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FIXING THE CHRONOLOGY IN TAI-AHOM CHRONICLES BY USING ASTRONOMICAL REFERENCES

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Abstract: The Tai-Ahom are an ethnic group, the admixed descendants of the Tai or Shan people who migrated from North Burma into the Brahmaputra Valley of Assam in India in the early decades of the thirteenth century. Their history is meticulously documented in chronicles called *buranjis*, manuscripts written in the Ahom or Assamese language. The *Ahom Buranji* (Royal Chronicle) was first translated in 1930 and covers Ahom history from the earliest times until the end of the Ahom rule in 1826 CE. Another *buranji* translated into English is the *Tungkhungia Buranji*, which covers the period 1681–1826 CE. Sprinkled throughout these texts are references to solar and lunar eclipses and bright comets. These objects and events can be dated.

Of particular interest in the *Ahom Buranji* is the record of an unusual occurrence during the reign of King Chao Susenpha, when the day suddenly became as dark as night. This had been identified as the solar eclipse of 6 March 1486 and was seen as an independent corroboration of the chronology in the *Ahom Buranji*. However, we find that this was a partial eclipse and was not visible over Assam. Instead, we found there was a total eclipse visible from Assam two years later, on 9 July 1488 CE. There is another solar eclipse mentioned in the *Ahom Buranji*, which we identified as that of 30 December 1758 CE. There are also two lunar eclipses on record, most likely those of 27 July 1646 and 4 February 1776 CE. Comets mentioned in the *buranjis* turned out to be the Great Comet of 1577, Chéseaux's Comet of 1744, Halley's Comet of 1759 and Messier's Comet of 1769 CE. Since the dates of these astronomical events are precise, we have a larger dataset that can now be used to establish dates in Ahom history more exactly.

Keywords: Assam, Tai-Ahom, *Ahom Buranji*, *Tungkhungia Buranji*, solar eclipses, lunar eclipses, Great Comet C/1577 V1, Comet C/1744 X1 ('Chéseaux's Comet'), Comet 1P/Halley (1759), Comet C/1769 P1 (Messier).

1 INTRODUCTION

The Ahom or the Tai-Ahom are an ethnic group, the admixed descendants of the Tai or Shan people who migrated from North Burma into the Brahmaputra Valley of Assam in the early decades of the thirteenth century. Their history is meticulously documented in accounts called *buranjis* (meaning: 'a store that teaches the ignorant'; 'ancient writings') and in manuscripts written in Ahom or Assamese on oblong bark strips. The *buranjis* were essentially compiled in prose by eye-witnesses and high officials at the behest of their kings, under due supervision and with access to state documents. These were official, held by the State Archive, and were considered sacred.

There were also records maintained by distinguished Ahom families, namely, the *Vamshāvalis* ('genealogies'), which were kept and constantly updated. There were also the *Rāja-Vamshāvalis*, most of which were written at the behest of the Koch kings of Kāmrupa from the eighteenth century on. Kāmrupa is the name of Assam in Indian Purāṇa mythologies, and in the *Mahābhārata* it is Prāgjyotisa.

The earliest *Buranjis* were written in the Ahom language and from the sixteenth century in the Assamese language. There are also the chronicles in Assamese, such as the *Pādshah Buranji*, that were devoted to the Muhammadan rulers in Delhi and Agra involving events in Assam. Over time, a large number of *buranjis* have been discovered, but only a fraction have been published.

The *Ahom Buranji*, the Royal Chronicle of the Ahom Kingdom, was brought to light by Rai Sahib Golap Chandra Barua in 1930, when he published a transcript of the manuscript and an English-language translation (Barua, 1930). The manuscript, written on oblong sheets of Sachi lark, was owned by a Deodhai *pandit* (scholar and holy man) in the Assam city of Sibsagar, and was found in 1894. Barua (1930: Preface) got help from a few Deodhai *pandits* who taught him Ahom and helped him copy the manuscript that he then translated into English. He found that it covered Ahom history from the earliest times until the end of the Ahom rule in 1826 CE.

Sprinkled throughout the text are references to a number of astronomical events. While we know that such events provide a good basis for pinning down specific dates in history, the only event that seems to have been considered in this context so far and used to confirm the chronologies in the *Ahom Buranji* is a fifteenth century solar eclipse. Its significance was not lost on Acharyya (1957; 1966), whose interest in Ahom history extended only up to the year 1603 CE.

In this paper I examine this identification, as well as the other astronomical events referred to in the *Ahom Buranji* and in another important chronicle, the *Tungkhungia Buranji*. This latter *Buranji* was published by Dr S.K. Bhuyan and documents the history of Assam from 1681 until 1826 CE (Bhuyan, 1933). This period belongs to the Ahom rulers of the Tungkhungia Dynasty.

During the six centuries of their rule, the Ahom reckoned time by means of a sexagenary cycle, and the *Ahom Buranji* follows this chronological cycle. The word *lākni* is for a current year in the sexagenary cycle (for details, see the Appendix). In the translated part, Barua (1930) also gives the dates in the Common Era. Overall, the *Buranji* dates are as per the cycle, with occasional inter-cycle discord, as also reflected in the converted dates. In contrast, the *Tungkhungia Buranji* uses the Saka era; it turns out that the given Saka years are elapsed years.

In what follows, we shall see how well the dates in the Ahom texts reconcile with the actual dates of the astronomical events. For ready identification, we have retained the converted dates in A.D. as given by Barua (*ibid.*) in the *Ahom Buranji*. Dates that we use or propose in this paper are expressed in CE. Note that the dates prior to 15 October 1582 are per the Julian Calendar. The Gregorian Calendar was introduced in 1582 to reform the Julian Calendar by neutralizing the accumulated error of thirteen centuries of timekeeping, which amounted to ten days. The reformed calendar began when the last day of the Julian Calendar, Thursday 4 October 1582 was followed by the first Gregorian day, Friday 15 October 1582, without affecting the cycle of weekdays.

The Saka era, which is used in the *Tungkhungia Buranji*, starts on 15 March 78 CE. This marked the start of the reign of the Kushāṇa King Kanishka (r. 78–102 CE), and has been used by classical Indian astronomers since the time of Varāhamihira (Saha, 1955: 255–256). The Vikrama era starts in 57 BCE; the calendar is luni-solar. In the Vikrama Era, the year commences from the first of the bright fortnight of the *Chaitra* month (late March–early April). Originally, it commenced on the first of the bright fortnight of the *Kārtika* month (see Shastri, 1996: 54).

2 THE RISE OF THE AHOM

The *Buranjis* contain valuable historical material, documenting the Royal, administrative, social and cultural life of the Ahom. Between them, the accounts match and the chronology is corroborated by other independent records, namely, the Muhammadan chronicles, the numismatic and inscriptional evidence, and also the inscriptions on a cannon (Gait, 1906: vii).

In his PhD thesis on the political history of Medieval Assam during the period 1228–1603 CE, Acharyya (1957) made a detailed study of the various *buranjis* and the local chronicles to present genealogies of the kings and outline the political condition of Assam and neighbouring regions. He talked in detail about the origin of the Tai Ahom who were an offshoot of the Shan race; their homeland; their migration from Mong Mao in Yunnan into Mungdunshunkhām (Assam, a country full of gardens of gold) during A.D. 1215–1228; their initial settlement in the Brahmaputra Valley; their gradual expansion; their integration into Hindu society whilst retaining the beliefs and customs of the Shan culture; and their eventual rise to be a new and powerful Kingdom that spread over a large part of the north-eastern frontier of India.

The Ahom believed in supernatural powers and worshipped their ancestors. Over time, the Royalty began to come under the influence of Hinduism. The Brahmins gained a place in the Ahom administration, and from the seventeenth century the Royalty started to assume Hindu names. By the end of the seventeenth century, the Ahom had embraced Hinduism *en masse*. Acharyya (1957) also discussed the history of the late Kāmrupi kings, and the neighbouring Koches, Kachāris, Jayantiyās, Sootiyās and Nagās. Assam in the period also saw migrations from Upper Burma, Western Yunnan and North and Eastern Bengal. Acharyya (1957: 27) noted that in the *buranjis*, "Inaccuracies and misstatements are rare except those caused by scribal ignorance or carelessness".

Chāo Lung Siu-Ka-Phā, or, Sukāphā the Great (r. A.D. 1228–1268) whose name means 'a tiger from heaven' was the founder of the Ahom Dynasty (Figure 1); here Phā means King in Ahom and also, sky, heaven. In A.D. 1251, he made Che-Rai-Doi ("a shining town on the hill"—Charaideo) his capital where he later also built a fort (Acharyya, 1957: 52). The *maidams* (burial mounds) in Charaideo are a great tourist attraction. These are actually the mausoleums of the Ahom Kings and Queens, hemispherical in shape, and are comparable to the pyramids of Egypt. Charaideo was abandoned in A.D. 1397 for a new capital Charagua in the Sibsagar district. However, Charaideo continued to be a sacred place for the Ahom (Guha, 1983:

13). In later times, Suklenmung alias Garhgaya Raja (r. A.D. 1539–1552) made the nearby Garhgaon the capital. From A.D. 1707, Rangpur became the Ahom capital. Rang Ghar in Rangpur is a beautiful amphitheatre that was built by Chāo-Shukhrungphā, alias Swargadeo Rudra Singha (r. A.D. 1695–1714) and later rebuilt in 1744–1750 with red baked bricks by Chāo-Shunenphā, alias Swargadeo Promatha Singha (r. A.D. 1744–1752). It served as a Royal Pavilion of the Ahom kings and is reflective of great Tai-Ahom architecture (Figure 2). From A.D. 1794, Jorhat became the Ahom capital.

The Ahom ruled Assam for six centuries, from A.D. 1228 to 1826 (Figure 3), until the arrival of the British. For more on Ahom history and culture, see Gait (1906), Barua (1930), Bhuyan (1933), Acharyya (1957; 1966), Gogoi (1976) and Nartsupha and Wichasin (1995), and the webpages of the Institute of Tai Studies and Research.

3 THE CHRONOLOGY IN THE *AHOM BURANJI*

The Ahom had no era. In the matter of chronology, they computed their time, like the other Tai ethno-families, by means of a sixty-year cycle, the *tāosingā*. The first year in the cycle was *Kāpcheu* (1) and the last one *Kākeu* (60); for details, see the Appendix. The first Cycle commenced from the year A.D. 568 which

Figure 1: Sukāphā the Great (Government of Assam Stamp; Wikimedia Commons).

was the date of the first ruler of Mong Mao (Elias, 1876: 10). That is the earliest the *buranjis* go back to when it is said that the ancestors of the Ahom kings descended from heaven (Gait, 1906: vi). The sexagenary cycle is of Chinese origin and is widely used

Figure 2: The Rang Ghar, in Rangpur (courtesy: Archaeological Survey of India, Guwahati Circle (accessed 30 January 2021).

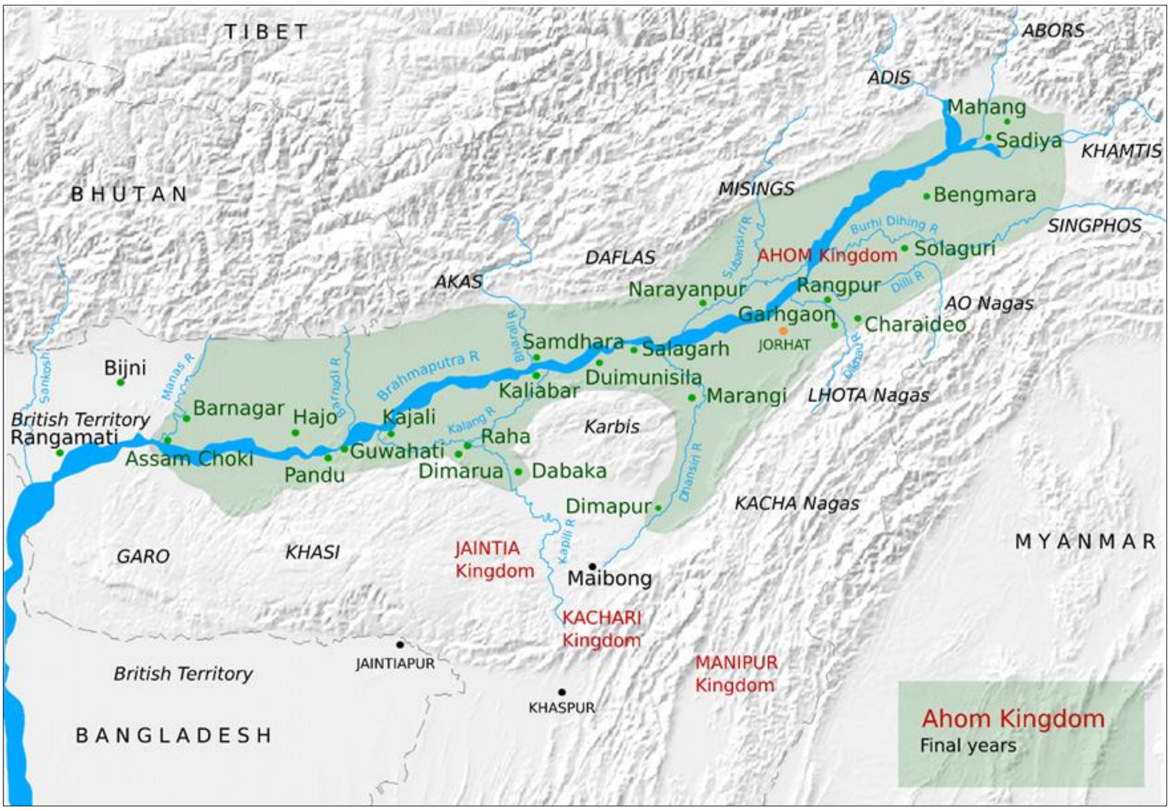


Figure 3: The Ahom Kingdom, ca. 1826 CE. Except for Charagua, all the Ahom capitals (Charaideo, Garhgaon, Rangpur and Jorhat) are marked. Charagua lay slightly north of Rangpur; see Figure 7 for its location (Wikimedia Commons).

in East Asian societies. The length of the cycle, figuratively speaking, was viewed in ancient times as being the equivalent of a complete human-life span. However, there is more to it, as we shall see. The Ahom have a sixty-day cycle also but their months are twelve (Phukon, 2018: 214). In the inscriptions as also in the *Ahom Buranji*, only the *lākni's* name is given, not the serial number of the *tāosingā*, although it is known that Sukāphā the Great had entered Assam in the first year of the twelfth *tāosingā*. Thus, add the number of the current *lākni* in the cycle to 11 × 60 + 568 to get the current year in the Common Era (Gait, 1906: 362). In other words, from 1228 CE the cycle commenced with the first *Lākni Kāpcheu*. Elsewhere in the *Ahom Buranji* (Barua, 1930: 327), it is stated that the new year, *Lākni Khutshingā* (i.e., A.D. 1774) came with the month *Dinching* (*Āghon*). It is the first Ahom month. It begins from the day following the New Moon of the twelfth month, and spans November–December.

The Shan used the lunar month as the basic unit of a year (Terwiel, 1981: 67). In the 60-year cycle, 38 years each have 12 months whereas, at regular intervals, a leap month is added, after the eighth month, to the other 22 in order to synchronize with the cycle of the Sun. The total number of months in the cycle is 742. Just to illustrate how the cycle compares with 60 solar years, if we take an average month as the synodic month of 29.5306 days, there would be 21,911.7 days in a 60-year cycle. For the same duration, 60 sidereal solar years of 365.25875 days each will comprise of 21,915.525 days. Thus one 60-year cycle falls short of a 60 solar sidereal years by about 3.8 days. In 60 tropical years of 365.24219 mean solar days each, there are 21,914.314 days, and one 60-year cycle falls short of 60 tropical years by 2.6 days.

Lars Gislén (pers. comm., 10 December 2020) points out that:

> People may have been aware of the difference but as the main calendar used was lunar ... they would not have bothered much over the solar calendar. With the lunar calendar it is easy to see if it deviates from the true Moon but it is not so with the solar calendar.

Is the Ahom 60-year cycle akin to the Indian Jovian 60-year cycle? Gait (1906: 361) called the former Jovian. The sexagenary cycle actually came with the Ahom as a part of Shan Culture. Despite its 60 years, it is not Jovian in the manner the Jovian cycle is in Hindu astronomy. Recall that the Brahmanic influence began in the Ahom Kingdom only from late fifteenth century.[1]

While going through the dates in the *Ahom Buranji* we note some discordance in the cycles. Since the sexagenary cycle is basically a counting system (Cherdsak Saelee, pers. comm., 22 December 2020), using a table of the cycle, we prepared a list of the 'Calculated Years' by counting from 1228 CE until 1826 CE. Beginning with the first one in the cycle, i.e., *Lākni Kapcheu* (November 1228–November 1229 CE) enabled us to cross-check the *lāknis* and their converted years. In the *Ahom Buranji*, some *lāknis* croped up several times. We selected a few to check how they followed the 60-year cycle (see Table 1).

In Table 1, the numeral before the *lākni* name in Column 1 is its sequence number in the sexagenary cycle (see the Appendix for the whole list). Here, the *lāknis* are chosen randomly, except those in which an astronomical event also happened. From Barua (1930), their converted dates (A.D.) cyclewise are given in Column 2. Alongside, in the brackets, are the Calculated Years (November–November CE). Where there is a double entry, that is how it was given on different pages of the *Buranji*. In Table 1, we have inferred for *Lākni Kāmut* (20) the year 1489, although there is no event for this year in the *Buranji*. That is because its Calculated Year (in the brackets) is important in the matter of the account of a solar eclipse, as we will see in a later Section.

There are also a few misprints in the *Ahom Buranji*. What is striking is that, (1) the converted dates are a year ahead of the Calculated Year, and (2) the converted dates fall out of step by one or two years in the successive cycles. Where the discrepancy is more than one year, the Calculated Year (in brackets) has been highlighted using bold print. In one instance, two different incidents, respectively in the *Lākni Mungrāo* (34) in the month of *Puh* and in the *Lākni Katkeu* (36) in *Āghon*, are mentioned, but the year A.D. 1744 was assigned to both (Barua, 1930: 276–277). That is a bit surprising since one expected that relatively recent dates would have been recorded exactly.

Importantly, we do not see any Jovian connection here. Over three Jovian cycles, a total of two Jovian years would need to be dropped once every 85 years but nothing of that kind is noticed here.[1]

Importantly, Acharyya (1957: 25–26) also observed that from the mid-sixteenth century up to the end of the Ahom rule, "… there is lack of conformity between the various Buranjis."

4 FIXING THE CHRONOLOGY WITH A SOLAR ECLIPSE

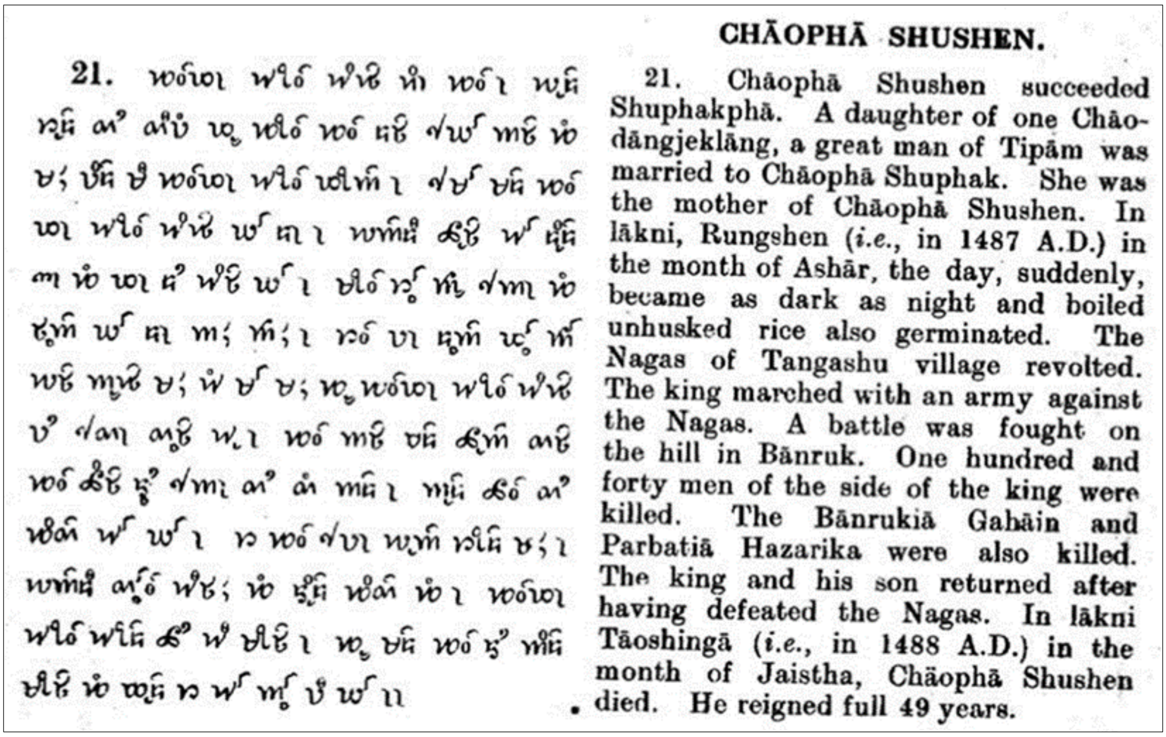
In the part of the *Ahom Buranji* about the reign of King Chāo Susenphā ('a holy tiger of heaven') there is a cryptic reference to the day suddenly becoming as dark as night. His reign spanned about half a century, from *Lākni Kāsheu* to *Lākni Tāoshingā* (Barua, 1930: 52), or in converted dates from A.D. 1439 to 1488. Acharyya (1957: 81; 1966: 83 and 128) observed that "… the most interesting event of this reign, from the point of view of the modern historians, was the occurrence of an eclipse of the Sun". Further, as per the *Ahom Buranji* (Barua, 1930: 52) and the *Deodhai Asam Buranji* (page 13), the eclipse occurred in *Lākni Rungshen* (1486–1487). Acharyya (1957) concluded that the statement in the *Ahom Buranji* referred to the solar eclipse of A.D. 6 March 1486.

Table 1: The converted dates in the *Ahom Buranji* and the *Lākni* Calculated Years.*

Ahom Buranji Date	Calculated Years
1. *Kapcheu*	1530 (1528–1529), 1651 **(1648–1649)**
3. *Rāingi*	1532 (1530–1531), 1592 (1590–1591), 1770 (1770–1771)
4. *Mungmāo*	1293 (1291–1292), 1533 (1531–1532), 1654 **(1651–1652)**, 1771 (1771–1772)
7. *Khutshingā*	1536 (1534–1535), 1596 (1594–1595), 1774 (1774–1775), 1832 **(1834–1835)**
18. *Rungshen*	1487 (1485–1486), 1547 (1545–1546)
19. *Tāoshingā*	1488 (1486–1487), 1548 (1546–1547), 1608 (1606–1607), 1668/1669 **(1666–1667)**, 1785 (1786–1787)
20. *Kāmut*	1489 (1487–1488), 1549 (1547–1548), 1670 **(1667–1668)**
30. *Kāsheu*	1439 (1437–1438), 1559 (1557–1558), 1619 (1617–1618), 1739 (1737–1738), 1796 (1797–1798)
34. *Mungrāo*	1563 (1561–1562), 1683 (1581–1582), 1744 **(1741–1742)**, 1798 **(1801–1802)**
40. *Kāmāo*	1389 (1387–1388), 1569 (1567–1568), 1688 (1687–1688), 1748 (1747–1748), 1804 **(1807–1808)**
56. *Katmut*	1525 (1523–1524), 1585 (1583–1584), 1646/1647 **(1643–1644)**, 1704 (1703–1704)

* Calculated Years (November to November) are in brackets.

Figure 4 is a screenshot of the relevant passage in the *Ahom Buranji* describing Chāo Susenphā's reign (Barua, 1930: 52), with the English translation shown on the right.



CHĀOPHĀ SHUSHEN.

21. Chāophā Shushen succeeded Shuphakphā. A daughter of one Chāodāngjeklāng, a great man of Tipām was married to Chāophā Shuphak. She was the mother of Chāophā Shushen. In lākni, Rungshen (*i.e.*, in 1487 A.D.) in the month of Ashār, the day, suddenly, became as dark as night and boiled unhusked rice also germinated. The Nagas of Tangashu village revolted. The king marched with an army against the Nagas. A battle was fought on the hill in Bānruk. One hundred and forty men of the side of the king were killed. The Bānrukiā Gahāin and Parbatiā Hazarika were also killed. The king and his son returned after having defeated the Nagas. In lākni Tāoshingā (*i.e.*, in 1488 A.D.) in the month of Jaistha, Chāophā Shushen died. He reigned full 49 years.

Figure 4: Chāo Susenphā's reign. The text on the left is in Ahom script. The image is a screenshot from Barua (1930: 52), the slight tilt in the image is as it is in the digitized volume.

To confirm if there was an eclipse of the Sun in 1486–1487, Acharyya (1957: 283) contacted the Royal Greenwich Observatory. The H.M. Nautical Almanac Office at the Observatory informed him that

> … there was a partial eclipse of the Sun on 1486 March 6, of which the maximum phase occurred shortly before local mid-day. The exact time for the centre of eclipse, quoted by Oppolzer, was 5h 36m U.T.

Theodor Ritter von Oppolzer's *Canon der Finsternisse* (*Canon of Eclipses*) has for long been an important and handy document for astronomers, ever since it was first published in 1887. It is a unique compilation of more than 8000 solar and 5200 lunar eclipses from 1207 BC to AD 2161. Confirmation that there was a solar eclipse at this time enthused Acharyya (1957: 81), who concluded that the statement in the *Buranji* was in agreement with the astronomical records and could be used as an important means of fixing the chronology and the dates of the Ahom kings. It also confirmed the accuracy of the *buranjis*.

In Gait (1906: 82), there is no mention of the day "… suddenly becoming dark". As per the *Ahom Buranji*, this event took place in *Lākni Rungshen* (i.e., in A.D. 1487). Around this time, the Tangsu Nagas had revolted and Chāo Susenphā and his army fought them and succeeded in containing the unrest. It is not clear if this happened prior to or after the eclipse event but it is stated the Heavenly King died in *Lākni Tāoshinga* (i.e., A.D. 1488) (Barua, 1930: 52).

Eclipses of the Sun and Moon, like other major astronomical events, have helped historians fix timelines arrived at by other means. As for the solar eclipse of 6 March 1486, the Nautical Office information was technically correct, and on this basis the eclipse in Acharyya's (1957: 81) opinion fitted the description. There seemed no better way of explaining the statement in the *Buranji*.

However, upon checking this eclipse in the "Five Millennium Catalog of Solar Eclipses: –1999 to +3000" by Espenak (2020), I found that the above eclipse never occurred over Assam. The Moon's shadow actually bypassed Bhutan and Assam. This eclipse was partial and happened over only the areas of India that lay within the solid green line in Figure 5.[2] Not only this, but the eclipse did not occur in the month of *Ashār.*

So, if there was no solar eclipse over Assam in A.D. 1486 or 1487, what is it that the *Ahom Buranji* was speaking about? The statement in the text is about an observed phenomenon. It is strongly suggestive of a solar eclipse, and going by the wording it had to have been total. Looking through the Catalog, I found that there was a total solar eclipse two years later, on 9 July 1488 CE, where the path of totality passed right over

Assam. From the description, the solar eclipse mentioned in the *Ahom Buranji* can only have been this one. As Figure 6 shows, the 220 km wide path of totality passed over Jammu and Kashmir, Himachal Pradesh, Tibet, Bhutan, Assam and Nagaland.

Charagua, the Ahom capital at the time, lay well within the path of totality, about 20 km from its northern fringe (see Figure 7) and people actually would have seen that "… the day, suddenly, became as dark as night." The solar eclipse over Charagua happened unexpectedly, and would have been an extra-ordinary event.[3] Totality lasted a little over 3 minutes. A sudden darkness at noon would have prompted many to go outside and view the event. The spectacle would have left many amazed, etched in their memories as a subject to talk about for the rest of their lives.

The *Buranji* writer faithfully recorded how the ambience changed. However, the wording is plain and crisp. There is nothing about the reaction of Royalty and the people, about any religious observances, or the unusual behaviour of animals, birds, etc. Furthermore, the Court astrologers are conspicuous by their absence. The Ahom believed in supernatural powers and observed rituals to ward off evil, and this eclipse occurred around the time when Brahmins were securing Royal patronage.

In Figure 7, we reproduce the Google map extracted from Espenak (2021), which shows an area of Assam around Sibsagar (Sivasagar) district that lay within the path of totality of the 9 July 1488 eclipse. The various markers are over cities that served as Ahom capitals throughout the ages: Jorhat is nearest the central line, Charagua is at the top; and below it, from left to right, are Rangpur, Garhgaon and Charaideo. As an example the eclipse circumstances over Charagua (27.09° N, 94.64° E), the then capital of the Ahom Kingdom, are given in Table 2 (after Espenak, 2021).

In Table 2, the term 'magnitude' is for the fraction of the Sun's diameter occulted by the Moon and 'obscuration' is the fraction of the area of the disc of the Sun occulted by the Moon. 'Alt' is for altitude of the Sun and 'Azi'. is the azimuth, measured North-to-East. The time listed is UT. IST= UT + 5:30 hrs.

It was a noon eclipse over India. Totality took place when the mid-summer Sun was high in the sky, near the zenith, and it lasted for a little over 3 minutes (see Table 2). That by itself would have made the eclipse striking and a memorable one. This was an aphelion–perigee eclipse, or almost so. In their respective orbits, the Earth was a few days past its farthest from the Sun, being at 1.016 au, and the Moon, being at 57.5 ER (ER= Earth Radius; 6371 km), was approaching its nearest to the Earth. The date of the eclipse, 9 July 1488 CE fell in the Ahom month of *Āhār*, which includes June and July. As the eclipse occurred in the right month, our identification is in conformity with the observation in the

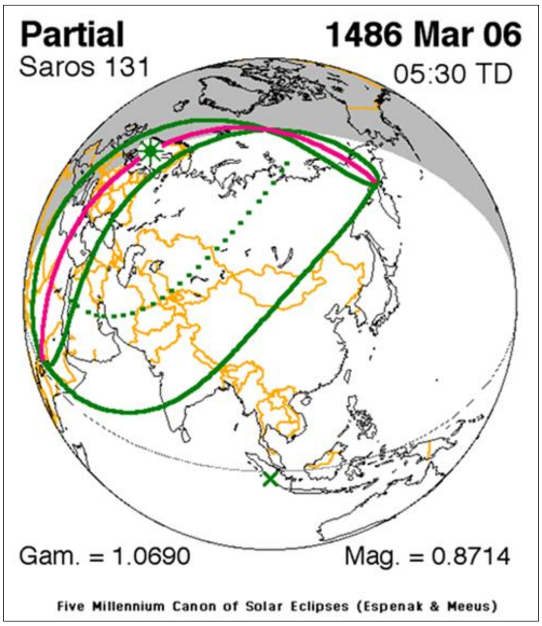


Figure 5: The solar eclipse of 6 March 1486 CE. The green lines show the reach of the Moon's shadow; for an explanation of the various terms in the diagram see Note 2 (after Espenak, 2020).

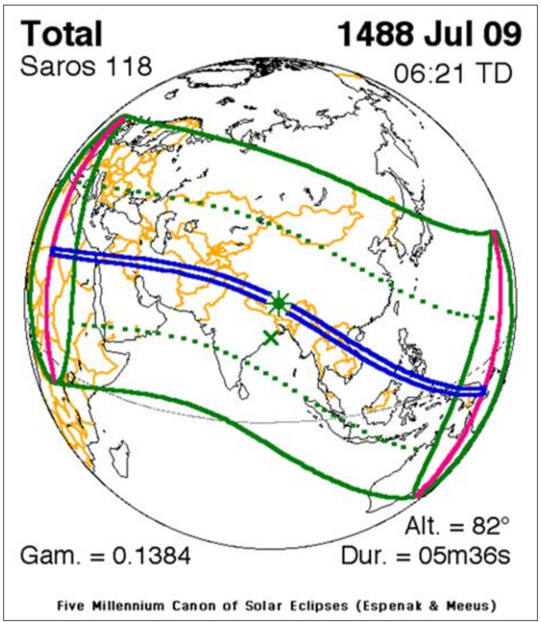


Figure 6: The reach of the Moon's shadow during the solar eclipse of 9 July 1488 CE. The double blue line represents the path of totality, and the areas outside it but within the green line witnessed a partial solar eclipse (after Espenak, 2020).

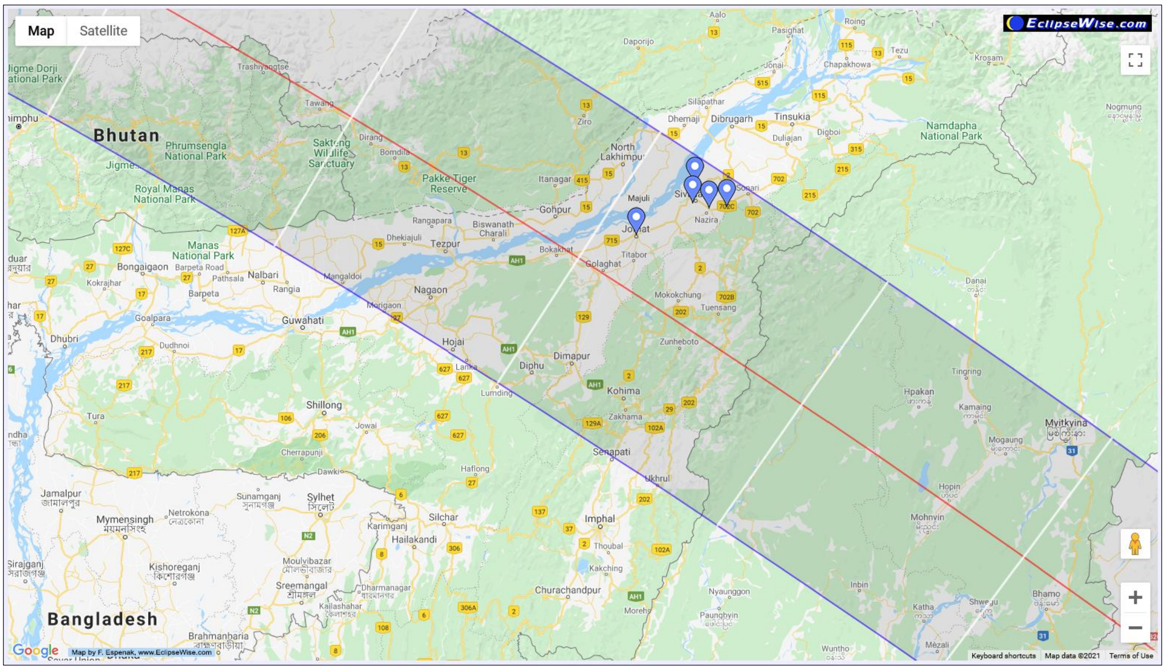


Figure 7: A screenshot of the path of totality of the total solar eclipse of 9 July 1488 CE over Assam around Sibsagar district. The markers are over the Ahom capital cities: Jorhat is nearest the central line, Charagua at top; the markers below it, left to right, are for Rangpur, Garhgaon and Charaideo (after Espenak, 2021).

Table 2: Circumstances of the 9 July 1488 total solar eclipse.

Event	Contact	Date	Time (UT)	Alt	Azi (N−E)
Partial eclipse begins	C1	09.07 1488	05:02:59	78.4°	118.9°
Total eclipse begins	C2	09.07 1488	06:29:33	78.5°	240.8°
Maximum eclipse		09.07 1488	06:31:04	78.2°	241.7°
Total eclipse ends	C3	09.07 1488	06:32:36	77.9°	242.6°
Partial eclipse ends	C4	09.07 1488	07:52:50	60.6°	265.1°

Ahom Buranji. This also makes the *Ahom Buranji* one of the rarest among Indian chronicles in recording a total solar eclipse. Most importantly, during the period 1475–1500 CE, there was hardly an eclipse of the Sun over Assam worthy of note other than the one of 9 July 1488 CE. Over this period, there were a few partial eclipses. Typically, they were small in magnitude, and only the eclipse of 8 September 1485 CE reached a magnitude as large as 0.56.

How does the eclipse of 9 July 1488 CE fit into the *buranji* chronology? In Table 1 we have already seen the converted year of a *lākni*, being at least a year ahead of its Calculated Year. The *Ahom Buranji* says that the phenomenon occurred in *Lākni Rungshen* (i.e., A.D. 1487). The *lākni* is eighteenth in the Cycle, and its Calculated Year is November 1485–November 1486 CE. The *Ahom Buranji* further says that Chāo Susenphā died in the month of *Jaistha* in *Lākni Tāoshingā* (i.e., A.D. 1488). That is *Lākni* 19, and its Calculated year is November 1486–November 1487 CE. If the recorded phenomenon was actually the eclipse of 1488 CE, its right *lākni* would be *Kāmut* (20), whose Calculated Year is November 1487–November 1488 CE. The eclipse identification implies that Chāo Susenphā may have actually died before the eclipse. We know from history that extraordinary phenomena have sometimes been connected with the lives of extraordinary people. In the present case, although the eclipse occurred later, it was too abstruse to be ignored. It would have been seen as a sign from above, and connected to the Heavenly King's demise. On that count, the *Ahom Buranji* reference, that the day became as dark as night, was literal as well as figurative.

In the *Ahom Buranji* posthumous rites and ceremonies of the Royal Family are also described (Barua, 1930: 357–358; see also Gogoi, 1976: Chapter IX). These were elaborate and extended over a month to go on until the *Maidam* was constructed for the departed king. The king's death would be kept secret until a successor was chosen and placed on the throne. For Chāo Susenphā, no posthumous rites are described.

5 THE OTHER SOLAR ECLIPSE

In the *Ahom Buranji* there are only two solar eclipses on record, one that we have just explored, and we will now discuss the other eclipse in this section. Notably, there was an annular eclipse that occurred on 18 May 1463 CE during Chāo Susenphā's reign, but it is not mentioned in the *Ahom Buranji*. Moreover, the eclipse was annular over Charagua, the then capital, reaching a magnitude of 0.945, obscuration of 89.4%, and with annularity lasting 3m 35s. At such obscuration, ~10% of the solar disc remained exposed as a bright annulus. The illuminance would have dropped by a factor of ~10 only, and so, the day would not have become dark, as happens at totality during a total solar eclipse.

There is a reference to a solar eclipse occurring in *Lākni Kāplāo* during the reign of Chāo-Shuremphā (r. A.D. 1752–1768) alias Swargadeo Rajeshwara Singha. The *Ahom Buranji* records the eclipse in the following words:

> In the latter part of the month of Dinpet (Āhār), the king came back to Rangpur from Harāighat. In Lākni Kāplāo [i.e., A.D. 1758] in the month of Dinkām (Puh), on the day Kāplāo and on Hindu Hanibar and at the moment Baiban, a solar eclipse took place. (Barua, 1930: 283).

At the time, the King was at Rangpur (near Sibsagar), the capital of the Kingdom since A.D. 1707 (Gogoi 1968: 508). In the quote, the phrase Hindu *Hanibar* should be for Saturday. The Calculated Year of *Lākni Kāplāo* (50) is November 1757–November 1758 CE. Between 1753 and 1760 CE, the following solar eclipses occurred that were visible in this region (weather permitting): 26 October 1753, 1 March 1756, 30 December 1758 and 13 June 1760 CE. But the eclipse of 1756 CE touched only the south-eastern parts of India and its penumbra did not touch the North-East parts, so it can be written off. The eclipses of 1753 and 1760 CE are out of step in chronology and also were insignificant partial events, being at magnitudes 0.292 and 0.481 respectively.

The remaining solar eclipse, that of 1758 CE, is our best choice. As the month of *Dinkām* spreads over December–January, the eclipse referred to in the *Ahom Buranji* should be that of 30 December 1758 CE. Also, it happened on a Saturday. Since its date falls in the Calculated Year November 1758–November 1759 CE, the right *lākni* of the eclipse event should be *Kāpngi* (51). This eclipse was annular. Its path passed over Maharashtra, Chhattisgarh, West Bengal, Bangladesh, South Meghalaya and Nagaland, etc. The eclipse was not only visible over India but it also reached a very large magnitude over Assam. Rangpur, the then capital, lay over 90 km north-east of the northern fringe of the path. Here, the eclipse was partial but still it was an eclipse of significance since it reached a very large magnitude, of 0.965, and obscuration of 94.9%.

Any place could be witness to partial solar eclipses from time to time, but total and annular eclipses are rare. If we look for partial solar eclipses in a particular area that reached large magnitudes and with an obscuration of ~95% and above, there would not have been too many. Such deep eclipses, though rare, can be regarded as 'eclipses of significance' because as the eclipse progressed to its maximum, the illuminance would have dropped very substantially. In Table 3, we list eclipses of significance that occurred over the Ahom capitals during the course of the Ahom Kingdom. The specific values have been deduced from NASA Eclipse Web Site. Note that not all Ahom capitals saw the same annular or total eclipse despite being geographically close. But they all did see the eclipse of 1758 CE, with an obscuration ~95%. In this table, ET= Eclipse type, P = Partial, A = Annular, T = Total; Mag.= eclipse magnitude, Obs. = obscuration, t = duration of totality / annularity. The figures in brackets after the names of the cities are their respective periods as the Ahom capital. Total and annular eclipses of special interest for this study are shown in bold print in the respective rows.

The list seems long, but in its own time each capital city saw only a few eclipses of significance.

6 THE LUNAR ECLIPSES IN THE *AHOM BURANJI*

The *Ahom Buranji* also records two lunar eclipses. The first reference is made in the description about the activities of Chāo-Shuchingphā alias Swargadeo Naria Raja in *Lākni Tāomit* (i.e., A.D. 1649) and his movement from Garhgaon, starting in mid-*Āghon* (Barua, 1930: 140). Going through the activities of the King over the months, we come to *Dāpmut*, the day of the eclipse, when the Buranji says "... the moon, disappeared in the sky." (Figure 8). Counting from *Āghon* (say, mid-November) and all the days until the day *Dāpmut* when the eclipse took place, we get into the month of *Dinruk* which is during April–May. The description in the *Buranji* is suggestive of a total eclipse of the Moon. Therefore, we looked at the eclipses of the Moon over a span of a few years, say 1645–1652 CE to zero in on the best fit. There were 12 lunar eclipses (total, partial, or penumbral) during this time span (Espenak, 2020). Of

Table 3: Significant solar eclipses (obs. ≥ 95%) potentially visible from the Ahom capitals between 1201 and 1826 CE.

Capital	Charaideo (1251–1397)	Charagua (1397–1539)	Garhgaon (1539–1707)	Rangpur (1707–1794)	Jorhat (1794–1826)
Date	ET Mag. Obs. t	ET Mag. Obs. t	ET Mag. Obs. t	ET Mag. Obs. t	ET Mag. Obs. t
25 May 1267-	P 0.954 94.4%	P 0.951 93.9%	P 0.956 94.6%	P 0.956 94.7%	P 0.966 95.9%
3 April 1307	P 0.971 97.1%	P 0.977 97.8%	P 0.971 97.0%	P 0.971 97.1%	P 0.963 96.1%
9 December 1322	P 0.972 97.1%	P 0.965 96.2%	P 0.970 96.9%	P 0.968 96.6%	P 0.968 96.7%
18 May 1463	**A 0.945 89.3% 3m39s**	**A 0.945 89.4% 3m35s**	**A 0.945 89.4% 3m39s**	**A 0.945 89.4% 3m39s**	**A 0.945 89.4% 3m23s**
9 July 1488	**T 1.066 100% 3m06s**	**T 1.066 1 00% 1m59s**	**T 1.066 100% 3m36s**	**T 1.066 100% 3m49s**	**T 1.066 100% 5m11s**
20 June 1648	P 0.993 99%	**A 0.997 99.3% 0m10s**	P 0.994 99.1%	P 0.996 99.3%	P 0.996 99.3%
16 January 1665	**A 0.913 83.4% 1m48s**	**A 0.913 83.4% 4m42s**	**A 0.913 83.4% 2m31s**	**A 0.913 83.4% 3m48s**	**A 0.914 83.5% 3m50s**
30 April 1688	**T 1.047 100% 1m21s**	P 0.999 100%	**T 1.047 100% 1m08s**	**T 1.047 100% 0m17s**	P 0.999 100%
23 September 1699	P 0.995 99.2%	P 0.992 98.8%	P 0.995 99.2%	P 0.995 99.2%	**A 0.997 99.4% 0m08s**
27 November 1704	P 0.983 97.8%	P 0.981 97.5%	P 0.985 98.1%	P 0.986 98.2%	P 0.967 99.5%
30 December 1758	P 0.968 95.2%	P 0.962 94.6%	P 0.967 95.1%	P 0.965 94.9%	P 0.966 95.0%
17 July 1814	P 0.975 97.9%	P 0.979 98.4%	P 0.972 97.7%	P 0.972 97.7%	P 0.962 96.6%
09 November 1817	P 0.955 95.1%	P 0.957 95.7%	P 0.953 94.9%	P 0.953 94.9%	P 0.942 93.6%

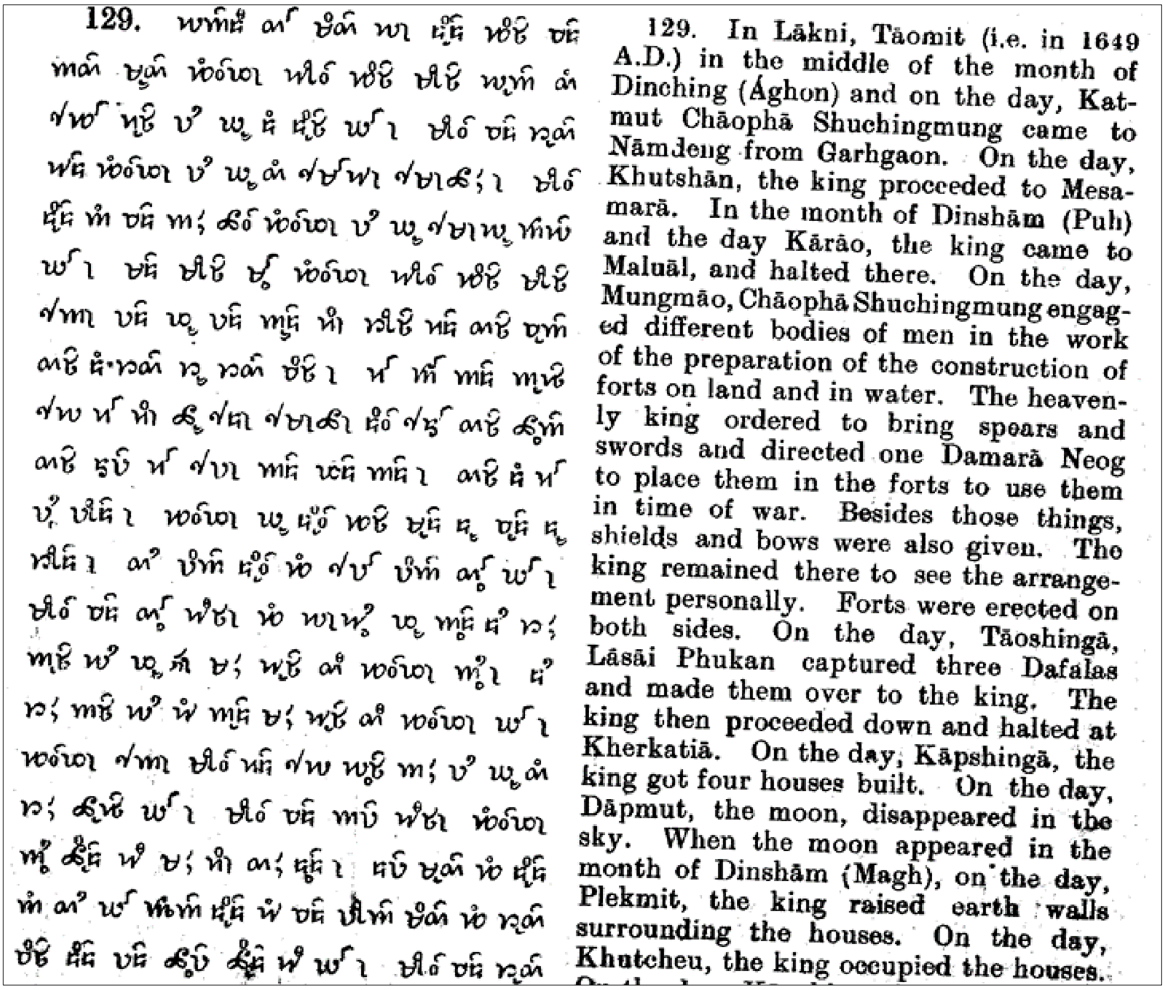

129. In Lākni, Tāomit (i.e. in 1649 A.D.) in the middle of the month of Dinching (Āghon) and on the day, Katmut Chāophā Shuchingmung came to Nāmdeng from Garhgaon. On the day, Khutshān, the king proceeded to Mesamarā. In the month of Dinshām (Puh) and the day Kārāo, the king came to Maluāl, and halted there. On the day, Mungmāo, Chāophā Shuchingmung engaged different bodies of men in the work of the preparation of the construction of forts on land and in water. The heavenly king ordered to bring spears and swords and directed one Damarā Neog to place them in the forts to use them in time of war. Besides those things, shields and bows were also given. The king remained there to see the arrangement personally. Forts were erected on both sides. On the day, Tāoshingā, Lāsāi Phukan captured three Dafalas and made them over to the king. The king then proceeded down and halted at Kherkatiā. On the day, Kāpshingā, the king got four houses built. On the day, Dāpmut, the moon, disappeared in the sky. When the moon appeared in the month of Dinshām (Magh), on the day, Plekmit, the king raised earth walls surrounding the houses. On the day, Khutcheu, the king occupied the houses.

Figure 8: The *Ahom Buranji* on a lunar eclipse during the reign of Chāo-Shuchingphā. The text on the left is *Ahom* script (after Barua, 1930: 140); the slight tilt in the image is as it was in the digitized volume.

these, five were penumbral. That left us with seven eclipses visible from Garhgaon, which was then the capital (see Table 4).

The Calculated Year of the *Lākni Tāomit* (59) is November 1646–November 1647 CE. The lunar eclipse in this period would be that of 20 January 1647 CE. It was a partial event, reaching an umbral magnitude of ~0.40 only. It fits less in view of the day-count made in respect of the activities of the King through *Lākni Tāomit*. The lunar eclipse of 15 May in 1650 CE was a total, but it was visible over

India as partial, reaching an umbral magnitude of 0.678. The eclipse of September 1652 CE, a partial, is rather late if we are to stay close to the description in the *Ahom Buranji*.

There were two total eclipses during the time span of 1645–1652 CE. The eclipse of 7 August 1645 CE falls in *Khutshan* (57) (November 1644–November 1645 CE). The total eclipse that is closer to the period of *Lākni Tāomit* (59) is that of 27 July 1646 CE. For its date, it fits better the circumstances in the *Ahom Buranji*. Only, it falls in the period of *Lākni Rungrāo* (58) (November 1645–November 1646 CE).

The other lunar eclipse on record took place in the time of Chāo-Shunyeuphā, alias Swargadeo Lakshmi Simha (d. A.D. 1779). It figures in the description of the events during the *Lākni Khutshingā* (i.e., A.D. 1774), *vide* Barua (1930: 327–328):

> 309. The old year passed, and the new year, lākni, Khutshingā [i.e., A.D. 1774] came with the month Dinching (Āghon). In the month of Dinkām (Puh), the principal royal building was completed. In the first part of the month of Dinshām (Māgh), on Hindu Mangalbar (Tuesday) and Ahom day Raishingā, the heavenly king came to Sonarinagar from Rangpur … in the month of Dinshām (Māgh), on the Hindu Deobar (Sunday) the heavenly king proceeded to the side of the river Tilāo (Lohit). On the day Plekshingā, an eclipse of the moon took place. The king offered twelve hundred cows and a large quantity of silver and gold to the Brahmins at large.

The eclipse according to the *Ahom Buranji* occurred in the month of *Dinshām* (*Māgh*), implying that the event happened in early A.D. 1775. That year, in the month of *Māgh*, the Full Moon was on 15 February. That was in fact the day of a lunar eclipse. It was partial, reaching an umbral magnitude of 0.531 at maximum, and was visible across India. The Calculated year of *Lākni Khutshingā* (7) is November 1774–November 1775 CE, to which the lunar eclipse of 15 February 1775 CE belongs. Following the day-to-day activities of the King in the month of Dinshām (*Māgh*) of *Lākni Khutshingā, Plekshingā* the day of the eclipse happens to be a Sunday. However, 15 February 1775 CE was a Wednesday.

The other eclipse to note is the total eclipse of 4 February 1776 CE, also a *Māgh* eclipse. Its partial and total phases were visible over eastern parts of India, including the Ahom Kingdom. As it falls in the period November 1775–November 1776 CE, its *lākni* is *Rungmut* (8). If *Plekshingā* was the day of the eclipse and a Sunday, the day of 4 February of 1776 CE was a Sunday too. So, that is our eclipse. In a chronicle, a total eclipse would more likely receive mention than a partial eclipse.

We know from history how the Hindu kings and chieftains indulged in ritualistic activity during the *parvas* and donated villages, land, silver and gold coins to the Brahmins since especially eclipses were considered auspicious occasions for granting gifts. The description in the *Ahom Buranji* reflects this activity, but only in the present case.

Table 4: The lunar eclipses of interest during 1645–1653.

Calendar Date	Mid-Eclipse* (UT)	Type of Eclipse*	Umbral Magnitude
10 February 1645	19:13:47	P	0.77
7 August 1645	13:19:26	T	1.09
27 July 1646	17:06:36	T	1.17
20 January 1647	21:23:09	P	0.40
5 June 1648	12:11:39	P	0.30
15 May 1650	19:54:19	P	0.68
17 September 1652	18:19:29	P	0.84

* IST = UT + 5:30 hrs; P= Partial, T= Total

7 THE COMETS IN THE *BURANJIS*

No work of history that meticulously describes the life in kingdoms and the genealogies of their rulers could be oblivious to happenings in the sky. Comets seldom figure in Indian mythologies and literature, and are most often literary constructs. Any reference to an actual apparition is usually undateable. The observations of comets from India that feature in historical accounts can be traced back to the fifteenth century only, when stray references begin to appear in literary works and chronicles, then later in the travelogues, and finally in the scientific literature (Kapoor, 2018). Interestingly, the *Ahom* and *Tungkhungia Buranjis* both record the appearance of a few bright comets that passed through the inner Solar System during the six centuries of Ahom rule.

7.1 The Great Comet of 1577 (C/1577 V1)

In the *Ahom Buranji*, a comet figures in the times of Chāo-Shukhāmphā (alias Khorā Raja; r. A.D. 1552–1603) in the description of the happenings in the year following *Lākni Tāocheu* (i.e., A.D. 1578):

> … Nāng-Chanphe *alias* Tumphe and the son of one Shengkhru entered in our

> country and stopped at Nāmruk. Then Chāo-lung Sāring, Chāophrangmung, Thāo-munglung, Chāo Shenglung and some others were sent to put up in the fort at Pāngrāo. In that year, a comet with a long tail appeared in the sky in the south-west. In Lākni Kāpngi (*i.e*. in 1580 A.D.), the heavenly king went to Ahataguri. (Barua, 1930: 94).

The description has no phenomenology, no word on the time of the observation, movement of the comet in the sky, or whether Royalty were seriously concerned about the apparition. The *lākni* following *Tāocheu* (49) is *Lākni Kāplāo* (50). Its Calculated Year is November 1577–November 1578 CE. For the suggested year of the apparition, there are a few contenders (see Kronk, 1999: 320–321) but we can ascertain which comet it was. According to the Chinese and Korean records, a long-tailed broom star appeared in 1578. It was seen in autumn in the east, until the last days of December. It had a tail reaching 50°–60° in length. However, this comet does not fit here.

The *Ahom Buranji* reference is to the sighting being in the south-west. We believe it is about the Great Comet of 1577 (C/1577 V1), which created a sensation throughout Europe and completely changed our perception of the so-called 'harbingers of doom' from above. One can make this out from the numerous writings on the sightings of this comet in Europe (Hellman, 1944). According to A.G. Pingré, the Great Comet was first sighted in Peru on 1 November at dusk as a very bright object, and "... shone through clouds like the moon …" at about magnitude –7 (Vsekhsvyatskii, 1964: 106). For an evening observation, the UT of the observation based on the calculated orbit is 2.0 November (Kronk, 1999: 317). On 8 November the Japanese recorded its curved white tail stretching 50º. The comet passed closest to the Earth on 10 November and was comfortably seen in December.

The form of the comet showed up most impressively in the famous engraving by Jiri Daschitzsky that depicted its passage over Prague on 12 November 1577 (Figure 9). The comet shone at its brightest during the month of November, extending into December when it was visible even in bright moonlight (Full Moon was on 25 November and 25 December). It was last seen on 26 January 1578 CE. The Great Comet of 1577 is truly an historical one because of observations of it made by the Danish astronomer Tycho Brahe (1546–1601), who settled the important question of the distances to comets. Upon determining its parallax, Brahe was able to argue that (1) comets lay beyond the atmosphere of the Earth, and that (2) comets followed circular paths between the orbits of the Moon and Venus.

This Great Comet also features in other Indian chronicles. Abū'l Faḍl (1551–1602), who came to the Court of the Mughal Emperor Jalāl ud-Din Muḥammad Akbar (1542–1605; r. 1556–1605) in 1575 CE, was a very knowledgeable person, having trained in the traditional as well as the rational (natural) sciences. He wrote in Persian the official biographical account of Akbar, the *Akbarnāmā*. In the part relating to the Royal expedition from Rajasthan to Punjab, Abū'l Faḍl records the appearance of a comet in the 22nd year of Akbar's reign, i.e., in 985 A.H. That was the Great Comet of 1577, and with his first observation dating to 5 November 1577 CE makes Abū'l Faḍl an independent discoverer of one of the most famous comets in history (Kapoor, 2015).

The *Ahom Buranji* description of a bright comet seen in the south-west in the evenings strongly matches the apparition of the Great Comet of 1577. The *lākni* of its appearance is *Kāplāo* (50).

We note that there is a comet reference made in one of the three *Ahom Ritual Texts* also, published by Terwiel and Wichasin (1992) that they had come across in 1984 during the 2nd International Conference on Thai Studies in Bangkok. The authors point out that the texts are composed of words from the Tai language group and, importantly, are basically devoid of Assamese words. The texts introduce Ahom cosmogony first and then professing the continuing influence of the creators over the heavenly bodies describe the rituals to be observed by the king to ward off dangers to the state from the heavens above. These Ahom texts refer to events from the late seventeenth and early eighteenth centuries. In the Third Text, stanza C40 reads thus: "If there occurs a long-tailed comet, the king will not be happy, cities and towns will be deserted." This is not a record of an actual event, but in the context of this stanza Terwiel and Wichasin (1992: 109) brought up the comet referred to in *the Ahom Buranji* (Barua, 1930: 94) as appearing in the year 1579. But as we have discussed above, that reference can only be to the Great Comet of 1577.

7.2 Comet 1P/Halley

Interestingly, the page in the *Ahom Buranji* that refers to the solar eclipse in the month of *Puh* of *Lākni Kāplāo* (i.e., in A.D. 1758), men-

Figure 9: The woodcut by Jiri Daschitzsky showing the Great Comet of 1577 over Prague on 12 November (Wikimedia Commons).

tions also the appearance of a comet with a long tail in the following year:

> Next year, in the month of Dinruk (Baisākh), an earthquake took place. On the day, Khutngi the Devighar was burnt by lightning. Then a comet with a long tail appeared in the sky. On the day, Karāo, at the moment Kinngāi, a screech-owl, perched on the top of the royal palace at Rangpur. (Barua, 1930: 283).

It appeared during the reign of Chāo-Shuremphā, alias Rajeswar Singha (r. A.D. 1752–1769). The comet would have been sufficiently bright as to deserve a mention in the *Ahom Buranji*. The Calculated Year of *Lākni Kāplāo* is November 1757–November 1758 CE. The comet appeared, according to the *Buranji*, in the following year, and that points to what can only be Halley's Comet, discovered in December 1758 and last seen in June 1759 CE.

That was its 27th recorded apparition and the first ever predicted return of a comet. It was Edmund Halley (1656–1742) who on the basis of Newton's laws of gravitation predicted that the comet of 1682 should return in late 1758 or early 1759 (Halley, 1715: 22). He did not live to witness this, but the prediction made it the most awaited apparition in history.

The comet returned indeed, and was named after Halley (it is now known as Comet 1P/Halley). It was recovered by a farmer and amateur astronomer Johann Palitsch from Prohlis in Germany in the constellation of Pisces on 25 December 1758, using a telescope of eight-feet focal length (Hind, 1852: 40). The find was confirmed only on 20 January 1759.

Subsequently, Comet 1P/Halley was well observed and widely reported by various acclaimed astronomers in Europe. It passed closest to the Earth on 26 April 1759 at 0.1222 au. It had just begun to move to the north-west having reached its southernmost declination of –71º in Apus, near the border with Triangulum Australis. From 26 April, the comet began to trail the Sun. It attained its best appearance in early May when it came to be seen as the symbol of the Seven Years War and other disasters and ill omens. It con-

Table 5: Positions of Comet 1P/Halley for the location of Rangpur.

Date	UT	Azi (N–E)	Alt	T-mag	Sun Az	Sun Alt	T-O-M	Moon Ill	Sunrise
Morning (nautical twilight ends with the Sun at –6º).									
14 April 1759	22:54	132.3	29.2	3.3	76.0	–6.09	89.5	94.85	23:19
The comet rose at 20:22 (past midnight) in the S-E. It reached an altitude of 29.2º when nautical twilight ended.									
18 April 1759	22:50	143.2	26.8	2.7	74.4	–6.06	34.8	65.33	23:15
The comet rose at 20:13 (past midnight) in the S-E. It reached an altitude of 26.8º when nautical twilight ended.									
22 April 1759	22:46	164.2	14.6	1.7	72.8	–6.06	40.9	22.65	23:11
The comet rose at 20:20 (past midnight) in the S-E. It reached an altitude of 14.6º when nautical twilight ended.									
Evening (nautical twilight begins with the Sun at –6º)									Sunset
27 April 1759	12:36	157.9	–2.6	1.5	289.0	–6.02	125.5	0.44	12:10
The comet rose at 13:06 in the S-E. It crossed the meridian at 15:27 reaching an altitude of 6.6º. The comet's head set in the S-W at 18:13, past midnight.									
29 April 1759	12:37	159.2	20.3	2.2	289.6	–5.98	105.9	8.52	12:11
The comet rose at 10:00 in the S-E. It crossed the meridian at 14:17 reaching an altitude of 25º. The comet's head set in the S-W at 18:43, past midnight.									
1 May 1759	12:39	161.8	33.4	2.9	290.4	–6.15	76.0	24.91	12:12
The comet rose at 08:52 in the S-E. It crossed the meridian at 13:47 reaching an altitude of 36º. The comet's head set in the S-W at 18:46, past midnight.									

tinued to be a naked eye object all through May, gradually slowing in its apparent motion to become near stationary, and its brightness had faded to magnitude +5 by 2 June. It was last ob-served on 22.91 June 1759 CE (Kronk, 1999: 422). With this return just as predicted, Com-et 1P/Halley provided the most cogent proof of the strength of physical theory—the laws of universal gravitation.

The *Ahom Buranji* states that the comet had been sighted in the year following *Lākni Kāplāo* (50) in which the solar eclipse had happened. As the comet was spotted in the month of *Dinruk* (*Baisakh*), the *lākni* should be *Kāpngi* (51), spread over November 1758 –November 1759 CE. We can be certain that the *Ahom Buranji* reference was to Comet 1P/Halley.

There is nothing else about the apparition in the *Ahom Buranji*. However, it is possible to construct a scenario of how the comet would have been seen throughout the Ahom Empire in the month of *Baisakh*. After mid-April, the comet moved fast in the sky and headed south, more to the advantage of southern observers. Until 24 April it was a morning object, and from the 27th, it could be spotted in the evenings after sunset. In Table 5 we list the positions of the comet computed for the location of Rangpur (26° 58′ N, 94° 37′ E), the then capital, but generally applicable to the whole Ahom region. These correspond to the time when the Sun is down, below the horizon at about –6º, which is the moment when nautical twilight ends / begins, the sky is deep blue and the horizon is still visible.[4] The Sun's and the Moon's positions are given in this table, to show where the comet was located in the sky. The times listed are in UT.

In Table 5, the Azimuth and Altitude values are apparent; T-mag. is the apparent total visual magnitude of the comet; T-O-M is the Moon's elongation from the comet; and Moon Ill is the Moon's illumination (%). The comet positions were computed with the Jet Propulsion Laboratory's Horizons System, and the Sun's positions with Fourmilab's Your Sky. All azimuths are measured N–E.

The entries in Table 5 suggest that the comet was visible from any location in the Ahom Kingdom for a long period. It was getting bright and the best-view dates seem to have been between 15 and 23 April, a little before sunrise when the comet could be seen in the South-East, and from 28 April onwards, soon after sunset (Full Moon was on 13 March, 12 April and 12 May). The scene in the evenings became different from the morning show, with the comet rising in the S-E and after crossing the meridian, setting in the S-W after midnight. Its tail was variously estimated from a few degrees to 25° during this period.

The best viewing dates of the comet seem to have been in the *Baisakh* month, and confirm the record in the *Ahom Buranji*. No other comet seen around this time fits as well as Halley's.

7.3 Comet C/1769 P1 (Messier)

The third comet on record in the *Ahom Buranji* (Barua, 1930: 293) appeared after Chāo-Shunyeuphā, alias Laxmi Raja, became king in *Lākni Kākeu* (i.e., in A.D. 1768):

> During that month, on the Áhom day, Dāpkeu, the king, was named Lakshmi Simha by the Brahmins and the Ganaks. On the day Kāpshām, the king collected materials for preparing a Holong. On the day Rāimit, the Holong was completed. Then a comet appeared in the sky and also a fire was seen burning in the air. It rained blood, tortoise, and shells from the sky. A piece of big stone came floating in the Jhanji river. A violent storm passed over the country from west to east, which

showered a great number of monkeys in the lakes and the rivers. Then two moons and two suns appeared in the sky and fought with each other. Many other bad omens took place in different parts of the country.

The word 'Holong' in this quotation means a Royal Palace. The weird events that followed the appearance of the comet relate to Ahom religious beliefs[5] and defy scientific explanation. They are discussed by Terwiel and Wichasin (1992: 94, 118).

While describing the activities of Chāo-Shunyeuphā in *Lākni Kākeu* (60), Barua (1930: 290) gives the converted year as A.D. 1768. The activities are from the month *Dinshām* (Magh). Since the comet is stated to have risen sometime after the month of *Dinpet* [*Āhār* (June–July)], the year of appearance of the comet could be A.D. 1769. We find there was indeed a bright comet that was visible around this time. This apparition occurred between November 1768 and November 1769 CE, which is the Calculated Year of *Lākni Kāpcheu*.

The *Ahom Buranji* reference is to Messier's Comet of 1769 CE. A summary of observations made by other observers is provided below, to give an idea of how the comet may have been seen as a memorable object from Rangpur, which was then the Ahom capital.

Messier's Comet (C/1769 P1) was discovered by Charles Messier (1730–1817) on 8 August 1769 from Paris, in the course of his dedicated search for new comets. The 'Great Comet' of 1769, as Messier described it in his *Memoirs* of 1808 "… preceded the birth of Napoleon the Great by 7 days …" Messier possibly believed that comets were premonitions of events on the Earth and in William Smith's words, as quoted by H. Frommert in his biography of Charles Messier, it was "… the last comet put astrologically before the public by an orthodox astronomer …" (Meyer, 2007: 6).

By 25 August, the comet was visible to the naked eye and had developed a tail 10° long. On 10 September, the tail measured 60°. Messier describes his own observations of this impressive comet in his *Memoirs*, and he also cited de la Nux, who claimed that he measured its tail as 97° long from the Isle de Bourbon. The comet was closest to the Earth on 10 September at 0.32296 au and was at perihelion (q = 0.123 au) on 8.1204 October. It was last observed on 3 December 1769 (see Kronk, 1999).

In India the comet also was observed, from Pondicherry by Guillaume Joseph Hyacinthe Jean-Baptiste Le Gentil (1725–1792), a French astronomer who had originally set sail for India in 1760 in order to observe the transit of Venus of 6 June 1761 CE from Pondicherry (which was then a French possession). Caught in the Seven Years' War between the French and the British, he could not make it because the British had taken Pondicherry just when the frigate he was aboard neared Mahé on the Malabar shores. He eventually returned to Pondicherry on 27 March 1768, well in time to be able to observe the next transit of Venus on 3 June 1769 that to his misfortune was clouded out. In his travelogue, *Voyage dans les Mers de l'Inde* ..., Le Gentil (1779(1): 353–356) writes about this all and his observations of the comet of 1769 (Kapoor, 2013; 2018).

In the month of September, Le Gentil was able to see the comet three to four times only, then once after its conjunction with the Sun at the end of October and next on 2 November. By then, the tail had diminished in length to barely 5°. Before the conjunction, the tail stretched more than 40°. Le Gentil (1779(1): 353–356) found the comet "… a sort of disheveled Nebula, but very clear, and transparent, much more so than the Nebula of Andromeda." He drew sketches to show how on the respective days of observation the comet moved among stars in a matter of minutes (Figure 10). From these, one gains some idea of how the comet would have appeared to viewers in the Ahom Kingdom.

7.4 The Comets in the *Tungkhungia Buranji*

The *Tungkhungia Buranji* is another important manuscript relating to the history of Assam, from A.D. 1681 to 1826 (Bhuyan, 1933). This was the period of the Ahom rulers of the Tungkhungia Dynasty. This *Buranji* gives dates in the Saka era; the given Saka years are elapsed years. There are no eclipses listed here, even though Charaideo had seen a total solar eclipse on 30 April 1688 CE at magnitude 1.047 with a totality lasting 1m 26s (Table 3). However, in two places the *Tungkhungia Buranji* makes reference to the appearance of comets.

The first one is in Saka 1665 (Bhuyan 1933: 42–43):

In the month of Push, 1665, there appeared in the sky a comet and it was visible in the sky for three successive months, Push, Magh and Phagun. On Friday, the tenth of Aghon, 1666, when four dandas had remained to complete the night, Maharaj Siva Singha passed away.

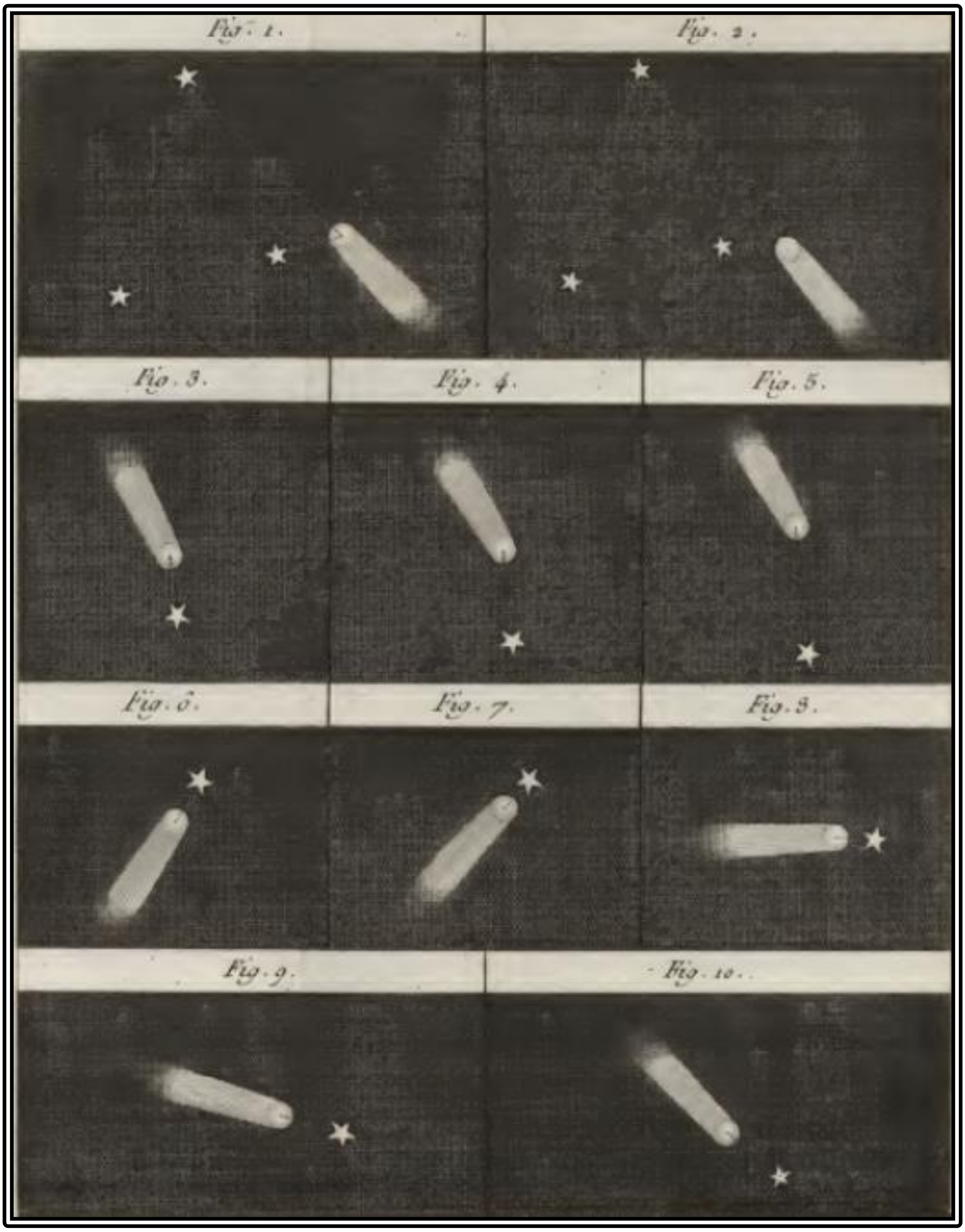


Figure 10: Le Gentil shows with the sketches of the comet and star fields how the separation between a particular star in the field of view and the comet head changed in a matter of minutes. His Figures 1 and 2 depict the situation on 1 September, Figures 3–5 on 9 September and Figures 6–10 on 12 September (after Le Gentil, 1779: Plate 6).

There is no other word said about the comet. The king's death was several months later; the date corresponding to the 10th of Aghon 1666 is 14 December 1744 CE.

The period in the quote above corresponds to 17 December 1743–14 March 1744 CE. The comet in the reference must be the bright comet of 1744, now designated C/1743 X1. It was discovered on 29 November 1743 and last seen on 22 April 1744 CE. The comet was discovered independently by Dirk Klinkenberg on 9 December 1743 from Haarlem (in Holland) and four days later by Jean Philippe Loys de Chéseaux from Lausanne (Switzerland). It became famously known as 'Chéseaux's Comet'. It enthralled viewers with

Figure 11: Screenshot of a plate in Guillemin's (1877) book *The World of Comets* showing Chéseaux's Comet on the morning of 8 March 1744 CE.

its multiple tails during 6–9 March and is said to be the most beautiful comet of the century, becoming so brilliant that it could be seen in broad daylight (Kronk, 1999: 408). The period *Push*, *Magh* and *Phagun* in Saka 1665 correlates with the brilliant phase of Chéseaux's Comet.

Looking at the image of the comet as it was seen in Europe (Figure 11), one can imagine how it would have left its mark on viewers in the Ahom Kingdom (and indeed, across all India). The term *danda* in the above quote is a unit of time, dividing the day akin to the *muhurta*, there being 60 *dandas* in a day of 24 hours.

The other comet that the *Tungkhungia Buranji* refers to is the one appearing in *Aswin* of Saka 1691 (Bhuyan, 1933: 65). The text reads as follows:

> Then in saka 1691, on the fifth day of Aswin, a star with a tail appeared in the sky, which portended evils.
>
> The King then ordered the Barbarua to despatch the three Abhayapurias to protect the store of gold and silver in Namrup and fight with the Morans …

This comet was seen during the reign of Chāo-Shunyeuphā, alias Laxmi Raja (r. A.D. 1769–1779). Except for ordering his men to prepare for fresh confrontations with the rebellious Morans, there is nothing in this part of the *Tungkhungia Buranji* that points to the king's concerns about the celestial occurrence.

This reference is to the bright Comet C/1769 P1, that was discovered by Messier and is also recorded in the *Ahom Buranji* (Barua, 1930: 293). The month *Aswin* in Saka 1691 started on 1 October 1769. The date of the observation "fifth day of Aswin" in Saka 1691 (elapsed) is 5 October. As a computation with the Horizons System indicates the comet was well above the horizon in the morning sky of Rangpur around the date, but would have been a challenge to see with the unaided eye. The best views of the comet date to the first half of September, which corresponds to the first half of *Bhadrapada* in the Saka Calendar. Messier's Comet had passed closest by the Earth on 10 September when it displayed a tail 60° long (Kronk, 1999: 445). It is remarkable that this comet was recorded independently in the two *Buranjis*.

8 CORRESPONDENCE OF THE AHOM RECORDS WITH THE ASTRONOMICAL EVENTS

In Table 6 we summarize the astronomical events chronicled in the *Ahom Buranji* and *Tungkhungia Buranji*, and the *Lākni* / Saka years of their occurrence. Column 1 lists the

Table 6: Astronomical events in the *Ahom Buranji* and the *Tungkhungia Buranji*.

Astronomical Event or Object	*Lākni/ Saka* Yr as in the *Buranji*	Event Date (CE)	Calc. Year of *Lākni* Nov–Nov (CE)	*Lākni* of Event	Contemporary Ahom King	Reign as per the *Buranji* (A.D.)
Ahom Buranji						
Solar Eclipse	Rungshen (18)	9 July 1488	1487–1488	Kāmut (20)	Chāo-Susenphā	(1439–1488)
Comet C/1577 V1 (Great Comet)	Tāocheu (49)	November–December 1577	1577–1578	Kāplāo (50)	Chāo-Shukhāmphā	(1552–1603)
Lunar Eclipse	Tāomit (59)	27 July 1646	1645–1646	Rungrāo (58)	Chāo-Shuchingmung	(1646–1650)
Solar Eclipse	Kāplāo (50)	30 December 1758	1758–1759	Kāpngi (51)	Chāo-Shuremphā	(1752–1768)
Comet 1P/Halley	Kāpngi (51)	April–May 1759	1758–1759	Kāpngi (51)	Chāo-Shuremphā	(1752–1768)
Comet C/1769 P1 (Messier)	Kākeu (60)	September 1769	1768–1769	Kāpcheu (1)	Chāo-Shunyeuphā	(1768–1779)
Lunar Eclipse	Khutshingā (7)	4 February 1776	1775–1776	Rungmut (8)	Chāo-Shunyeuphā	(1768–1779)
Tungkhungia Buranji						
Comet C/1744 X1 ('Chéseaux')*	Saka 1665	January–March 1744	1743–1744	Katkeu (36)	Chāo-Shutanphā	(1714–1744)
Comet C/1769 P1 (Messier)	Saka 1691	September 1769	1768–1769	Kāpcheu (1)	Chāo-Shunyeuphā	(1768–1779)

* Not referred to in the *Ahom Buranji*.

events (eclipses) and objects (comets), and Column 2 the *Lākni* / Saka of the event as given in or deduced from the descriptions in the *Buranjis*. The actual dates of the astronomical events or objects are given in Column 3; here, the eclipse dates are exact, whereas the comet dates are of the best-view periods ascertained from observations and computations. Column 4 lists the calendar years in which the observations occurred. With reference to *Lākni Kāpcheu* (November 1228–November 1229 CE) as the first year of the sexagenary cycle in Ahom history, Column 4 leads to the *lāknis* corresponding to the astronomical events, which are given in Column 5. This agrees with Terwiel and Wichasin (1992: 105–107) who fixed the year *Katplāo* (26) in a medieval Ahom text as extending over the period November 1673–November 1674. Columns 6 and 7 name the Ahom king of the time, and his reign according to the *Ahom Buranji*.

It is apparent from Table 6 that the *lāknis* of the astronomical events (Column 5) generally disagree by at least one *lākni* from those given in the *Ahom Buranji* (Column 2). Only in one case is there a match. With reference to Columns 6–7, some of the astronomical events seem to have occurred in the year of the ascension or death of the contemporary king. No such association can be made now in the light of the present findings since the periods of the reigns have to be revised.

9 CONCLUDING REMARKS

Eclipses have been an integral part of India's cultural and political history. There are only a few instances in old Indian literature and chronicles where eclipses feature in the narrative, whether for effect or for record. In contrast, there are innumerable records of eclipses to be found in inscriptions on stone (e.g. see Ganesha, 2017; Shylaja and Ganesha, 2016; Tanikawa et al., 2017; 2019) and on metal, since the middle of the first millennium. Similarly, in ancient times, the sight of a comet evoked fear and awe in many cultures. It also led to extraordinary cultural expressions. Yet there is an embarrassing silence in the Indian literary texts and chronicles over comet appearances. On that count, the *Rājatarangiṇī* (The River of Kings), the Mughal chronicles (Ansari, 2002; Kapoor, 2015; 2016; 2018) and the *buranjis* of the Ahom Kingdom stand out by having recorded eclipses of the Sun and the Moon and bright comets, along with a few earthquakes.

The Ahom rule was a glorious phase in the history of medieval Assam and was very meticulously chronicled in the traditional *buranjis*. The translation into English of the *Ahom Buranji*, by Rai Sahib Golap Chandra Barua in 1930 was a major step towards revival of interest in the Ahom language, culture and people's consciousness about Ahom identity. In his book, Barua (1930) featured the text with the Ahom script on each printed page, with the English translation alongside. It was a mammoth task and, errors notwithstanding, Barua's book may be seen as a treasure house of Ahom life in a bygone era.

This *Buranji* was resurrected at a time when there were hardly any native speakers of the language alive who could cross-check it for authenticity since the Ahom language itself had become virtually extinct by the turn of the nineteenth century. In a critical appraisal of Barua (1930)'s publication, Terwiel and Wichasin (1992: 2–3) noticed numerous copying and spelling errors in the Ahom script in the *Ahom Buranji* that they felt resulted in an inexact translation.

More recently, Wichasin (1996) has transcribed and translated the *Ahom Buranji*, namely the *Phongsawadan Thai `Ahom = Ahom Buranji*, which covers the same period as in Barua (1930). This translation is taken to be authentic. Unfortunately, this book was not available to me so I could not cross-check the astronomical events and their dates. Still, the astronomical references in the *Ahom Buranji*, described however briefly, are neither ambiguous, nor are their *lāknis* and the converted A.D. years much in error.

In this paper, we have examined the astronomical events mentioned in two important Ahom chronicles, the *Ahom Buranji* and the *Tungkhungia Buranji*. We have cross-checked these references with independent records of the same events from elsewhere and by computations. In different cultures, many times the dates of astronomical events were altered in the records to match some important events in the lives of the rulers. What is noteworthy in the case of these *Buranjis* is that the dates given are quite close to the dates of the actual occurrences. Because of this, we have in hand several definite points on the time axis in Ahom chronology.

In our search, we were limited by the *buranjis* available in English translations only. While listing the eclipses of significance, of obscuration of 95% or more, that occurred over the Ahom capitals during the course of the Ahom Kingdom, we found that the *Ahom Buranji* mentioned only two solar eclipses from among several. In addition, the region would have witnessed several total lunar eclipses, plus many bright comets. It is therefore imperative that all the Tai-Ahom chronicles be looked into, just to see if there are references to astronomical events apart from the ones already mentioned here. In the *Buranji* texts, very often the months are given and, in some instances, the days too. This is very helpful. In light of the dates of the astronomical events established in this study, a task now awaits any enthusiast wishing to rework Ahom chronology.

10 NOTES

1. The first reference to Jovian cycles is found in the *Surya Siddhānta* (Burgess 1860). Varāhamihira in the *Brhat Samhitā* (8: 27) says:

   > When Jupiter enters the last quarter of the asterism Dhanishthā and at the same time rises after getting eclipsed by the Sun, in the month of Māgha, Prabhava, the first year of his cycle of 60 years comes into being and it will be beneficial to all beings' (Bhat, 1986: 91).

   The identifying star of *Dhanishthā* is β Delphini. Jupiter's sidereal period around the Sun is 11.8622 years and considered over a long spell, 86.308 Jovian years equal 85.308 sidereal solar years. If the two calendars are kept tied, then every 85 years, a Jovian year is to be dropped. This is followed in North India but in the South the convention is to count the years in a regular succession. In all, 14 years would have to be adjusted in the Ahom chronology beginning A.D. 568 until A.D. 1826. This is nowhere reflected in the chronology in Barua (1930).
2. 'Saros', mentioned in Figures 5 and 6, refers to the Saros Cycle of $18^{yr}\ 11^{d}\ 8^{h}$, when the eclipses seem to repeat themselves. 1 Saros = 223 Synodic lunar months of 29.53^{d} each (New Moon to New Moon).

   'Gam' in Figures 5 and 6 is Gamma, the distance of the Moon's shadow axis from Earth's centre in units of equatorial Earth radii. It is defined at the instant of greatest eclipse when its absolute value is at a minimum (see Espenak, 2020; 2021).
3. At any given place, a total solar eclipse will repeat in 350–400 years only. A total solar eclipse has to be actually seen before it can be appreciated and faithfully depicted or talked about in a work of art or literature. In olden times most of the people would not know if there was a forthcoming eclipse, or, if it would be total. For most, it was a lifetime's spectacle only.

   The areas lying outside the path of totality see a partial eclipse. Brightness of the partially eclipsed Sun is proportional to the disc area. Until it reaches 90% obscuration people generally do not notice an eclipse. As the eclipse proceeds, the ambient temperature falls by several degrees, accompanied by changes in the wind speed and direction. As it begins to resemble late evening, birds get confused and begin to return nest-wards, bees get disoriented and flowers tend to close. Horses become agitated, shake their heads, sniff the air and paw the ground. Some may calm down, lie down or refuse to advance (Bozic, 2003: 105). The illuminance drops significantly when it is about 3 minutes before the beginning of totality (2nd Contact, (C2)). The drop is dramatic in the last 30 seconds which is by a factor of 105 (Hughes, 2000: 205). When the partial eclipse turns total, one can notice a few bright stars, and most often Venus and Mercury if the Sun is high enough in the sky, but above all it is the solar corona that is unmissably noticed, presenting a most beautiful spectacle. In many cultures, people will run for cover, shout, hurl objects or beat drums to scare away whatever it is that is trying to eat the Sun. For most viewers, the impact of a total eclipse is profound and lasting, and anecdotes loaded with this sensational experience travel far and wide.

4. Morning civil twilight commences when θ_s the elevation of the centre of the Sun's disc is 6º below the horizon and lasts until its top shows. During the civil twilight, the sky is lit by sunlight scattered from the upper layers of the Earth's atmosphere. The brightest stars and planets can be seen. It is nautical twilight when θ_s is between –6º and –12º. The sky is deep blue, the horizon is still visible and navigator's guide stars can be sighted. It is astronomical twilight when θ_s lies between –12º and –18º. When θ_s is less than –18º, it is night and the sky is dark, so regular astronomical observations can be made (US Naval Observatory). These definitions are for a geometrical horizon, 90º from the zenith. The length of the twilight depends on latitude and the time of the year.

5 An important aspect of the Ahom culture was the worship of nature and their forefathers' spirits to whom they would make offerings. They believed in one omnipotent god, *Phā*—the Great God in the sky (Barua, 1930: 1). There were other gods too, from nature: Gods of rain; the Earth; the Sun; the Moon; the stars; of fire; lightning; clouds, etc. The Ahom believed that the unusual happenings in the sky were connected to the major events in the Kingdom and they worshipped their gods to ward off the ill effects.

The kings had their own priestly class —the *Deodhai Pandits*, *Mohung* (*Mohan*) and *Bai-lungs*, for advice on matters of tradition, performance of religious activities, removal of evil effects, etc. For instance, on one occasion, Chāo-Shunyeuphā (r. A.D. 1768–1779) was advised thus:

> The time was not favourable according to Ahom calculation. The heavenly king was advised to offer sacrifice to the gods and spirits and perform Rikhvan ceremony. The king paid no heed to the advice of the Deodhai Pandits. The Brahmin and Ganak Pandits were consulted … (Barua, 1930: 332).

The *Rikhvan* is an expiation ceremony for longevity of life. Ahoms of the priestly class were custodians of the vast knowledge of Tai Ahom culture. They had books on omens and prayers, and books with procedures for divination, i.e., forecasting the outcomes of certain events. The *Deodhais* would examine the legs of fowls and do calculations to determine if the stars were in favour. As and when the king commanded, they would use their astrology books and decide auspicious moments, invoke divine powers to the throne through rituals, advise the king on expeditions, etc. As Brahmins gained access to the Court, the kings began to consult them and also the *Ganak Pandits* (Brahmin astrologers). Between them, these two groups did not always agree and the king would have to choose to follow the advice of one side or the other. On some occasions there also would be disagreement over dates (Barua, 1930: 281). There is no indication if there were any *Ganak Pandits* capable of calculating and predicting eclipses.

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13 APPENDIX: AHOM TIME-KEEPING

The Ahom brought with them to Assam not only their literature and the script but also the system of chronicling and time-keeping. The people skilled in the art were the scholar priests, known as the *moo* (learned *pandits*; Phukon, 2018: 213). This system continued until the end of the Ahom rule.

The Tai people reckoned time starting with a larger unit and moving to a smaller unit, i.e., year, month, day and subdivision of the day itself. This system is called the *lākni.* It was used in the chronicles, the inscriptions, and also on Ahom coins. In the *lākni* system, there are two sets of years, *me* or *Mother* (decimal) and *luk* or *Child* (duodecimal). The base names are given in the Table 7.

The ten *Mother* names are rotationally combined in a five-fold repetition of the twelve *Child* names till the last name from each set to generate sixty names.

Table 7: The Tai decimal and duodecimal series.

Mother Name	*Child* Name
Kāp	*Cheu, Chau*
Dāp	*Plāo*
Rāi	*Ngi*
Mung/Mong	*Māo*
Plek	*Shi*
Kat	*Sheu, Sao, Siu, Shen*
Khut	*Shingā*
Rung	*Mut*
Tāo	*San*
Kā	*Rāo*
	Mit
	Keu, Keo

This is illustrated in Table 8, to show how the years get their names in a cycle. The year names so constructed are sequenced in Table 9.

This system applies to days also. While there is a cycle of sixty days, the months, call-ed *Din*, number twelve. The Ahom months along with their Assamese names (after Terwiel, 1981: 96) are: *Din Ching* (*Āghon*), *Din Kām* (*Puh/Poush*), *Din Shām* (*Māgh*), *Din Shi* (*Falgun*), *Din Ha* (*Chaitra*), *Din Ruk* (*Baisākh*), *Din Chit* (*Jaistha*), *Din Pet* (*Āhār*), *Din Kāo* (*Shawon*), *Din Ship* (*Bhadra*), *Din Shipit* (*Āhin* / *Āshwin*) and *Din Shipshang* (*Kartik*).

In the Chinese Sexagenary Cycle, the years 2008, 1948, 1888, 1828 CE etc. belong to the same Lunar Year Cycle 25, being from the Heavenly Cycle 5 and the Earthly Cycle 1, i.e., *Wu Zi* (5,1) (Wikipedia, 2020). Going back in the cycle, the years 568 A.D. and 1228 A.D. belong to the *Mother* and *Child* Cycle (5,1) only. In Ahom chronology, the corresponding *lākni* would be *Plekcheu* (25) but that is not so. Obviously, the Chinese and the Ahom cycles have run independently. For the former, the new *Jia Zi* (1,1) began in 1984 CE. The Ahom cycle started in 1228 CE with the first *Lākni Kāpcheu* (1,1). The current Ahom cycle commenced just recently, in 2008 CE.

Table 8: Table for naming the years of the Shan cycle when the number is given, or numbering them when the name is given (after: Elias, 1876: 6).

	Cheu	*Plāo*	*Ngi*	*Māo*	*Shi*	*Siu*	*Singā*	*Mut*	*San*	*Rāo*	*Mit*	*Keu*
Kāp	1		51		41		31		21		11	
Dāp		2		52		42		32		22		12
Rāi	13		3		53		43		33		23	
Mung		14		4		54		44		34		24
Plek	25		15		5		55		45		35	
Kat		26		16		6		56		46		36
Khut	37		27		17		7		57		47	
Rung		38		28		18		8		58		48
Tāo	49		39		29		19		9		59	
Kā		50		40		30		20		10		60

Table 9: The *Lākni* names.

1.	*Kāp Cheu*	21.	*Kāp San*	41.	*Kāp Shi*
2.	*Dāp Plāo*	22.	*Dāp Rāo*	42.	*Dāp Siu*
3.	*Rāi Ngi*	23.	*Rāi Mit*	43.	*Rāi Singā*
4.	*Mung Māo*	24.	*Mung Keu*	44.	*Mung Mut*
5.	*Plek Shi*	25.	*Plek Cheu*	45.	*Plek San*
6.	*Kat Shiu*	26.	*Kat Plāo*	46.	*Kat Rāo*
7.	*Khut Singā*	27.	*Khut Ngi*	47.	*Khut Mit*
8.	*Rung Mut*	28.	*Rung Māo*	48.	*Rung Keu*
9.	*Tāo San*	29.	*Tāo Shi*	49.	*Tāo Cheu*
10.	*Kā Rāo*	30.	*Kā Siu*	50.	*Kā Plāo*
11.	*Kāp Mit*	31.	*Kāp Singā*	51.	*Kāp Ngi*
12.	*Dāp Keu*	32.	*Dāp Mut*	52.	*Dāp Māo*
13.	*Rāi Cheu*	33.	*Rāi San*	53.	*Rāi Shi*
14.	*Mung Plāo*	34.	*Mung Rāo*	54.	*Mung Siu*
15.	*Plek Ngi*	35.	*Plek Mit*	55.	*Plek Singā*
16.	*Kat Māo*	36.	*Kat Keu*	56.	*Kat Mut*
17.	*Khut Shi*	37.	*Khut Cheu*	57.	*Khut San*
18.	*Rung Shiu*	38.	*Rung Plāo*	58.	*Rung Rāo*
19.	*Tāo Singā*	39.	*Tāo Ngi*	59.	*Tāo Mit*
20.	*Kā Mut*	40.	*Kā Māo*	60.	*Kā Keu*

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Ramesh's current interest is the history of astronomy in the Indian region, and he has published a succession of papers in this journal. He has all along been active in popularizing astronomy. He has published also on Indian Systems of Medicine. He is a Member of the International Astronomical Union (since 1985), a Life Member of the Astronomical Society of India (since 1973), and an Associate of the National Institute of Advanced Studies (NIAS, IISc) since 2002 and an Associate of COSPAR Commission E (since 2005).