernable without the help of instruments. Vasiṣṡha has a companion star Arundhatī (Alcor) of fourth magnitude. Again, as per modern astronomy Alcor goes round Mizar with a very long period. Hence, the above statement in *MB* is a naked eye observation of the sky in a poetic language. The remarkable fact is that the composer of the above verse knew about the motion of Alcor with respect to its companion star Mizar. Dhruva the Pole Star is supposedly fixed and unmovable. Thus, this statement has not been taken seriously by some people as an astronomical observation. However, the phenomenon of precession would show that Dhruva is also subject to a slow motion. Jacobi was the first to point out that the current Pole Star α -U.Minor was not the *Dhruva* of Vedic literature. This topic has been discussed by indologists and their conclusions on dating the Vedic marriage rituals are available in the book by N.Law¹³. Briefly, α -Draconis was the Pole Star c. 3000 BC. This situation would have changed with κ -Draconis and β -U.Minor coming near the pole but never as close as α -Draconis had been. Hence, the North Star that was also the Pole Star for a long time (3000-1500 BC) must have been α -Draconis. With this in the background, it would be clear that α -Draconis

drifting away from its previous expected position around 1500 BC is what has been described in *MB* as Dhruva moving anti-clockwise. Thus, the above celestial statements broadly match with 1493-1443 BC period found previously for the eclipses and planetary positions stated in *MB*. The statement, in *Aśvamedha Parvan* (Ch.44) about the stars starting from Śraviṣṭhā (Dhaniṣṭhā) also points to the time when winter solstice synchronized with this star c.1400 BC¹¹.

HARI-VAMŚĀ (HV)

HV is considered an appendix to *MB* and hence is of prime importance in our present investigation. Like with *MB*, this text also has several recensions containing many interpolations. As per the critical edition from Pune, the following planetary position is found in the second book of *HV* called *Viṣṇu-parvan*.

eṣa ghorō grahaḥ svātim ullikhan khe gabhastibhiḥ |
vakram aṅgārakah cakre vyāharanti kharam dvijāḥ || (66.25)

This verse as it is, refers to a fierce planet near star Svātī (Arcturus) in the first half. The second half cites Mars, but whether this is same as the fierce planet of the first half is not clear. Also what is its relation to the statement *vyāharanti kharam dvijāḥ*? On the other hand, in the variant readings the last quarter of the verse is *citrāyām ghora darśanaḥ*, which would mean that retrograde Mars, was ominously seen near star Citrā (Spica). Some editions state that Mercury could be seen in the west and Venus had crossed star Viśākhā. All editions are unanimous in stating a solar eclipse as,

grastaḥ svarbhāmunā suryo divā naktam ajāyata ||
“Sun having been eclipsed, the day turned into night”

Among the portents, some editions include a comet extending along the ecliptic as

bharanyādī ni bhinnāni nakṣatrāni trayodaśa |
ketunā dhūma-ketostu nānuyānti niśākaram ||

“Thirteen stars beginning with Bharani have been covered with the flag of a comet and they (stars) are unable to follow the moon.”

The above statements are mentioned in a conversation between

Kamsa and Andhaka. The latter dissuades the former from inviting Kṛṣṇa and Balarāma by deception to Mathura. Incidentally, the above celestial signs are mentioned as bad omens observed in the recent past and thus form the backdrop for the killing of Kamsa by Kṛṣṇa. This story comes after the Indra festival and the untimely rains at Gokula, in *śarad-ṛtu* (autumn). But, the season in which the eclipse occurred is not clear from the text. Since, the people of Mathura were in a festive mood during the visit of Kṛṣṇa, this season may be taken as spring (March-May). An eclipse and a single position of Mars are not good enough to independently date the above naked eye observations. Since *HV* narrates Kṛṣṇa's life as being an appendix to *MB*, it would be pertinent to ask whether the above statements reasonably precede the date 1493 BC assigned to the solar eclipse in the *Sabhā-parvan* of *MB*. As in the previous investigations with *MB*, the planetarium software, PVIS (www.alcyone.de) has been used to search for solar eclipses observable at Mathura. A solar eclipse was possible to have been observed on 4th April 1523 BC. A few days later Mars could have been seen in the stated position. The sky chart for a near by date (25th June 1523 BC) is shown in Fig.1 as generated by EZC software. It would appear that the fierce planet mentioned to be near Svātī was Saturn, which is usually referred to as malevolent and fierce. It can be verified also that Mars was in retrograde motion a few weeks earlier. The statement about the comet is not included in the main text of the critical edition. Probably, this is a memory of an event at some other time, but clubbed with the killing of Kamsa, in a few traditions. This verse appears in Chapter 10 on comets in *Adbhuta-sāgara* by Ballāḷa Sena (10-11th cent. AD)¹⁴. Identification of the comet from the stated verse is not possible. However, one can verify whether Halley's comet could have been sighted during this period, from the results of back calculation provided by Brady¹⁵. It is found that Halley's comet would have been visible in the sky during 1521 BC, its perihelion passage being on 14th August 1521 BC. Thus, the period of 1523-1521 BC for the celestial observations of *HV* is consistent with corresponding statements in *MB*.

***SKĀNDA-PURĀṆA*¹⁶(*SP*)**

Next to *MB* and *HV*, tradition assigns greater importance to *VP* and *BP* as far as the story is concerned. However, it is found that *SP* contains more number of celestial observations connected with Kṛṣṇa's time, than any other

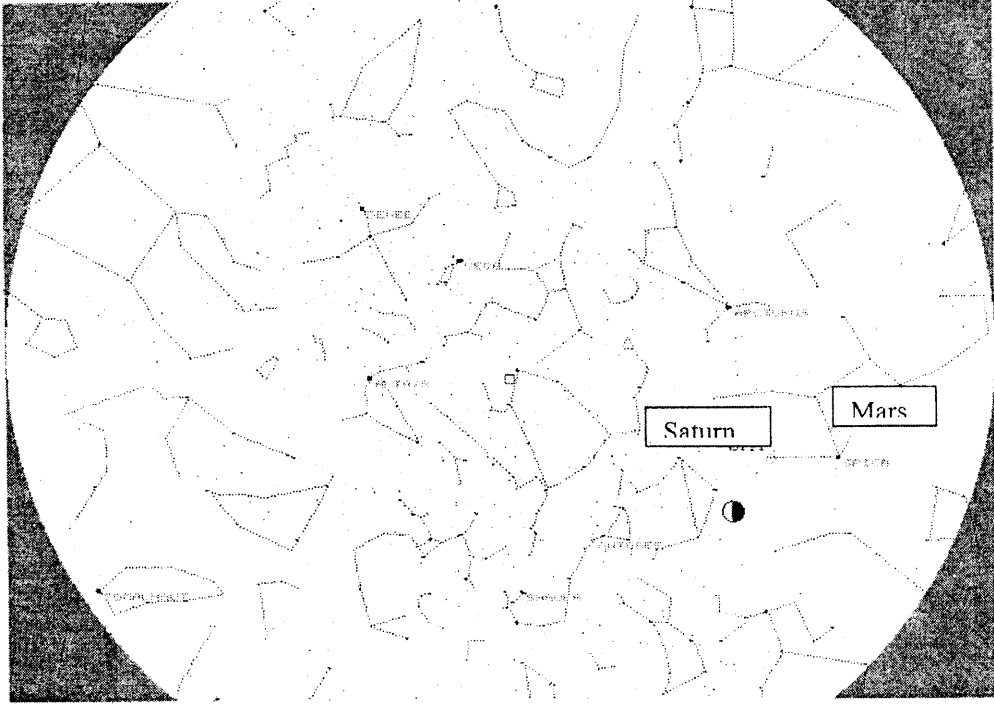


Fig.1.Sky Chart as per EZC Software for 25.6.1523 BC. 22 hr. (L.T).

Purāṇic text. *SP* is the largest among the eighteen Purāṇas. The last part of *SP* called *Prabhāsa-khaṇḍa* contains four books namely, *Prabhāsa-kṣetra-māhātmya* (*PKM*), *Vastrāpatha-kṣetra-māhātmya*, *Arbuda-khaṇḍa* and *Dvārakā-māhātmya*. All these books refer to Kṛṣṇa in different contexts in a rather unconnected fashion. For our purpose, there are two solar and one lunar eclipse statements in *PKM*. The first is in Chapter 85, where Kṛṣṇa's emigration, along with his followers, from Mathura to the then west coast is described.

grhītvā yādavān sarvān bāla-vṛddha-vaṇig-jaṇān |
sa śūnyam mathurām kṛtvā prabhāsam samupāgataḥ ||
samudram prārthayāmāsa sthānam samvāsa hetave |
etasmin eva kāle tu deva-devo divākarah ||
sangrasto rāhuṇā devi parva-kāle hyupasthite |
tam dṛṣṭvā yādavāḥ sarve viṣādādam paramam gatāḥ || (Ch 85.5,6,7)

“He (Kṛṣṇa) having vacated Mathura arrived at Prabhāsa taking with him all the Yādavas and sought from the sea, land for settlement. At this time, there occurred a solar eclipse, seeing which the Yādavas were dejected”.

The text further states that Kṛṣṇa cheered up his followers, by exhibiting his yogic powers when Sannihitī Lake broke open from the ground at Prabhāsa. As far as the eclipse is concerned, without other constraints the year can only be estimated with reference to the statements arising from *MB* and *HV*. Previously 1523 BC has been found to be consistent with Kṛṣṇa’s visit to Mathurā. There were seven solar eclipses possible to have been observed at Kurukṣetra during 1522-1500 BC. Thus, the above eclipse of *PKM* connected with Kṛṣṇa is a distinct possibility.

In the next chapter, a lunar eclipse at Prabhāsa finds mention.

gupta-caryām yadā yātāḥ pāṇḍvāḥ vana-vāsinaḥ |
tīrtha-yātrā-prasāngena prabhāsam kṣetramāgatāḥ ||
tasmin kāle mahādevi samprāpte soma-parvarṇi |
sthāpayāmasuḥ te sarve liṅgam sannihitī-taṭe || (Ch. 86.2,3)

“Pāṇḍvās came to Prabhāsa during their incognito exile in the forest, on a religious trip. At that time, when a lunar eclipse (*soṃa-parvarṇi*) occurred, they established a liṅga on the banks of Lake Sannihitī .

This eclipse introduces a severe constraint on the original *MB* story of Pāṇḍava’s remaining *incognito* for one year. In the previous paper on *MB* it has been found that the compatible year for the war is 1478 BC. Also there is internal evidence in *MB* text, to effect that the war took place about an year after the thirteen year exile was completed⁷. Hence, for *PKM* of *SP* to be in conformity with *MB*, the above lunar eclipse should have been in 1480 BC. Indeed there was a total lunar eclipse on 10th January 1480 BC, as can be verified from PVIS

software, visible over Kurukṣetra and near by regions. It may be noted here that traditionally Sannihitī is located in Kurukṣetra. Hence, the above verses indicate that Prabhāsa could not have been too far away from Kurukṣetra. The next information available from *SP* is about the last days of KṚṢṆA. This appears in chapter 237 of the second part of *PKM*. The description is as graphic as in *MB*. In particular, a comet citing is mentioned followed by a solar eclipse. The comet is personified as time the Destroyer (*kāla-puruṣa*) and is described as,

sammārjinī mahā-ketuḥ japā-puṣpāvataṃsakaḥ |
grhāṇyaveksya vṛṣṇinām nādr̥syata punaḥ kvacit || (237.24-25)

“Broomstick mega-comet (*mahā-ketuḥ*) with hibiscus flowers as his ear ornament, having observed the houses of *Vṛṣṇis*, did not appear again.”

trayodaśī pañcadaśī kṛ teyam rāhunā punaḥ |
tadā ca bhārata yuddhe prāptā cādya kṣayāya naḥ ||
mene prāptam sa ṣaṭ-triṃśam varṣam keśi-niśūdanaḥ |
putra-śokābhisantaptā gāndhārī yad uvāca ha ||

“The thirteenth (day has not been made again into the fifteenth (day) by Rāhu, like during the Bhārata war, bringing destruction to us. KṚṢṆA understood that the 36th year foretold by the grieving Gāndhārī had arrived.”

This implies that 36 years after the *MB* war bad omens like a comet and a solar eclipse occurred signaling the end of KṚṢṆA’s sojourn on earth. If the comet were to be taken as a past apparition of Halley’s comet, this had its perihelion passage on 21 st January 1445 BC, as per the back calculations of Brady¹⁵. The solar eclipse has already been dated to 1443-44 BC as being compatible with other celestial observations in *MB*. The comet is figuratively mentioned as *brahma-daṇḍa* in *MB* (Ādi P. 2.349; Mausala P. 3.39). The name *musala* (pounding rod) that is supposed to have caused the destruction of Yādava clan appears to be an euphemism for a comet. Several verses indicating bad omens are common to *MB* and *PKM* and the comet appearance synchronizes with other events within *MB*. Moreover, the comet sighting occurring in *HV* identified for 1521 BC is compatible with the above comet in *SP*, occurring some 77 years later. If KṚṢṆA’s first visit to Mathura was when he was about 18 years old, he should have lived for about 96 years. This figure is compatible with what little information is available in *Viṣṇu-purāṇa*.

VIṢṆU PURĀṆA (VP)

This text of *VP* is more coherent and organized unlike *PKM*. With reference to Kṛṣṇa, no astronomical information is presented, except for his birth. This also is indirect and cursory as,

prāvṛt-kāle ca nabhasi kṛṣṇāṣṭamyām aham niśi |
utpatsyāmi navamyāntu prasūtim tvam avāpsyami || (5th book, 1.78)

“In the early rainy season, in the month of Nabhas, on the eighth night of the dark-half, during the ninth tithi I will be born”.

This (statement of Viṣṇu to be incarnated as Kṛṣṇa) agrees with the traditional belief about Kṛṣṇa’s birth in the month of Śrāvāṇa (August-September) that is followed to this day all over India. As is well known, due to precession, the rainy season has now fallen back to June. However, the above would have been true around 1500 BC. This dating has a parallel in the Vedic *upakarāṇa* ritual being observed on Śrāvāṇa *purnimā*¹³. Chapters 37 and 38 of *VP* describe the last days of Kṛṣṇa. No specific celestial observations are mentioned, but it is said that gods sent in secret messages to Kṛṣṇa to the effect that he has already lived for more than 100 years. About the birth star of Kṛṣṇa we get the information from the *Bhāgavata*.

BHĀGAVATA PURĀṆA (BP)

This text, one of the most popular, appears to belong to a later date. This we see in Chap. 78 of the 10th Book, wherein Balarāma is made to travel all over India for one year, in contrast with the 42-day travel as per *MB*. Nevertheless, *BP* may retain ancient information, in a somewhat distorted fashion. Information about the birth star of Kṛṣṇa occurs in a highly stylized stanza,

yarhyeva ajana-janma-nakṣatram śāntarṅga graha-tāraṅga
 (10th book 3.1)

The phrase *ajana-janma-nakṣatram* is interpreted by the commentator Śrīdhara as Rohiṇī (Aldebaran)¹⁷. Interestingly a solar eclipse connected with Kṛṣṇa appears in *BP*.

athaikadā dvāravatyām vasato rāma-kṛṣṇayoh |
sūryoparāgaḥ sumahān āsīt kakpakṣaye yathā ||
tam jñātvā manujā rājan purastādeva sarvataḥ |
samanta-pañcakam kṣetram yayuḥ śreyo-vidhitasayā ||
 (10th book Ch 82.1,2)

“Once when Balarāma and KṚṢṢṢa were living in Dvārakā there occurred a solar eclipse, like at the end of time (Kalpa). Having known this in advance, people went to *Samanta-pañcaka* for observing rituals.”

No other text mentions this eclipse but since *BP* may be retaining ancient happenings even if in an exaggerated form, the possibility of this eclipse cannot be ruled out. It was mentioned previously that during 1522-1500 BC seven eclipses were possible at Kurukṣetra. *BP* says that KṚṢṢṢa stayed at Kurukṣetra for about three months till the rains started. The solar eclipse on 1 st July 1507 BC may roughly fit into the above description. The eclipse is supposed to have been predicted in advance for people to converge at Kurukṣetra. However, there is no clue as to how this could have been achieved.

DISCUSSION AND CONCLUSION

The effort in this paper has been to see whether celestial observations mentioned in ancient texts, in relation to KṚṢṢṢa and his times, are consistent among themselves or not. The texts considered are *MB*, *HV*, *SP*, *VP* and *BP*. Several other Purāṇas also narrate the story of KṚṢṢṢa, but progressively omit astronomical information and concentrate only on mythology. Thus, a discernable trend of these texts is that those called *itihāsa* (history) have been structured to retain their chronological perspective in terms of eclipse occurrences and other celestial events. This is particularly true with *MB* and *HV* and to some extent with *SP*. It is seen that taking all the above books together, consistency in celestial happenings demands that these observations should be assigned to the period 1543-1443 BC. This result is heavily influenced by *MB*^{6,7}, but the other texts do not contradict this conclusion. Infact they support this as in *PKM*, where the lunar eclipse introduces a stringent constraint on the *MB* observations, but fits in neatly to 1480 BC. Similarly, narrating the last days of KṚṢṢṢa, *PKM* mentions a comet that is only indirectly stated in *MB*. However, *BP* (XI.30.5) retains this directly as *yama-ketavaḥ* (deadly comets). This fits in well with the appearance of Halley’s comet in 1445 BC, a date that is too close to the figure of 1443-1444 BC for the last eclipse of *MB* identified previously⁶. Such correspondences among different texts cannot be coincidences, but are indicators of over all consistency in the tradition of KṚṢṢṢa as a historical person. There is another internal information that supports the above period as the his-

torical period. This is the traditional chronology between Parīkṣit, grandson of Arjuna of *MB* and the historical Mauryas. The relevant texts appear in *VP* (IV. Ch. 24) and *BP* (XII. Ch.1 and Ch. 2). These are not celestial observations and hence not discussed here further, but have been thoroughly discussed previously by others. Majumdar¹⁸. commenting on this chronology concludes that as per these texts, two dates emerge for the *MB* war namely 1900 BC and 1450 BC in round figures. The latter figure is harmonious with the results of the present investigation based only on celestial observations found in *MB*, *HV*, *SP*, *VP* and *BP*.

ACKNOWLEDGEMENTS

Thanks are due to Dr. B. P. Radhakrishna, President, Geological Society of India, for useful discussions. Financial support by Indian National Academy of Engineering under its Engineering Heritage Program (Civil) is acknowledged.

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13. N.N.Law, *Age of the Ṛgveda*, Firma K.L.Mukhopadhyay, Calcutta, 1965
14. *Adbhuta-sāgara* by Ballāla Sena, Sanskrit Text (ed.) Pt. Muralidhar Jha, The Prabhakari & Co. Benares Cantt. 1905.
15. J. L. Brady, “Halley’s Comet: AD 1986 to 2647 BC” *J. of British Astronomical Association*, 92.5 (1982) 209-215.
16. *Skānda-purāṇam*, Prabhāsa-khaṇḍa, in three volumes. Sanskrit Text with Kannada translation by Pt. M. Subrahmanya Sastri, Sri Jayachamarajendra grantha-ratnamālā, No. 14, Publ. Palace of Mysore, 1958.
17. *Bhāgavata Purāṇa* with Sanskrit commentary of Śrīdhara-cārya, (ed.) Purāṇam Hayagriva-sastry (1850) *ajanā-janma-nakṣatram* is explained by the commentator as *ajanāt nārāyanāt-janma yasya, prajāpateḥ, tasya ṛkṣam, Rohiṇi nakṣatram*.
18. R.C. Majumdar, “The Bhārata War” in *Bhārata War and Paranic Genealogies* (ed. D C. Sircar), Univ. of Calcutta, (1969), pp.11-17.