

Time measurement in Hinduism

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*(We pray the readers to forgive the bad translation of the following text.
This translation has not been corrected yet.)*

Time does not exist; it is but a relative perception that is proper to the world of manifestation. All this has been clearly expounded in “HAMSA”. Time is one of the first created things. It is concomitant to the 'Big Bang', to the 'explosion' of '*Hiranyagarbha* (the golden egg) (1).

This manifestation is cyclic, the universe appears and disappears, and this since times immemorial. Within this very manifestation, different cycles exist. Brahma is regarded as the creating 'God', in that he is the symbol of the All when seen as a creator.

The **life of Brahma** (therefore of the creation) is made of 100 years of Brahma, one year of Brahma being made of 3.110.400.000.000 years. So, Brahma's life has a duration of 311.040.000.000.000 years. It is what is called a parardha (according to some scriptures the first 50 years are called the

first parardha and the last 50 years the second parardha). At the beginning of the parardha, it is the primary manifestation. At the end of the parardha, the general destruction of the Universe takes place, Brahma himself ceasing to exist. The worlds of Bhur, Bhuvah, Svahah and Mahah perish and only the worlds above stay intact. This destruction is called Prakrtika Pralaya or Prakrta pratisanchara. In other words, everything is destroyed, including Brahma, Vishnu and Shiva. Everything merges in Mahat (primordial energy) (Devi), which merges in Mahadeva.

A **year of Brahma** is made of 360 **kalpas** or '**days of Brahma**', each one made of 4.320.000.000 (4 billions 320 millions) years. After each day of Brahma comes a night of Brahma. At the beginning of the kalpa, there is manifestation. At the end of the kalpa comes a destruction called *Naimittika Pralaya* (destruction of all the creatures). The earth is no more able to make the atmosphere contribute to the biological life on its surface. A cataclysm occurs, which lasts 100 years. Everything is burnt, due to the heat of the Sun, even the oceans evaporate. Then the earth is a deserted planet. (Then life is transferred on Janaloka or Brhaspati, with an atmosphere that is favourable to the birth of biological life.) After this, comes the night of Brahma, of an equal duration. The Kalpa in which we are presently is called VARAHAKALPA.

Each day of Brahma is made of 14 **Manvantara** (or ages of the world), each of them made of 306.720.000 years. At each manvantara a Manu, "creator" and sovereign of the human races, appears. There are 7 rishis on a Manvantara. We are presently in the 7th Manvantara, of which the Manu is called VAIVASVATAMANU. On each manvantara, the universe

passes (like for the other cycles but at different levels) through the phases of creation, preservation and destruction.

A manvantara is made of 71 **Mahayuga** (big age) of 4.320.000 ans. So, one finds that a kalpa is made of 1000 mahayuga.

Each Mahayuga is made of 4 yugas in the following manner:

- **Satyayuga** (or krtayuga) (age of truth) of 1.728.000 years
- **Tretayuga** of 1.296.000 years
- **Dvaparayuga** (age of doubt) of 864.000 years
- **Kaliyuga** of 432.000 years.

The smallest of the pralayas is the pralaya when the world, each night, sinks in darkness. It is the 'constant pralaya'.

Presently, we are just entering the 5101st year of the 7th Manvantara of the 2th Mahayuga of the first kalpa of the 51è year of Brahma (Note: according to the remark that I made above concerning parardhas, if we call parardha the duration of 50 years of Brahma's life, then one will speak of a parardha as a half-life of Brahma. This does not change anything to the calculation. Then one will say that we are in the first kalpa of the second parardha (instead of the 51th of the first)).

Kali Yuga has begun at the end of the Mahabharata War when Krishna went back to the Vaikuntha, that is to say on the 20th of February 3.102 BC at 2: 27'30 sec. PM. As the ruling emperor at that time was Yudhishtira, this Kaliyuga is also called 'Yudhishtira Shaka'. Therefore, our era would have begun 1.960.853.101 years ago. In this, this calculation is in accordance with the calculation of Swami Dayananda Sarasvati.

However, we have spoken of some differences of calculation in the issue nr 14 of RAMA NAMA. According to the Vikram Samvat there would be 1.972.949.101 years, and we also agree on this calculation. Why?

For this last calculation, the duration of a manvantara is 308.448.000 years and not 306.720.000 years. Why this difference? Actually, if a kalpa of 4.320.000.000 years makes 14 manvantaras, then a manvantara would have to be equal to 308.571.420 and not to 306.720.000. Puranas remain vague on this difference. Actually, a manvantara would be made of 71 mahayugas and 6/14.

Scriptures tell us that, between two kalpas, there is a sandhya (intermediary time), that is to say that the kalpa in itself is made of 4.318.272.000 years and that the sandhya between two kalpas is made of 1.728.000 years. If we divide this number of 4.318.272.000 (duration of one kalpa itself without the sandhya) by 14 (number of manvantaras for a kalpa), we actually find the number of 308.448.000 for a manvantara. (But also, we clearly see that, concerning the manvantara, the difference between 308.338.000 and 306.720.000 makes (also) 1.728.000 years, duration of a satyayuga. Actually, a manvantara is therefore made of 71 mahayugas + a satyayuga. This duration, equivalent to a satyayuga, is called sandhya or period of transition, and here it is called Manusandhi.). Then the problem is to know where these 1,728,000 years of sandhya go between two kalpas.

In which manner could we know the tradition on this subject? It is extremely difficult. The *SURYA SIDDHANTA (I.18-19)* says that there are 15 sandhi-kalas, one before the beginning of

each manvantara, and the rest, which is 14, at the end, sandhikala covering the period of deluge between two manvantaras.

If we calculate the duration of 6 manvantara with a duration of 308.448.000 years, then we obtain 1.850.688.000 years; with the 120.533.000 years of the mahayugas passed since then, we obtain 1.971.221.000 years. The difference with the Vikram Samvat is: 1.728.000 years, duration of a sandhya between 2 kalpas, or duration of a satyayuga. So, this also means that the Vikram Samvat takes into account the sandhya that has passed between the preceding kalpa and our kalpa, what is borne out if one actually take the number of 4.318.272.000 years for a kalpa, considering apart its sandhya, and not 4.320.000.000 years without considering the sandhya and therefore without being able to adjust the calculation: between 4.320.000.000 / 14 with 306.720.000.

So, taking the sandhya into account, the number is: 1.972.949.100, as follows:

- Sandhya at the end of the preceding:	1.728.000
- 6 passed manvantaras: 6 x 308.448.000 years:	1.850.688.000
- 27 passed mahayugas : 27 x 4.320.000 years:	116.640.000
- For the present mahayuga :	
- 1 krtayuga:	1.728.000
- 1 tretayuga:	1.296.000
- 1 dvaparayuga:	864.000
- Kaliyuga up to the 18th/3/1999:	5.100

	1.972.949.100

In which way were the ages established? The Sanskrit word "Yuga" means "era, age". The first, the shortest yuga is a

period of 5 years, which is measured by the time taken by the Sun and the Moon to meet in the constellation of the Sagittarius (Dhanush). Every 5 years, on the first day of the ascending Moon (the period between the new moon and the full moon is called 'bright fortnight) of the month of Magha (Lunar month of January-February), when the northern hemisphere of the earth turns toward the Sun, Sun and Moon are in conjunction in the Sagittarius. The 5 years of such a yuga are called: 1) Samvatsara, 2) Parivatsara, 3) Idavatsara, 4) Anuvatsara and 5) Idvatsara.

Then comes the Yuga of 12 years, based on the time of the revolution of Jupiter, the most important planet after the Moon, called Guru: the one who brings light. Then, the 5 years yuga was studied in connection with Jupiter and, in this way, one got a Yuga of 60 years. The first such Yuga occurred when there was also conjunction of the Sun, the Moon and Jupiter in the Sagittarius after 865 millions years of the present Kalpa. This kind of conjunction appears only 5 times in a kalpa. The *Vishnudharmottara Purana* (quoted in the *Adbhuta Sagara* by Vallasena) says: "The 60 years Yuga begins with the conjunction of Jupiter, the Moon and the Sun in the constellation of Dhanistha (Sagittarius), on the first day of the bright fortnight of the month of Magha." This cycle of 60 years is also divided in 5 cycles of 12 years that have the same names as those given above.

At the beginning of this Kalpa, all the planets were in conjunction in the constellation Ashvini 1.970.000.000 years ago (Ashvini being one of the 27 nakshatras). These planets come into conjunction with the same constellation every 432.000 years. The time of a conjunction is the duration of the Kaliyuga, the time of two conjunctions is the duration of the

Dvaparayuga, of three conjunctions the duration of the Tretayuga and the times of three conjunctions the duration of the Satyayuga. The European astronomer Belly (quoted by the Comte Bjornstjerna in his "Theogony of the Hindus") says: *"According to the astronomical calculations of the Hindus, the present period of the world, the Kaliyuga, began 3.102 years before Christ's birth, on the 20th February at 2:27'30" P.M., the hour being thus calculated to the nearest minute and the nearest second. They say that a conjunction of planets has occurred and their tables show this conjunction. It was normal to say that a conjunction of planets occurred at that time. This calculation of the Brahmans is confirmed in a so exact way by our astronomical tables that nothing, apart from real observation, was able to come to a result that was corresponding so much."*

As we have seen, a Mahayuga is made of 4 yugas called Satyayuga, Tretayuga, Dvaparayuga and Kaliyuga. We already spoke of these ages in connection with dharma, man's height, his life duration, etc... in preceding RAMA NAMAs. At the beginning of a Mahayuga (and therefore of a Mahayuga), Dharma is of 100% and at the end of Kaliyuga it is of 0, but, as this is not in relation with the measurement of time, we will not come back on it today.

Now, let us come to the Manvantara. It is marked by a inversion of the poles, which occurs in 322 .580.000 years as already seen above. As the polarities have changed, the directions have changed too.

Also, the Rishis identified 5 systems in the creation, the smallest turning around the following in size and so on, up to the entire universe; the revolution of the Moon around the

Earth (Chandramandala), of the Earth around the Sun (Prthivimandala), of the Sun around Parameshti (Suryamandala) and the revolution of Parameshti (Parameshti-mandala) around Svayambhu (Svayambhumandala), centre of all the galactic centres of the universe.

In the same way as the Moon around the Earth creates months (see below), the Earth around the Sun creates years, the revolution of Brhaspati the 12 years Yuga, etc... " *In the same way, Dr. Ravi Prakash Arya says, the revolution of the Sun around the galactic centre must be at the origin of the inversion of the world order and the change of the Earth polarity... According to the modern estimations, the Sun turns around the galactic centre with a speed of 250 km/sec. Along its ecliptic of about 20.000.000 'kharabs' (thousands of billions (not)) Kms in 250 to 270 millions years. But according to the estimations of the most erudite Indians, the Sun takes 322.580.000 years to complete its course around the galactic centre, and thus this period was established as a Manu. This difference between the old Hindu scholars and the modern scholars concerning the course of the Sun around the galactic centre shows that the size of the galaxy that was known to the old Hindus was much bigger than the one that is known by our modern scholars.*"

As seen before, the superior unit of time is the kalpa that makes 14 manvantaras and 15 satyayugas. One kalpa is equal to 1.000 mahayugas. It is the time taken by Parameshti to turn around Svayambhuva mandala. The Atharvaveda says: «The galaxy takes 4.320.000.000 years to complete a revolution. Here Vishvadeva stands for the galaxy. " A revolution of the galaxy around Svayambhuva Mandala constitutes a Kalpa or Brahma's

day. After the day of Brahma, comes the night of an equal duration.

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This being said, it is interesting to know all the measures of times, beginning with the smallest. This is not very easy as, often, Puranas give measures that know some differences (here the *Bhagavata Purana* (BP) and the *Kurma Purana* (KP) :

- (BP) 1 paramanu
- (BP) 1 anu (atom) = 2 paramanu (interesting to find matter associated with time)
- (BP) 1 trasarenu = 3 anu
- (BP) 1 truti = 3 trasarenu (1 truti = 1/33.750th of a second)
- (BP) 1 vedha = 100 truti
- (BP) 1 lava = 3 vedha
- (BP) 1 nimisa = 3 lava
- (BP) 1 kshana = 3 nimisa
- (KP) 1 kastha = 18 nimisa
- (BP) 1 laghu = 15 kastha
- (KP) 1 kala = 30 kastha (2 laghus)
- (BP) 1 nadika = 15 laghus
- (BP) 1 muhurta = 2 nadikas (30 kalas)
- (KP) 1 'day' = 30 muhurtas (24 'hours')
- (KP) 1 'month' = 30 days
- 1 ayana = 6 months
- 1 'year' = 2 ayanas (dakshina (meridional) and utara (septentrional))

Actually, there are several measurement systems. Here are the definitions that are given by the great mathematician Bhaskaracarya:

1 truti = the time for a lotus leave to react to a needle
(1/33.750th sec.)

1 taptara = 100 truti

1 nimisa = 30 taptara

1 asu (prana) = 45 nimisa (= 4 sec.) = the time that is equal to the breathing of a normal man, according to the Suryasiddhanta))

1 vinadi = 6 prana

1 kastha = 18 nimisa

1 kala = 30 kastha

1 ghata (or nadi) = 6 vinadi = 30 kala = also 60 palas (1 pala =60 vipala)

1 muhurta = 2 ghata

1 complete day (day and night) = 30 muhurtas (=21.600 prana (breathings)).

The lighted part of the Earth is 'ahah' (day) and the dark part 'ratri' (night). Both together make 'ahoratra'. A form of this system has been developed later with the name of 'hora' (degeneration of a-hora-tra). From this term 'hora', the French 'heure' has come, and 'hour' in English.

It is also interesting to note that the names of the 7 days of the week have universally stayed as they were defined by the old Hindu sages: Monday, day of the Moon, etc... (but in English, as ever with this people that want to be 'original', it is not the same, yes, for Saturday and Sunday also ...). Since the creation begins with the rising of the Sun, the first day has been called 'ravivara': day of the Sun (Sunday). Actually, each hour of each day is assigned to a planet, and the name of the day is given according to the name of the planet that has been assigned at the first hour of the said day.

In the *Rig Veda*, it is said that the year is a cycle of 12 rays, that a circle of 12 rays has surrounded the Sun. Thus, the ecliptic is

divided between 12 signs of the Zodiac: *mesha*, *vrishbha*, *mithuna*, etc... which have been universally retained afterwards. This ecliptic, too, is divided on 360 degrees and each degree that is travelled through by the Earth is a solar day, which is 21 minutes bigger than a civil day. A month is made of 30 degrees of the ecliptic. The month is constituted, not by the revolution of the Earth around the Sun, but by the revolution of the Moon around the Earth. "Moon makes months", says the Rig Veda. The month is called '*masa*'. The Moon makes a revolution around the Earth in 29 days and 12 hours. Therefore the lunar month has 12 h, 10 mn and 3 sec. less than the solar month. So, every 32 months and 15 solar days, there is more than a solar month in excess, which is called *Adhika masa* or *Mala masa* (inserted). The Veda says: " The one who knows the natural laws knows the twelve months and the inserted month. "

The names of the months were given according to the heavenly body that comes in conjunction with the Moon at the end of the full moon (*punnima*). We will not say anymore on this subject, as there is no equivalence between solar and lunar months.

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Which civilisation, more than 6.000 years ago, was considering such periods of time, in the infinitely big as well as in the infinitely small, when our learned Westerners, few years ago, were giving to the creation the date of 4.000 BC? (1). Small as well as big, all the Hindu 'divisions' of time are based on scientific calculations. The Rig Veda, the Yajur Veda, the Puranas and the *Manusmriti* give the same method of calculation. The Indian tradition is the only one that has expounded the "history of time", since the origin of the

Universe up to our time and even in the future, included the time that has passed since the beginning of life on Earth!

So, according to the Indian tradition, the duration of the Universe is 311.040.000.000.000 years. 50 years of Brahma have passed since the beginning of the creation of Svayambhuva mandala, Parameshti Mandala (galaxies), Surya Mandala (stars), Prthivi mandala (planets) and Chandra mandala (satellites). In this creation, the Earth appeared 4 to 5 billions years ago, and on it life exists since 1.970.000.000 years.

The Christian year '2.000' does not mean anything, as the Muslim year does not mean anything. Both take, as a point of beginning, one human being among billions of billions that have existed. There is strictly no scientific base. The Hindu calendar does not take into account any being in particular, even if, as Jesus, there is 'unity with the Father', but the entire universe, it gives the universal time. It is "objective" and scientific. Since thousands years, it gives dates that present science are only approaching. In some Hindu pujas, the exact date of these pujas is given. It is not said : "today 4th of April 1999 at such hour ...", but : "We are in the second parardha of Brahma, the first kalpa, Varahakalpa, in the 7th manvantara, the one of Vaishvata, in the 28th Mahayuga, the year 5100 of the Kaliyuga has finished, on the", etc.

अथ ब्रह्मणो द्वितीयपरार्धे श्वेतवाराहकल्पे सप्तमे वैवस्वतमन्वन्तरे
अविंशतितमे कलियुगे कलिप्रथमचरणे ५१०० शताब्दे

atha brahmaṇe dviṭīyaparārdhe śvetavāharākālpē saptame vaivasvatamanvantare
aṣṭaviṃśatitame kaliyuge kaliprathamacaraṇe 5100 śatābde