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PEGGING DATE OF THE MAHĀBHĀRATA – A PEG IN INDIA'S TIMELINE

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The need to establish a timeline for *Mahābhārata*

The two *Itihasa*, historical works of India - the *Rāmāyana* and the *Mahābhārata*, define the cornerstones to pegging the timelines and history of this civilization.

These two works have been influenced by the lives of Rama and Krishna, respectively, who are held Divine by the people of India. While the *Rāmāyana* is about the life and deeds of Rama, the events of *Mahābhārata* and the life of Krishna run intertwined. Pegging the time window of the *Mahābhārata* thus also anchors the historicity of Krishna.

Challenges to pegging the *Mahābhārata*

In the Indian method of recording and time tracking, events have been chronicled using astronomy and sky configurations as a way to mark them. This has posed a challenge to many, who, citing the inability to relate to such descriptions and map them to a date in the way it is popularly specified today in the Gregorian calendar, have relegated events of the *Mahābhārata* and Krishna to the realm of mythology.

Hence, to establish the historicity of the *Mahābhārata* and Krishna and the history of the Indian civilization, in turn, it becomes paramount to first establish a date in the Gregorian calendar

for this time window, which also bears the stamp of the start of *Kali Yuga*. This means that, by dating *Kali Yuga*, too, one can get a handle on the time window of the *Mahābhārata*.

Kali Yuga and Mahābhārata connection

The events of the *Mahābhārata* are unambiguously written in the text to have occurred in the interim period, “*antare*”, between the closing stages of *Dwapara Yuga* and the start of *Kali Yuga*.

Hence, in the effort to correctly date the *Mahābhārata* and Krishna, we need to first peg this key, epoch marking, calendrical event of that time - the transition from *Dwapara Yuga* to *Kali Yuga*. But to be able to do that in the correct perspective, we need to first understand what a *Yuga* is.

Yuga and the Indian calendar

The Indian calendar is cyclical in nature and is divided into four periods, with the duration of each being a multiple of the base unit, *Kali Yuga*.

1. *Kṛta* or *Satya Yuga* = 4 times *Kali Yuga*
2. *Treta Yuga* = 3 times *Kali Yuga*
3. *Dwapara Yuga* = 2 times *Kali Yuga*
4. *Kali Yuga*

The four *Yugas* are taken together to form one cycle, called *Chatur Yuga*. The term *Yuga* which is common to all the above terms is like the generic term age, aeon, era. *Yuga*, from *Yuj*, means to join, to align. It is a conjunction of stars and planets in an alignment. Every day is also a *yuga* of earth and the sun. Every Full Moon and New Moon year is a *Yuga* of Earth, Sun and Moon. There are many such *Yugas* taking place periodically in space. A related word in the English language is “Yoke”, that which binds or brings two bullocks in line. Thus a *Yuga* is a generic measurement unit. The actual elapsed time of a *Yuga* will depend on the individual scale used and can vary from one year on an earthly calendar scale to 4,32,000 years on an astronomical scale. The table below lists various types of *Yuga* scales that have been prevalent in India since millennia.



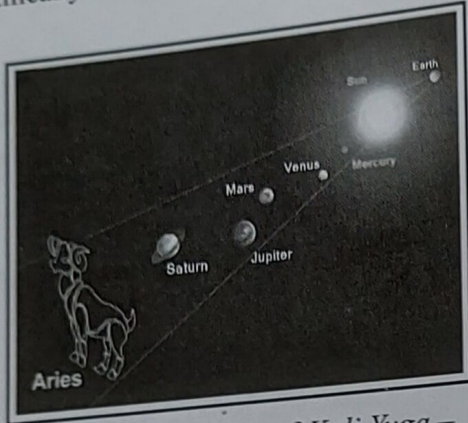
Bulls aligned with a Yoke

	Yuga	Period in earth years
1.	<i>Sanskara</i>	1, 4, 5, 12, 18, 19 in which education & other human based activities are achieved
2.	<i>Manava</i>	60, 100, 120 human life span
3.	<i>Parivarta</i>	360
4.	<i>Sahasra</i>	time taken for <i>Saptha Rishi</i> (<i>Ursa Major</i>) to rotate round the 27 <i>nakshatra</i>
5.	<i>Dhurva</i>	3 times <i>Sahasra Yuga</i>
6.	<i>Ayana</i>	26,000 - Millankovitch Cycle
7.	<i>Chathur</i>	43,20,000

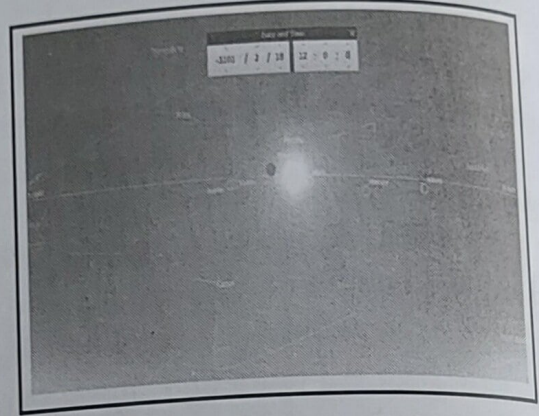
The seven different types of *Yuga*

Kali Yuga date from astronomy

Astronomically, one such conjunction of all the planets in the solar system with the sun and the Aries Zodiac, a unique event which took place on the night of Friday, the 17th / 18th February, 3102 BCE. This is taken as the onset of *Kali Yuga*. This date is not based on the birth or death of any individual or any historical event on earth. It is an astronomical event, which is dateable scientifically using an ephemeris table or planetarium software.



An artist impression of *Kali Yuga* – alignment of Sun, Moon and all planets with Aries



Sky Chart of the day *Kali Yuga* alignment last occurred – 18th February 3102 BCE

The software shows a date of 3101 BCE due to the counting of 0 year by the software, instead of -1 BCE after 1 CE.

Kali Yuga in *panchanga*

The Indian almanac is called “*Panchanga*”.

The *Panchanga* calendar is based on the combination of five key astronomical factors. There are varieties of *Panchanga* in different parts of India. All these *Panchanga* have been in use from time immemorial. All these *Panchanga* observe only one date for the start of the *Kali Yuga*, i.e., 17th / 18th February, 3102 BCE. The start of the *Kali Yuga* also denotes the start of a fresh era in the Indian almanac.



Kali Yuga as per Aryabhata

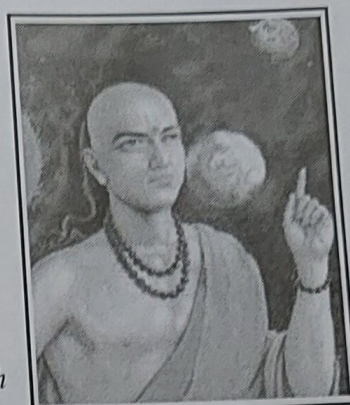
Aryabhata was one of the foremost mathematicians of medieval India. He was born in the year 476 CE. His treatise on mathematics and astronomy called *Aryabhattiyam* is considered as one of the pioneering works in the field of mathematics. *Aryabhattiyam* was written in the year 499 CE when Aryabhata was just 23 years old. This information is given in his work itself.

Start of Kali Yuga

Regarding the start of Kali Yuga, the relevant quotation for this can be found in his work.

*Kaho manvo da, manuyugaha; skha
gataste ca, manuyugaha: chuna ca
Kalpadheryugapadha ga ca
gurudhivasacca, bharatat purvam*

-Aryabhattiyam, 1.5



which means,

“Out of four parts, three parts of the Yuga have elapsed, the 28th Yuga has come. That Thursday has gone with that Yuga which is prior to bharatat.”

The word *bharatat* here indicates the Mahābhārata war. In the first part of the above explanation, the three parts of the Yuga that have elapsed are the *Kṛta Yuga*, *Treta Yuga* and *Dwapara Yuga*. The next Yuga that is *Kali Yuga* had started after Thursday had gone by, i.e. on Friday.

Calculation of Start of Kali Yuga

Further, in the introduction to his work and speaking of his birth date and age at the time of writing, Aryabhata gives information that helps in calculating the start of *Kali Yuga*. He specifically mentions the time that had elapsed since the start of *Kali Yuga* at the time of writing the book.

“When 60 times 60 years and three parts of the Yuga had elapsed, 23 years had then passed since my birth.”

What does this statement mean mathematically?

As we have already seen, there are four components to the Yuga calendar - *Kṛta Yuga*, *Treta Yuga*, *Dwapara Yuga* and *Kali Yuga*. Three parts of the Yuga had elapsed, which means that the previous three Yugas had elapsed and *Kali Yuga* had set in.

60 times 60 years = 3600 years

Aryabhata thus writes that, at the time of writing *Aryabhattiyam*, he was 23 years old, and 3600 years had elapsed since the start of *Kali Yuga*. The accepted year of birth of Aryabhata is 476 CE.

Hence $476 \text{ CE} + 23 \text{ years} = 499 \text{ CE}$.

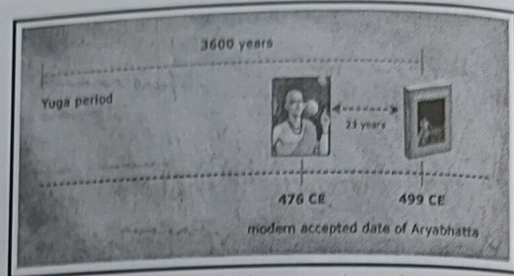
If in 499 CE, 3600 years had elapsed since the start of *Kali Yuga*, then *Kali Yuga* should have started in $499 \text{ CE} - 3600 \text{ years}$, i.e., in 3102 BCE, as there is no Zero year in the Gregorian calendar and we have 1 BCE before 1 CE.

$$60 \times 60 = 3600 \text{ years}$$

$$-3102 \text{ BCE} + 3600 \text{ years} = 499 \text{ CE}$$

$$499 \text{ CE} - 23 \text{ years} = 476 \text{ CE}$$

Calculation of Aryabhata's lifetime



Timeline of Aryabhata, *Aryabhattiyam* and *Kali*

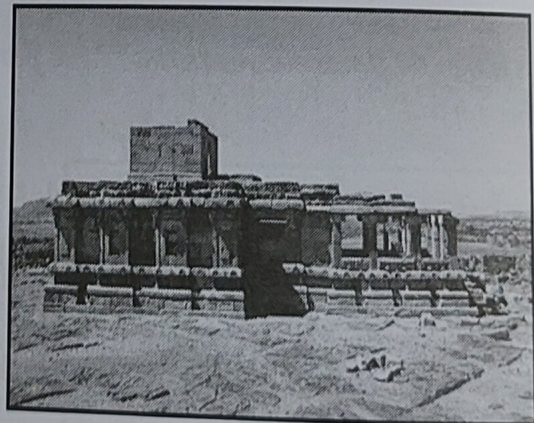
These two statements of the *Aryabhattiyam*, when read together, clearly takes us to only one date for the *Kali Yuga* as per the calculations of the astronomer, mathematician par excellence. It takes us to the year 3102 BCE. Aryabhata composed his work *Aryabhattiyam* in 499 CE. This is about 1500 years before the present. So, 1500 years ago itself, the start of *Kali Yuga* had been calculated and used as a benchmark by Aryabhata to place his work on the timeline for posterity.

Kali Yuga date from the Aihole Inscription

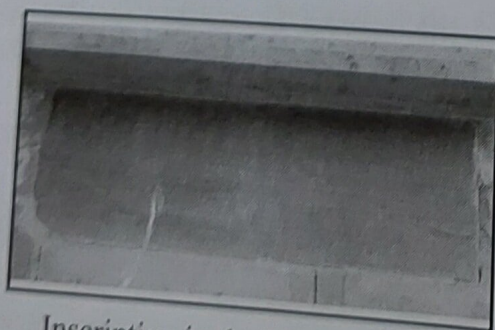
Aihole is situated in the northeastern part of the present-day state of Karnataka in south India. There, in a Meguti Jain temple built during the reign of the Chalukya king, Pulikesi, we find an interesting inscription with which we can date the start of *Kali Yuga* to 3102 BCE. This inscription has been dated to 634 CE by modern archaeologists.



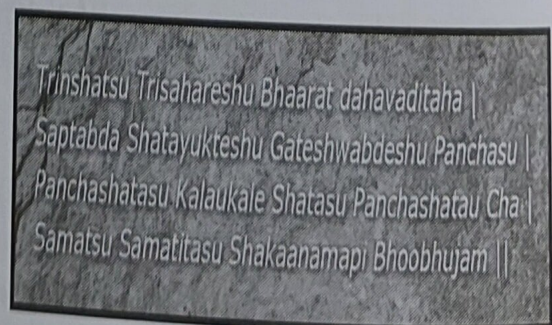
Aihole in Karnataka



Meguti Jain temple



Inscription in the Meguti temple



Aihole Inscription - English transcription of *Sanskrit* text

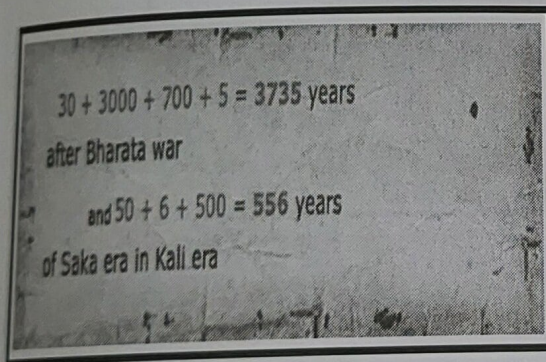
This inscription mentions the year when it was inscribed. The text in arithmetical terms indicates the years that had elapsed since the start of the Bharatha war and the start of *Kali Yuga*. It also mentions the year in terms of the elapsed time in the Saka Era, i.e., with respect to the date of Salivahana's period. The Saka Era is one of the other prominent calendars used in medieval India and is dated from the date of King Salivahana's ascension to the throne.

From these two references to the year of the inscription and the fact that the inscription has been archaeologically dated to 634 CE, we can calculate the start of *Kali Yuga*.

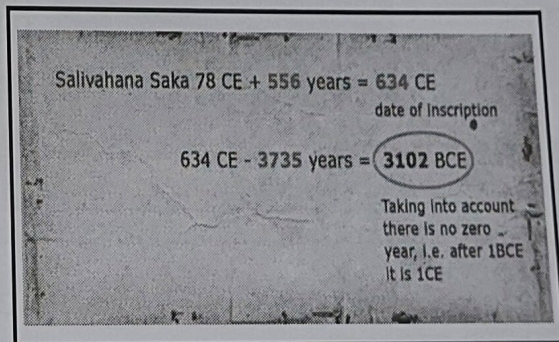
The Aihole inscription is one of the best examples of inscriptions from medieval India, from which we can derive precisely the start of *Kali Yuga*.

What is interesting to note here is that the Meguti temple is not a Hindu temple but a Jain temple.

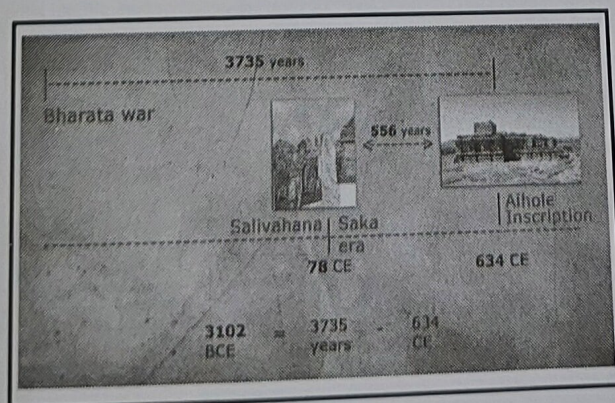
This places beyond doubt that both the events, the *Mahābhārata* war and *Kali Yuga*, were looked upon as historical events in India across ages and their date, back in history, was known precisely.



Year as mentioned in the inscription



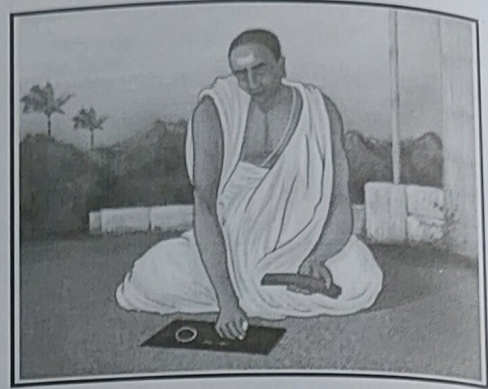
Calculation for Start of *Kali Yuga* in 3102 BCE



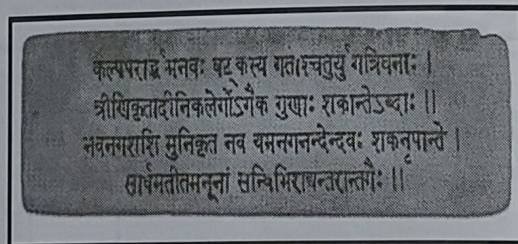
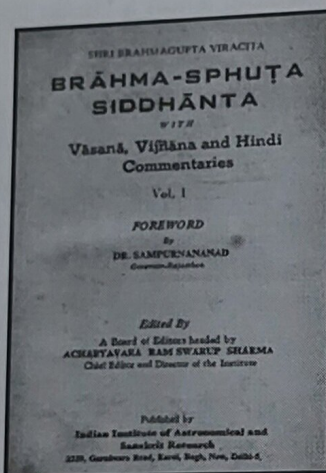
Graphic Timeline - dating *Kali Yuga*

Kali Yuga date from Brahmagupta

Brahmagupta was a great Indian mathematician and astronomer who lived between 598 CE and 668 CE. He was born in Rajasthan and later became the head of the astronomy centre in Ujjain. He authored many works on mathematics, of which *Brahmasphuta Siddhanta* is the most popular. This work found its way to Baghdad during the 8th century CE and provided the Arabic world with a link to Indian mathematics and astronomy. In his work, *Brahmasphuta Siddhanta*, in 628 CE, he writes that the *Salivahana Saka* started from the 3179th year of the *Kali* Era. *Salivahana Saka* started in the year 78 CE.



Brahmagupta, the renowned mathematician – An Illustration



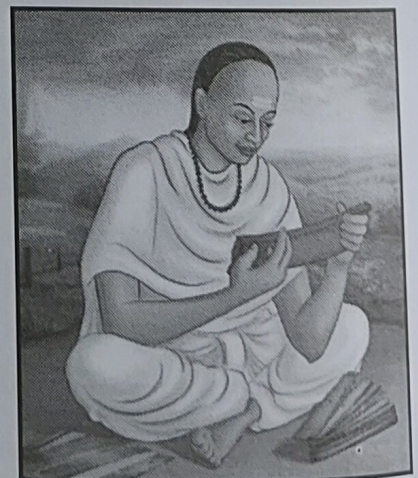
In time calculation, 3179 years have elapsed in the present *Kali Yuga*

This means that the *Kali* Era started in 3102 BCE and tallies well with the date arrived at from other sources.

Kali Yuga date from Bhattotpala

Bhattotpala was another mathematician who lived around 966 CE and wrote several commentaries on Brahmagupta's works as well as works by other mathematicians who had lived before him, such as Aryabhatta and Varahamihira. His claim to fame was his critical analysis of all the works prevalent in the domain of mathematics during his times.

In his critical study, too, he concurs with Brahmagupta's dating of the *Kali Yuga* era.

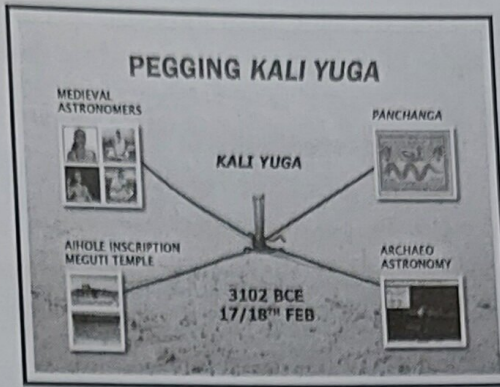


Bhattotpala

Pegging *Kali Yuga*

Thus it is not just one author dating *Kali Yuga* at random, but a host of luminaries in the field of mathematics and astronomy who have dated it independently and have all arrived at the same year of 3102 BCE for the start of *Kali Yuga*.

Bhattotpala's critical examination and stamp of approval to this date for *Kali Yuga* gives it that extra level of credibility and mathematical correctness.



Pegging *Kali Yuga*

Dating this *Kali Yuga* from multiple sources such as,

1. statements of medieval mathematicians and astronomers,
2. archaeological inscriptions,
3. from *Panchanga* calculations and
4. modern astronomy,

and all four converging to the same date, pegs the *Kali Yuga* connected with the *Mahābhārata* time window, to only one date – 17th /18th February, 3102 BCE.

Pegging the start of *Kali Yuga*, which occurs during the lifetime of Krishna to 3102 BCE, in turn also pegs the times of Krishna and the *Mahābhārata* to around 3100 BCE.

Further, using archaeo-astronomy, a method of dating events by extracting astronomical description of those events from literature and searching for those sky configurations in the past, we get to see the exact dates for the events in the *Mahābhārata*. Some of these, which also included Krishna, are listed below. These fit in well around this date of *Kali Yuga*.

27 th July 3112 BCE	Krishna Birth
26 th September 3067 BCE	Krishna departure to Hastinapura
28 th September 3067 BCE	Krishna dhoota
8 th October 3067 BCE	Krishna - Karna chariot ride
1 st November 3067 BCE	Balarama pilgrimage start
22 nd November 3067 BCE	Kurukshetra war begins
12 th December 3067 BCE	Balarama pilgrimage concludes
13 th February 3031 BCE	Krishna's departure
November 3031 BCE	Yadava Civil war

Internally Consistent Dates of Krishna's Lifetime as arrived at by Prof. Dr. Narachari Achar of Memphis University

In this set of dates, we see that the sequence of events and their dates are in the right order and the elapse of time between them is also as mentioned in the text. If even one of these dates had

gone out of place, then the entire set of dates becomes questionable. Such an internal consistency of dates is of high importance while dating the events.

- It lends credibility to
1. the process of research
 2. the planetarium software
 3. the field of Archaeo-Astronomy and above all,
 4. the text.

It is a combination of all these factors collectively that make for the amazing internal consistency that we see here in this chart. More details regarding the possibility, veracity as well as logicity of these dates for Krishna and the *Mahābhārata* can be found in the book Historical Krishna - Dating of Krishna, published by us in the Bharath Gyan series of books.

Such an internal consistency confirms that the events mentioned in the text and their sequence of occurrence along with the elapsed time are not figments of the imagination of the author of the *Mahābhārata*, but actual occurrences recorded for posterity, which makes this text the history of India. A history that goes back over 5100 years, to the day *Kaliyuga* started in 3102 BCE for sure!