

Cosmic Cycles, Cosmology, and Cosmography

In the view of classical Hinduism, this world is the domain of time, and time is viewed as a cyclical process. Society and the entire created universe are subject to a recurring sequence of creation and destruction that is endless. The picture painted by the → Purāṇas, Dharmasāstras (→ Dharmasūtras and Dharmasāstras), and astronomical treatises known as Siddhāntas (→ astrology and astronomy) is of an ongoing cyclical process that includes different kinds of cosmic cycles. This is not to say that these texts reflect a lack of sense of history, as has often been argued. Nor does it imply that Indian perceptions of history are strictly cyclical, as opposed to the presumed linear – more properly, rectilinear – understanding of history in religious traditions like Judaism, Christianity, and Islam. In fact, although there is a marked difference of emphasis in these traditions *vis-à-vis* Indian ones, the distinction between cyclical and linear time is not absolute. Judaism, Christianity, and Islam follow cyclical ritual cycles, and Christianity includes the notion of a returning savior. Hindu cosmic cycles are so vast that, in practice, an event such as the great battle described in the → *Mahābhārata* fulfills a similar role to that of a unique event in a tradition whose history is patterned according to linear time (González-Reimann, 1988, 19; Thapar, 2007, 32–32). The Purāṇas give great importance to genealogy and the lineages of historical kings, in what can also be viewed as an expression of linear time (for detailed discussions see Thapar, 1997; 2007; Malinar, 2007a; 2007b). Nevertheless, such instances of linear time play themselves out against the backdrop of the large recurring cosmic cycles that, in the developed puranic and shastric system, provide the ontological and mythic-historical background for traditional Hinduism.

There are three main cycles in this complex system: the *kalpas* (also known as days of → Brahmā), the *manvantaras*, and the *yugas*, each with its own defining characteristics, and each responding to a certain need within the religious, cultural, and social circumstances of the time when they first appeared in Sanskrit literature. These cosmic cycles involve enormous time peri-

ods with durations that dwarf modern estimates of the age of the universe. In the 18th century, some European intellectuals were so impressed by the antiquity that Hinduism claimed for its texts and traditions on the basis of such durations that prominent figures such as Voltaire sought proof in these claims that Indian traditions were older than biblical ones. The enormity of Indian time cycles was also alluded to by Carl Sagan (the well-known 20th-century astronomer and popularizer of modern astronomy and cosmology) when he was explaining modern scientific views of the origin of the universe. If cosmic time in traditional Hinduism is cyclical, then space is circular, because the world is often arranged in a series of concentric circles defining different continents. Alongside this horizontal geographical arrangement, there is also a vertical one, intimately related to levels of existence.

Time

Antecedents: The Vedic Period (c. 1200–500 BCE)

Time Cycles

In the *R̥gveda* (c. 1200 BCE; → Vedas), there is no developed system of large cycles of time. The word *yuga*, which would later designate specific periods of prosperity and decay for human society, is sometimes employed by the poets to refer to a human generation or to an unspecified time period. We occasionally hear of an earlier *yuga* (*RV.* 10.72.2) or of future *yugas*, (*RV.* 10.10.10). In 1.158.6, the sage (→ *ṛṣi*) Dīrghatamas is said to have grown old or died in his tenth *yuga*, with a *yuga* probably representing five or ten years. Subsequent Vedic literature mentions a five-year *yuga*, a cycle that was not defined astronomically until the *Jyotirvedāṅga* of Lagadha (c. 400 BCE), where it is used to reconcile solar and lunar cycles by positing that five years consist of 1830 days as well as of 62 synodic months. Although not very precise, this equation was used for calendrical purposes (for details see Pingre, 1973, 6–8).

The closest that Vedic literature comes to the conception of long time periods is a passing reference in the *Atharvaveda* (8.2.21) to periods of 100 and 10,000 years, as well as of two, three, or four undefined *yugas*, and the mention in the *Taittirīyabrāhmaṇa* (13.12.9.5, 16, 19; → Vedas and Brāhmaṇas) of two Vedic *soma* rituals (→ *yajña*) performed in the distant past by “the creators of everything” (*viśvasrjs*). These rituals are said to have lasted 1,000 and 100,000 years, the former being divided into four periods of 250 years each.

Just as there is no evidence in the *Ṛgveda* of a well-defined system of large time cycles, creation is not viewed by the poets as a recurring process. The text presents several versions of creation, but Ṛgvedic poets were apparently not concerned with the possibility that the world might someday come to an end. There are no predictions or descriptions of catastrophic events that would herald the destruction of the world. In fact, earth and sky are said to never grow old: they are unageing (*ajara*; *ṚV.* 3.6.4; 6.70.1; 10.31.7), which implies they do not die. And Uṣas, the goddess of dawn, is both unageing and immortal (*ajarāmṛtā*; *ṚV.* 1.113.13). The gods in general are considered immortal (*ṚV.* 4.54.2; 7.17.4; 10.65.15), and this must include sky and earth. Thus, for the Vedic poets, the world was not in danger of being destroyed.

Creation, however, was an important topic for many poets, and we encounter varying explanations of how the world came into being. We find the description of the god Indra’s heroic slaying of the serpent-demon Vṛtra, who withheld the waters that allowed for life to exist (*ṚV.* 1.32), a feat that has been interpreted as an anthropomorphic creation story. There is the important and very influential description of creation that appears in the *Puruṣa Sūkta*, the Hymn to the Man (*ṚV.* 10.90), which portrays the origin of the world as the result of the division or dismemberment of a cosmic man (→ *puruṣa*) of enormous proportions. Different parts of the physical world, as well as the social structure of four social classes (*varṇas*; → caste) and the all-important Vedic ritual, are said to have originated from sections of his cosmic body. Creation is also imagined as the work of a cosmic carpenter (*ṚV.* 10.81.4), or as the separation of the earth from the sky by gods like Varuṇa (*ṚV.* 7.86.1), who then keep these two world halves apart by means of a pole or pillar (*skambha*, *stambha*), an image reminiscent of the

setting up of a tent. In another version, creation occurs when a cosmic mother spreads her legs in order to give birth to the earth and the directions of space (*ṚV.* 10.72.3–4). In a more abstract sense, being, or what is (*sat*), emerges from a state of nonbeing (*asat*; *ṚV.* 10.72.2–3), although these two states are elsewhere said to come later in the process of creation (*ṚV.* 10.129.1).

There is one Ṛgvedic version of creation that is especially relevant here because of its influence on later puranic cosmology. It is the origin of the world from a *hiranyagarbha*, a golden germ or embryo (*ṚV.* 10.121). Equally important is the fact that a frequent feature of Ṛgvedic cosmogonical descriptions is the presence of water. According to *Ṛgveda* 10.129.3, in the beginning everything was water (*salila*), while in 10.190 an ocean with waves (*samudro arṇavaḥ*) came into existence at an early stage, and from it emerged the year with its days and nights, thus creating measurable time. The golden germ/embryo itself was on the waters in the beginning (*ṚV.* 10.121.7), just as the gods were in the waters (*salila*) when they brought the sun (Sūrya) out of the ocean (*samudra*; *ṚV.* 10.72.6–7).

The connection between water and creation continues in the Brāhmaṇas (c. 9th–6th cents. BCE) and Āraṇyakas (→ Upaniṣads and Āraṇyakas). The *Taittirīyabrāhmaṇa* (2.2.9.3) links the ocean, understood as the place of generation, with the placental water of animals, and the notion that water was the original state is frequently reaffirmed (*ŚBr.* 11.1.6.1; *TaiĀ.* 1.23.1).

Although Vedic literature shows no awareness of large recurring time cycles, nor does it seem interested in the possibility of world destruction, the three principal astronomical cycles – the day, year, and lunar month – are often portrayed as recurring, circular phenomena, and the periodic disappearance and reemergence of the sun and the moon are frequently depicted as a process of death and rebirth. The year is a wheel (*cakra*) that revolves endlessly (*ṚV.* 1.155.6; 1.164.11, 13), and the moon “becomes new again and again as she is born” (*ṚV.* 10.85.19).

These three astronomical cycles share two fundamental characteristics in Vedic tradition that are of great importance for the Vedic ritual. First, they are divided into two halves, one in which light gradually increases, known as the light half, and another in which light decreases, the dark half. In a broader sense, they are an ascending and a descending half. Second, the points at

which one half gives way to the other are transitional periods that carry special ritual significance. In the case of the year, the ascending half begins with the shortest day, at the time of the winter solstice, and it ends with the longest day, at the summer solstice. This is the *uttarāyana* or *udagāyana*, the “movement towards the north” (of the sun at sunrise). The descending half is the *dakṣiṇāyana* or “movement towards the south.” The moon’s ascending half is called *śukla*, white, and it extends from new moon to full moon, after which the *kṛṣṇa*, or dark half, begins. In the case of the day, the division is usually placed at sunrise and sunset, although it can also be at midnight and noon (ŚBr. 2.1.3.1–3). The moments of transition between the two halves of each cycle will then be the solstices for the year, the new and full moon for the month, and the two twilights – or midday and midnight – for the day. These are critical junctures that require the performance of prescribed rituals.

The importance of the halves of the year and their periods of transition is well illustrated in a ritual described in the Brāhmaṇas, called the *gavām ayana*, which lasts for an entire year. Throughout the year the priests emulate the sun’s movement by performing the sacrifice in the normal order during the ascending half, from winter solstice to summer solstice, and then inverting the order of the performance for the descending half. They also pause at the solstices, like the sun appears to do (KauṣBr. 19.1.28–2.22; 25.1.5–6).

Time as Destroyer

Even if Vedic poets were not preoccupied with the possible end of the world, they do display a concern with the end of life. Vedic hymns are generally inspired and life affirming. However, they contain the seed of what was to become a dominant concern at the end of the Vedic period, namely, the notion that time is an unstoppable force that eventually leads to death. We witness an early manifestation of such worries in the hymns to Uṣas, dawn (→ Vedic gods). Uṣas is praised as the bringer of light and day, the dispeller of night’s darkness, and, as such, her arrival is eagerly awaited. But she is also the bringer of old age and death, since her daily return makes us one day older and slowly drives us towards our end. She causes humans to age (*jarayanti*; RV. 1.92.10; 1.179.1), and she destroys (*praminati*) human generations (RV. 1.124.2). The increasing

importance of time as a powerful force is well illustrated by the presence of two hymns in the *Atharvaveda* (19.53–54), which present time as the origin of everything. Time, *kāla* (a word used only once in the *Rgveda*), created earth, sky, the waters, and the Vedas. Time also created Prajāpati – who in the Brāhmaṇas became the undisputed creator god – thus making time the creator of the creator. Nothing is higher than time, and everything exists in it (see also → time and destiny).

The Brāhmaṇas addressed the concern voiced earlier in the hymns to dawn by emphasizing the need to overcome time ritually. The year was the epitome of time, and its basic cycle. The *Śatapathabrāhmaṇa* (10.4.3.1) declares boldly that the year is death (*mṛtyu*; → death and after-life), destroying the life span of mortals by means of its days and nights. Additionally, the year is equivalent to the god Prajāpati, whose ritual brick altar, the *agnicayana*, is constructed with 10,800 bricks, emulating the 10,800 *muhūrtas* or “minutes” of the year (ŚBr. 10.4.2.1–20; 10.4.3.20). The ideal year is made up of 360 days, each containing 30 *muhūrtas*, and men can reach immortality by building this altar to Prajāpati (10.4.3.10–11). Similarly, the *Taittirīyabrāhmaṇa* (3.11.8.1–6) prescribes the building of a fire altar called *nāciketa* that allows the sacrificer to escape the reach of days and nights.

The rituals described in the Brāhmaṇas serve to counter the negative impact of time, as the sacrificer ritually obtains (*āpnoti*) the year, which is to say that he conquers and survives it. But the year, like the succession of days and nights, is a solar cycle, so another way of conquering time is by going beyond the sun. According to the *Taittirīyabrāhmaṇa* (3.11.4), the sacrificer who conquers the imperishable world beyond the sun escapes the reach of day and night.

The ideal human life span was 100 years in the *Rgveda* (1.89.9; 2.33.2), and this continues in the Brāhmaṇas. The *Śatapathabrāhmaṇa* states that 100 years is a full life span (*āyus*), and whoever lives that long reaches immortality (*amṛta*; 10.2.6.7–9; 13.2.6.8; 13.4.2.10). Other Brāhmaṇas (KauṣBr. 11.7) contain similar statements, while the *Bhāgavatapurāṇa* (3.11.12) will still claim that 100 years is the maximum, or best, length of human life.

Time’s role as bringer of death and destroyer of life continues in the Vedic Upaniṣads, where old age and death are a common concern. In the

Bṛhadāraṇyakoṇiṣad (3.1.3–5), a priest asks the wise Yajñavalkya how the sacrificer can free himself from death, from days and nights, and from the two halves of the moon's cycle. In one of the late Vedic Upaniṣads, the *Maitrāyaṇīyopaniṣad* (6.15), the eternal *brahman* is said to have two forms, time (*kāla*) and the timeless (*akāla*). Its timeless form existed before the sun, prior to the appearance of days and nights, the markers of time.

Death and Rebirth

There are three crucial developments in the Upaniṣads. First, the belief in reincarnation emerges, and the interval between birth and death is now seen as a brief moment in a long cycle of birth, death, and rebirth. Living beings endlessly rotate (*anuparivartante*; *BĀU.* 6.2.16; *āvartante*; *ChāU.* 5.3.2; *PrU.* 1.9) in the wheel of existence (→ *samsāra*), a term that first appears in the *Kaṭhōpaniṣad* (3.7). Second, the only way to avoid the suffering brought about by repeated birth in this world is to break away from the wheel of time – in whose domain we are bound (*baddha*) – and to reach the world of the → *brahman*, beyond time (*ChāU.* 8.15.1). The Vedic ritual can no longer accomplish this, only knowledge of the *brahman*. This is → liberation (*mokṣa*). In the Upaniṣads, reincarnation entails spending time in the moon before returning to earth, while liberation requires going to the sun and beyond (*BĀU.* 6.2.15–16; *ChāU.* 5.10.1–6). This is reminiscent of the Vedic idea that the sun moves alone, while the moon is born repeatedly (*ṚV.* 10.85.18; *VājSa.* 23.9–10; *ŚBr.* 13.2.6.10–11; *MBh.* 3.2.97.46–47). Third, the process of liberation is understood as a return to the source. The *Taittirīyopaniṣad* (3.1.1) explains that the *brahman* is “that from which these beings are born, thanks to which, once born, they live, and into which they go when they die.” This return is conceived of as taking place in the reverse order of that in which the creation of the constitutive elements of the individual came about. It is, again, evocative of the *gavām ayana*, the Vedic ritual that required the sacrifice to be performed in reverse order during the second half of the year. It also evokes the Ṛgvedic notion (10.16.3) that at the time of death the different components of a person return to the parts of Nature with which they are identified – such as breath going to the wind – a process further detailed in the

Bṛhadāraṇyakoṇiṣad (3.2.13). This follows the equivalences outlined earlier in the *Puruṣa Sūkta* of the *Ṛgveda* (10.90.13).

We can visualize existence in the wheel of time as a horizontal, circular movement that takes place “down here” in the world. However, at the time of liberation, there is an upward vertical movement by which the individual breaks free from the horizontal rotation in *samsāra*. The opposite of liberation would then be creation, thus completing a vertical cycle whose first half comprises coming into worldly existence, while its second half is the escape from it into the eternal, formless *brahman*.

There is a fourth, relevant tenet of upaniṣadic thought. Everything in the world is understood as being invisibly linked, and “the world up there” and “the world down here” are reflections of each other (*KaṭhU.* 4.10). This general principle of correspondence or correlation was already prominent in the *Brāhmaṇas*, where the term *bandhu* is employed to indicate a connection with or the counterpart of something. It is of great relevance in the Upaniṣads, where its ultimate expression can be seen in the identity of the → *ātman* (the self) with the *brahman* (the immaterial foundation of the world). The Upaniṣads deal with the birth, death, and rebirth of living beings; but on account of this principle of correspondence or correlation, it seems natural to view the world as going through the same process: it is created, it exists for some time, and it is then destroyed. At the time of destruction, it returns to its source in *brahman*. Not surprisingly, some upaniṣadic descriptions of death can be read as allusions to the end of the world, as in *Muṇḍakoṇiṣad* 3.2.6, where the term *parāntakāle* (at the time of the final end) almost certainly refers to death, but could be read as “at the end of (cosmic) time.” Similarly, *kṛtsnākṣaya* (the destruction of everything) in the late *Maitrāyaṇīyopaniṣad* (4.6; 6.17) probably means death, although it can be construed as referring to world destruction, especially in its second occurrence.

The notion that the world undergoes constant creation and destruction, an idea that becomes prevalent in our next historical phase, is therefore a mirror image, a projection, of the human process of repeated life and death. Likewise, the emerging theory that the world is eventually reabsorbed into its origin is, essentially, a projection of the mystical or yogic process of gradually withdrawing from contact with the external world

and experiencing a return to the timeless origin (see Biardeau, 1968; 1969). The term *pratyāhāra* (withdrawal), which is the name of a stage in the classical eightfold yoga of Patañjali (→ Pātāñjala Yoga), is used in the → *Mahābhārata* (12.209.20; 12.224.74) with both these meanings: the *yogin*'s withdrawal of the senses from objects, and world destruction. Similarly, the compound *prabhavāpyaya* (coming from and returning into), with which the *Kāthopaniṣad* (6.11) defines the yogic process, is employed several times in the epic for the creation and destruction of the world (3.188.4; 12.47.57; 12.328.14). The parallelism between the individual process of liberation and that of world destruction is also evident in epic passages such as *Mahābhārata* 12.271.

The Formative Period (c. 400 BCE–400 CE)

The centuries surrounding the beginning of the Common Era were instrumental in the formation of many fundamental puranic beliefs. The many social, political, economic, and religious changes that took place during that long period would inform all later Indian traditions in one way or another. The changes involved a complex combination of internal transformations of the Vedic tradition, foreign influence, and the reaction to, and often assimilation of, local non-Vedic elements.

World Destruction and Re-creation

The earliest mentions of cosmic cycles in Sanskrit literature are found in the *Yugapurāṇa* section of the *Gārgīyajyotiṣa* (c. 1st cent. BCE), the *Mahābhārata* (c. 3rd cent. BCE–4th cent. CE), and the *Manusmṛti* (c. 2nd–3rd cents. CE). In the *Mahābhārata*, the name applied to the cycle of creation and destruction is not consistent, indicating that these ideas were still being formulated. The cycle is either called a *yuga* (*MBh.* 1.1.28; 12.327.89; 13.135.11), a *kalpa*, meaning a formation or a creation (*MBh.* 6.31.7 [= *BhG.* 9.7]; 12.326.70; 12.327.23), or a day of the *brahman*, or of *Brahmā*, the creator god (*MBh.* 12.224.28–31). Sometimes, it is simply referred to as the process of creation and destruction (*saṃhāravikṣepa*; *MBh.* 12.271.30, 40, 43, 47–49). The ambiguity of the designation of the cycle continued in classical Tamil literature, where the word *ūli* can designate either a *kalpa* or a *yuga*. The first term em-

ployed in Sanskrit was probably *yuga*. In the *Mahābhārata*, the expression “the end of the *yuga*” (*yugānta*) is routinely used by the epic poets to allude to a mythological “end of the world” characterized by natural disasters. This world destruction is usually presided over by the god → Śiva, and it involves earthquakes, scorching heat, devastating rains, and strong winds (González-Reimann, 2002, 64–73). We have epigraphical evidence for this use of the term in the Junagaṛh Rock Inscription of Rudradāman I, from 150 CE (Sircar, 1965, 176–177). These natural disasters are integral to the natural environment of South Asia. The intense heat and torrential rains are part of the yearly monsoon cycle, while earthquakes are also common in the subcontinent. In Sanskrit, the names *kalpa* and Day of *Brahmā* eventually became definitely associated with the cycle of creation and destruction. The cycle is compared to the rising and setting of the sun in the *Mahābhārata* (12.326.71). When the world is created and while it lasts, it is the cosmic day, while the period between its destruction and a new creation is the night. During the day, *Brahmā* is awake, and during the night, he sleeps (*MBh.* 6.30.17 [= *BhG.* 8.17]; 12.224.29–30; see also *MaSm.* 1.73).

Vaiṣṇavism appropriated *Brahmā*'s role as creator by explaining that the god who wakes up and goes to sleep is *Nārāyaṇa*-*Viṣṇu* (*MBh.* 12.327.89). However, *Brahmā*'s participation was still included in the *Vaiṣṇava* narrative, where *Brahmā* himself is said to come from → *Viṣṇu*. *Brahmā* is born on a lotus that grows out of *Viṣṇu*'s navel when he wakes up at the end of the cosmic night (*MBh.* 12.335.19–20), which he spends reclining on the serpent Śeṣa (“Remainder”), also called *Ananta* (“Endless”). In a variant version, *Brahmā* sleeps on the primeval lotus (*ādipadma*) during the night (*MBh.* 3.186.76). It should be pointed out that the sleep of *Viṣṇu* during the cosmic night is said to be “yogic sleep” (*nidrāyoga*; *MBh.* 12.335.17, 57; or *yoganidrā*; *MBh.* 1.19.13; 12.47.39). *Viṣṇu*'s slumber and awakening were also connected to the yearly cycle established by the monsoon rains, as attested by an inscription from the year 423/424 CE, which refers to *Viṣṇu* waking up at the end of the rainy season (Gangdhar Stone Inscription of Viśvavarman, lines 20–21; Fleet, 1888, 75, 77).

The old association of water with creation is now given new life and is placed within the emerging cyclical cosmogonical worldview. If the

world is created repeatedly, and if water is present at the beginning, then water must set in after the world's destruction and remain there until a new creation arises. The idea of a devastating flood at the time of world destruction now gains prominence. The serpent on which Viṣṇu reclines during the cosmic night floats on the cosmic waters (*MBh.* 3.194.8–12; 12.328.14–15; 12.335.18–20), which comprise a dreadful “single ocean” (*ekārṇava*). As for the presence of a lotus at the moment of creation, this is an older motif that appears in the *Taittirīyabrāhmaṇa* (1.1.3.5–7), where Prajāpati, in the form of a boar, sees a lotus leaf on the surface of the cosmic ocean and dives to retrieve some earth from the bottom. He then spreads it on the lotus leaf to create earth. This boar, which in the → *Rāmāyaṇa* (2.102.2–4) is said to be Brahmā, becomes Viṣṇu in the Vaiṣṇava narrative. Water is also the source of creation in the myth of the churning of the ocean, which appears first in the *Mahābhārata* (1.15–17) and the *Rāmāyaṇa* (1.44). The gods and the demons (→ *asuras*), intent on obtaining *amṛta*, the drink of immortality, churned the ocean like one would churn milk to obtain butter. In the detailed *Mahābhārata* version, their churning turned the water into milk and produced, among other things, the sun, moon, goddess → Śrī/Lakṣmī, and god Dhanvantari, who held a jar containing the *amṛta*.

Kalpas and Yugas

The earliest known datable mention of the *kalpa* as a long period appears in the fourth and fifth stone edicts of King Aśoka's Prakrit inscriptions (3rd cent. BCE; → historical periods). They state that his descendants will follow the (Buddhist) *dharma* (teaching) throughout the *kalpa*, but no duration is given for the *kalpa*. The *kalpas* are absent from the Upaniṣads, with the exception of an also undefined passing reference in the late *Śvetāśvataropaniṣad* (6.22). The puranic *kalpa* theory will include three phases: creation, duration, and destruction, associated with the gods Brahmā, Viṣṇu, and Śiva, respectively. Interestingly, the Buddhist version of the *kalpas* – as expounded in the *Abhidharmakośa* (3.89–90) of Vasubandhu (c. 5th cent. CE) – adds the time during which the world does not exist as a fourth phase (this would correspond to the night of Brahmā). It describes a *mahākalpa* (great *kalpa*) made up of four smaller “innumerable” (*asaṃkhyeya*) *kalpas*. These four subdivisions of

the *mahākalpa* correspond to the four phases: destruction of the world, duration of destruction, re-creation of the world, and duration of the world. The “innumerable” *kalpas*, in turn, consist of 20 still smaller, intermediate (*antara*) *kalpas*. The *Mahābhārata* uses the term *mahākalpa* five times, but it probably has no specific technical meaning (12.323.1; twice in 12.326.104; 13.17.122; 13.110.71). In the first of these instances, it could be synonymous with the *mahāyuga*, which we will now discuss.

The *mahāyuga* or *caturyuga* (fourfold *yuga*) is a cycle characterized by a gradual decay of → *dharma*, a term that, for our purposes, can be understood mainly as proper behavior in accordance with one's social class (*varṇa*; → caste). By contrast to the largely ontological *kalpa* or Day of Brahmā, the *mahāyuga* is concerned with society and morality. The cycle, often called simply a *yuga*, includes four successive minor *yugas*, in the course of which *dharma* wanes from a perfect state into one of confusion and disarray. It must be understood that in puranic and shastric discourse, it is the Brahmanical *dharma* that is at stake. Historically, the centuries immediately preceding and following the beginning of the Common Era presented the Brahmanical tradition with serious challenges. First, there was the rising influence of local traditions – mainly Buddhism and Jainism – which denied the validity of the Vedas and rejected the notion of a creator god (see also → historical periods; → Hinduism and Buddhism; → Hinduism and Jainism). Followers of these traditions were usually called *nāstikas*, nonbelievers. Second, there was a growing presence of foreign invaders who sometimes embraced Buddhism and did not recognize the Vedic system of four social classes. These threats were viewed as the “end of the world” in some Brahmanical circles and were considered to be a *yugānta*. We saw above how this term was used in the *Mahābhārata* for the moment of cosmic destruction, but in these narratives (*MBh.* 3.186–189) it carries a different meaning, alluding mainly to a social and moral catastrophe, even if some form of cosmic crisis is often included. In this restricted sense, the *yugānta* is the culmination of the gradual decay of *dharma* through the four *yugas* that make up the *mahāyuga*.

The four descending ages, the *yugas*, were not named after metals, as were their Greek counterparts, by which they could have been influenced. Instead, the names come from throws of dice. It

is a fourfold classification that, conveniently, included a numerical gradation from best to worst. The names are *kr̥ta*, the best throw, followed in descending order by *tretā*, *dvāpara*, and *kali*, the losing throw. The system of *yugas* thus appears as a scale that descends from the prosperous *kr̥tayuga* – when *dharma* is followed by everyone – down to the *kaliyuga*, a time when foreign invaders appear, the social order is upset, *nāstikas* (nonbelievers) abound, the Vedas are no longer followed, and morality is at an all-time low. According to the *Yugapurāṇa*, people live 100,000 years in the *kr̥tayuga*, but their lifespan is gradually reduced to 10,000 and 1,000 in the subsequent *tretāyuga* and *dvāparayuga*. Although not stated, it would presumably be 100 years in the *kaliyuga*. This decimal numerical sequence was abandoned, however, and the numbers connected to the dice throws (4–3–2–1) prevailed as the numerical values for the *yugas*. The human lifespan was then considered to be 400 years in *kr̥tayuga*, 300 in *tretāyuga*, 200 in *dvāparayuga*, and 100 in *kaliyuga*. Note that in both systems the duration of life in the *kaliyuga* coincides with the ideal lifespan of Vedic literature.

The 4–3–2–1 sequence determined by the dice game was also applied to the *yugas* in other ways. *Dharma* was metaphorically said to be a cow that stands firmly on four legs in *kr̥tayuga*, on three in *tretāyuga*, on two in *dvāparayuga*, and on only one in the *kaliyuga*. As the *yugas* decline, human beings' understanding, strength, and virtue also decrease proportionately (*MBh.* 3.188.13). More importantly, in the *Mahābhārata* (3.186.17–23; 12.224.19–20) and *Manusmṛti* (1.68–73; → *Dharma-sūtras* and *Dharmaśāstras*), the duration of the *yugas* was deemed to be four thousand, three thousand, two thousand, and one thousand years, respectively. The Vedic notion of transitional periods was also applied, so that each *yuga* would be preceded by a dawn and followed by a dusk, each lasting one-tenth of the duration of the *yuga* itself. These transitions are called *saṃdhis*. The total number of years for the *mahāyuga* was then 12 thousand, a figure that elicits a correspondence with the 12 months of the solar year. Furthermore, one thousand of these great *yugas* are said to constitute one *kalpa*, or Day of Brahmā, while his night has an equal duration.

There is yet another stage in the numerical development of the *yuga* theory. Although these early sources do not say so, the duration of the *yugas* was soon considered to be reckoned in

divine years. One human year was equal to one day of the gods, thus requiring the length of the *yugas* to be multiplied by 360 in order to calculate them in human terms. In doing so, the duration of the *yugas* was extended to the astronomical numbers of the classical system (table 1). The equation of a human year with a day of the gods goes back to the Brāhmaṇas (*TaiBr.* 3.9.22.1) and was taken up in the *Mahābhārata* (12.224.16) and *Manusmṛti* (1.67). A likely reason for the application of this equivalence to the duration of the *yugas* – besides the common epic and puranic tendency to increase numbers – is the possibility that the end of the *kaliyuga* and the ensuing return of the *kr̥tayuga* were awaited in some circles around the beginning of the Common Era. There is probable evidence for this in the *Yugapurāṇa* as well as in the *Mahābhārata* (3.188), where the notion has been tailored to suit the epic's narrative. As there was no indication that the *kaliyuga* had ended and the *kr̥tayuga* had started, interpreting the duration of the *yugas* in divine years allowed postponing its expected arrival into the distant future.

As can be seen in table 1, the number 432,000 is central to the system. It marks the length of the *kaliyuga* and – with the addition of zeroes – also that of the *mahāyuga* and *kalpa* (which consists of one thousand *mahāyugas*). Equally important is one-fourth of the cycle, 108,000 years, with its own addition of zeroes. D. Pingree (1963, 238–240) points to the Babylonian origin of these numbers in the context of large time periods. However, they are also Vedic numbers connected to the year and the ritual in the *Śatapathabrāhmaṇa*, where, as we have seen, the 10,800 bricks of the *agnicayana* altar (→ *yajña*) represent the *muhūrtas* of the year. In addition, the *Śatapathabrāhmaṇa* computes the number of syllables contained in the *Ṛgveda* as 432,000, with an equal number for the *Yajurveda* and *Sāmaveda* taken together (*ŚBr.* 10.4.2.23–24; for further analysis, see González-Reimann, 1988, 101–112). The use of such figures for cosmic cycles could well be the result of an amalgamation of local traditions with external influences.

The destructive aspect of time plays a central role in the *Mahābhārata*, where *kāla* is an inexorable force that drives everything towards its conclusion and is virtually synonymous with destiny (González-Reimann, 2002, 20–32). Vyāsa, the purported author of the *Mahābhārata*, is said to be a *kālavādin*, a proponent of the

Years of the Gods				
<i>yuga</i>	duration	one <i>saṃdhis</i>	two <i>saṃdhis</i>	total
<i>kṛta</i>	4,000	400	800	4,800
<i>treta</i>	3,000	300	600	3,600
<i>dvāpara</i>	2,000	200	400	2,400
<i>kali</i>	1,000	100	200	1,200
<i>mahāyuga</i>	10,000		2,000	12,000

Human Years				
<i>kṛta</i>	1,440,000	144,000	288,000	1,728,000
<i>treta</i>	1,080,000	108,000	216,000	1,296,000
<i>dvāpara</i>	720,000	72,000	144,000	864,000
<i>kali</i>	360,000	36,000	72,000	432,000
<i>mahāyuga</i>	3,600,000		720,000	4,320,000

Table 1: The length of the *yugas* according to classical Hinduism

doctrine of time (*MBh.* 6.4.2–3). In the Vedic period, knowing time had been the role of Vedic priests, one of whom was called *ṛtvij* (“Knower of the Seasons”), but around the beginning of the Common Era, the influence of Greco-Babylonian astronomy and horoscopic (→ astrology) injected a new dimension into the computation and interpretation of time. This resulted in the emergence of a new kind of expert on time, the astrologer. In Varāhamihira’s *Bṛhatsaṃhitā* (6th cent. CE), an astrologer is a “knower of the year” (*sāṃvatsara*, *sāṃvatsarika*, *sāṃvatsarapāṭhin*), which is to say he is a knower of time. He is also a knower of destiny (*daivajña*, *daivavid*, *daivacintaka*; Shastri, 1969, 349). Just as astrologers could now unravel the intricacies of time as it acts upon the individual, astronomers would give historical meaning to cosmic cycles by calculating them in terms of measurable planetary cycles.

The Classical Period (after 400 CE)

The *Manvantaras*

By the beginning of the 5th century, the *kalpas* and *yugas* were probably firmly in place and widely accepted, despite some disagreements concerning their exact measurement. There is a third cycle that emerged separately and was eventually combined with them. This is the “period of Manu” (*Manu-antara*). In the *Rgveda*, Manu was

regarded as the father of mankind and the first man to have performed the Vedic sacrifice. However, as traditions and lineages multiplied, in the early centuries of the Common Era, the notion emerged that there had been several Manus instead of only one. In this scheme, the Manu of the *Rgveda* – known as the son of Vivasvat – becomes Manuvaivasvata, only one of many Manus, each of whom presides over a different *manvantara*. Additionally, according to the Purāṇas, in every *manvantara* there is a new Indra (→ Vedic gods) and a distinct group of seven *ṛṣis* (sages), whose task it is to teach the Vedas.

There is an incipient version of the *manvantaras* in late sections of the *Mahābhārata*, but no well-developed theory (12.321.9; 12.323.51; 12.329.15; 12.337.40–41; 12.337.52; 13.14.22). The *manvantaras* are first outlined in the *Manusmṛti* (1.61–62), where six Manus are listed before Manuvaivasvata, the current one. These are Svāyambhuva, Svārociṣa, Auttami, Tāmasa, Raivata, and Cākṣuṣa. The Purāṇas would place seven more Manus in the future, thus bringing the total number to 14. In order to incorporate the *manvantaras* into the system of *yugas* and *kalpas*, these 14 *manvantaras* were said to make up one *kalpa*. This presented a mathematical problem because the number of *mahāyugas* in a *kalpa* is one thousand, and, consequently, each *manvantara* must include 71.4286 *mahāyugas*. This prompted puranic authors to say that every *manvantara* contained 71 *mahāyugas* plus an

unspecified surplus (see figure 1). The *Manusmṛti* (1.79) simply states that a *manvantara* includes 71 *mahāyugas*, with no reference to the surplus. Puranic commentators calculate the fraction in terms of years, months, and days, but astronomers would propose a more elegant solution. The *Paitāmahasiddhānta* (3.4; 5th cent. CE) states that at the end of every *manvantara*, there is a *saṃdhi* of the duration of a *kṛtayuga*, plus another one at the beginning of the *kalpa*. The duration of these 15 periods coincides exactly with that of all the surpluses in a *kalpa*, thus providing the system with a more coherent structure. The famous astronomer Āryabhaṭa (5th–6th cents. CE) posited, in his *Āryabhaṭīya* (1.5), the existence of 72 *mahāyugas* in every *manvantara* (instead of 71), bringing the total number of *mahāyugas* in the *kalpa* to 1,008. He also divided the *mahāyuga* into four unnamed *yugas* of equal duration and named the first half of the *mahāyuga* *utsarpiṇī* (ascending) and the second half *avasarpiṇī* (descending; 1.3–4; 3.9), thereby revealing an influence from Jain cosmic cycles. Note that this division in halves is consistent with the Vedic manner of dividing cycles into dark and light, whereas the 4–3–2–1 system of *yugas* breaks with the pattern by jumping from the *kaliyuga* to the *kṛtayuga* instead of gradually ascending through the four *yugas* in reverse order, as is actually the case in some Buddhist versions of the *yugas* (Hardy, 1853, 7–8). Āryabhaṭa’s theories in this matter were so severely criticized by the astronomer Brahmagupta (7th cent. CE) for not conforming to the doctrines of the Purāṇas and Śāstras that they were soon abandoned, even by his own disciples (Pingree, 1981, 590).

Cosmic Cycles and Traditional History

The involvement of astronomers resulted in the establishment of a correlation between the *yugas* and historical dates. They concluded, probably in the 5th century, that the *kaliyuga* had to begin

with a conjunction of all the known planets at the beginning of *meṣa* (Aries), which was the first constellation in the newly acquired division of the zodiac into 12 solar constellations, the *raśis* (as opposed to the 27–28 Vedic lunar constellations, the *nakṣatras*). While Āryabhaṭa’s system of equal *yugas* allowed for major conjunctions at the beginning of each *yuga* within the *mahāyuga*, the dominant puranic system did not, prompting astronomers to find a way to place a conjunction at the beginning of the *kaliyuga*. The *Sūryasiddhānta* (1.24; c. 800 CE) solved the problem by positing a period of creation of 17,064,000 human years at the beginning of the *kalpa*. The link between cosmic cycles and chronology was achieved by calculating the date of the most recent major conjunction. Using the mathematical parameters at their disposal, astronomers concluded that the last major conjunction – and the beginning of the present *kaliyuga* – took place on Feb 18, 3102 BCE. This date provided an anchor that became very influential. It was linked to traditional history because the *Mahābhārata* war was, by then, widely regarded as having taken place around the beginning of the *kaliyuga*. Although the connection between the start of the *kaliyuga* and the events of the *Mahābhārata* is quite certainly late in the epic itself, it was widely accepted in the Purāṇas. The *Viṣṇupurāṇa* (4.24.113), for instance, declares that the *kaliyuga* began precisely on the day Kṛṣṇa passed away. In terms of traditional genealogy, this means that all descendants of Parikṣit, the heir to the throne of the Pāṇḍavas (the heroes of the *Mahābhārata*), were rulers of the present *kaliyuga*. It also means that the end of the *kaliyuga* is more than 400,000 years away in the future.

The Purāṇas further refined the placing of mythical and historical events within cosmic cycles by asserting that Kṛṣṇadvaipāyana-Vyāsa – the traditional author of the *Mahābhārata* and the purported arranger of the Vedas into four collections – was the 28th Vyāsa (“Arranger”) to appear

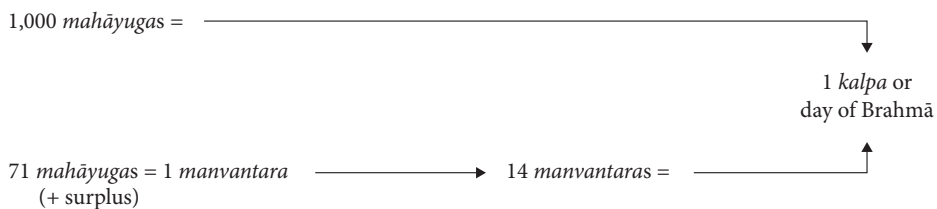


Fig. 1: The number of *mahāyugas* in a *manvantara* and a *kalpa* (after González-Reimann, 1988).

in the current *vaivasvatamanvantara*. This places us in the 28th *mahāyuga* of the *manvantara* (figure 2). The texts also state that a Vṛ̥ṣā is born in every *dvāparayuga* (*ViP.* 3.3.9–10; *VāP.* 1.23.111–214).

the time elapsed since the Big Bang, according to modern astronomy, would be less than two days and nights of Brahmā. There is a precedent for the notion of several births of Brahmā in the *Nārāyaṇīya* section of the *Mahābhārata*

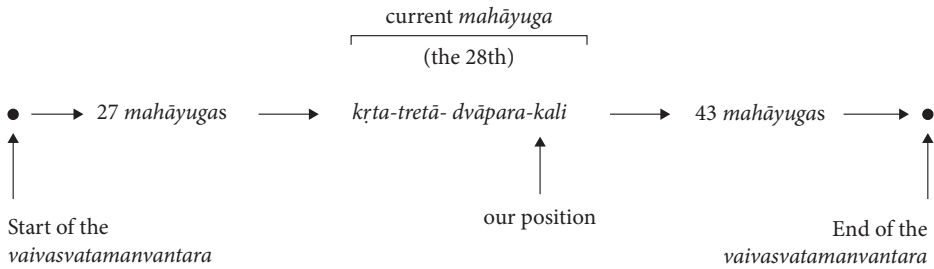


Fig. 2: Our position in the *Vaivasvatamanvantara* (after González-Reimann, 1988).

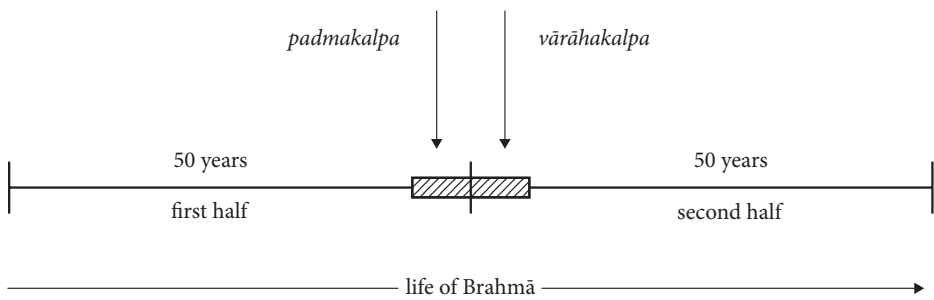


Fig. 3: Placement of the current *kalpa*, the *vārāhakaḷpa*, in the life of Brahmā (after González-Reimann, 1988).

As for the *kalpas*, the current one is the *kalpa* of the boar (*varāha*), said to have started when Viṣṇu rescued the earth from the bottom of the ocean. The previous one was the *kalpa* of the lotus (*padma*) when Brahmā emerged from the lotus in Viṣṇu's navel. There is one further stage of development before we reach the complete puranic system of time cycles. If there are days of Brahmā, there must also be years of Brahmā; and if Brahmā had a birth, it is logical to assume he will also die. Thus, puranic theory adds the life of Brahmā as a larger cycle. In consonance with the well-established human life span of 100 years, the life span of Brahmā is said to be 100 of his years. This means that he lives for an unwieldy 3.1104×10^{14} human years. To put this in perspective,

(12.336.13–45), where he is born seven times, but there is no evidence there of the life of Brahmā as a well-defined cycle. The Purāṇas agree in stating that one-half of Brahmā's life has elapsed and that we are in the first *kalpa* of the second half (figure 3).

We can now determine our precise position in time. We find ourselves in the *vārāhakaḷpa* (the first *kalpa* of the second half of the life of Brahmā), in the *vaivasvatamanvantara* (the seventh of the current *vārāhakaḷpa*), in the *kaliyuga* of the 28th *mahāyuga* of the *manvantara*. Because a *kalpa* is a day of Brahmā, we can say we are near noon in his day (figure 4). In modern terms, the time is now precisely 11h 28m 49s of the current day of Brahmā. It is evident that in terms of the life of Brahmā, as well as of his day, we are at the center

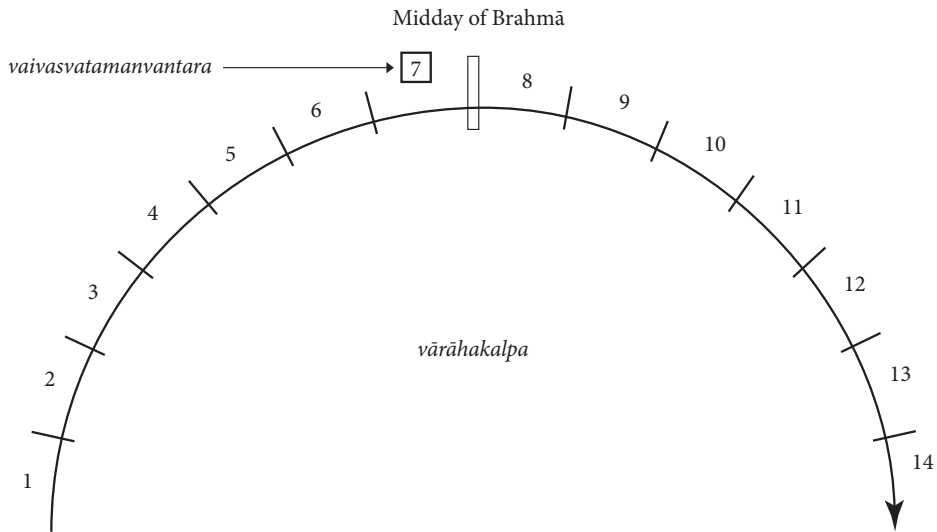


Fig. 4: Position of the *vaivasvatamanvantara* in the *vārāhakaḷpa* (after González-Reimann, 1988).

of time, although this is not the case with respect to the *mahāyugas*.

Once Brahmā's life was added to the list of cosmic cycles, another adjustment became necessary. The destruction of the world (*pralaya*), which takes place at the end of his day, cannot be the same as the one at the end of his life. The Purāṇas therefore distinguish between a minor, "occasional" (*naimittika*) destruction at the end of Brahmā's day, and a total one, called elemental or primordial (*prākṛtika*, *prākṛta*), at the end of his life. The *naimittikapralaya* is partial, and it mainly involves natural catastrophes. It gives way to the cosmic night, when the god sleeps. The *prākṛtikapralaya* is total, and all the elements return to their source. Two kinds of creation are then posited as counterparts to these two types of destruction. The *prākṛta* creation takes place when Brahmā's life begins, and the daily (*dainandina*) creation occurs every morning of Brahmā's day. Puranic accounts of the *prākṛta* creation and destruction are heavily influenced by the → Sāṃkhya school of philosophy, and they include the natural elements that had already appeared in the Upaniṣads. In this rendering, the world evolves out of → *prakṛti*, primordial matter, into *mahat*, *ahaṃkara*, and the elements. The descending order of creation with respect to the elements is space (*ākāśa*), air (or wind), fire (or light), and finally water and earth (→ *mahābhūtas*), while destruction occurs in the reverse order. The natural calamities associated with the destruction at the end of the Day of

Brahmā are also related to these elements: earth corresponds to earthquakes, water to flooding, fire to intense heat from seven suns, and air to strong winds. The Purāṇas describe another type of complete destruction, the *ātyantikapralaya*, which is nothing more than individual spiritual liberation (*ViP*. 1.7.41–45), thus bringing us full circle regarding the intimate connection between the yogic experience of return to the source and world destruction.

In this complex system of cosmic cycles, the *kalpas* and the life of Brahmā pertain mainly to cosmogony and are closely linked to ontology and eschatology. The *manvantaras*, however, are especially concerned with genealogy and lineage, often providing a linkage to Vedic tradition. But it is the *yugas* that acquire great relevance with respect to social circumstances and everyday life. They provide a mythological and historical framework that places puranic and shastric Hinduism at a well-defined moment in traditional time. The *kaliyuga* becomes the focal point of the system, as it represents the present, and its negative characteristics explain the difficult world we live in. The *Mahābhārata* (12.224.26–27) had put forth the notion of *yugadharma* by saying that *dharma* changes according to the *yuga*. It stated that the foremost activities for each *yuga* are asceticism (→ *tapas*) in *kṛtayuga*, knowledge (*jñāna*; → wisdom and knowledge) in *tretāyuga*, ritual sacrifice (*yajña*) in *dvāparayuga*, and giving (*dāna*) in *kaliyuga*. This list would be repeated with some

variants in later texts, but the placement of sacrifice in the *dvāparayuga* must be emphasized as it situates the Vedic tradition in a bygone era. This served to explain why the Vedic ritual had lost importance and was no longer followed by many. The concept of *yugadharmā* also explained changes in social customs, as in the later lists of *kalivarjas*, the practices that are forbidden in the *kaliyuga*. On the religious front, it opened the door for advocating different paths as the best suited for the present *kaliyuga*. Vaiṣṇava devotional traditions pointed to → *bhakti* (devotion), especially the recitation of the name of god, as the best path to liberation in the *kaliyuga*. Śaivism claimed Śiva to be the supreme god in the *kaliyuga* (*KūP.* 1.28.32), and other traditions did the same with respect to their own divinities and teachings.

The rise of *nāstika* (nonbeliever) traditions and the presence of foreign invaders around the beginning of the Common Era were attributed to the effects of the *kaliyuga*. As stated above, at the time there were probably expectations that the *kaliyuga* would end and a new *ṛtayuga* would commence, although they never materialized. The central passages of the *Mahābhārata* that deal with the dreadful conditions of the *kaliyuga* (3.186–189) close with the announcement of the coming birth of a prominent Brāhmaṇa (Brahman) in a village called Sambhala, who will take up arms and become king. He will destroy the foreigners and restore the Brahmanical social order by celebrating the Vedic horse sacrifice (*āśvamedha*). His name will be Kalki, and he will inaugurate a new *ṛtayuga*. In subsequent centuries – and up to the present – the theory of the *yugas* and the expectation of Kalki's arrival often acquired a more general, moral import. Kalki was soon appropriated as an → *avatāra* (descent) of Viṣṇu, and the *ṛtayuga* became known more commonly as the *satyayuga*, the *yuga* of truth, while its original connection to the game of dice was largely lost. Expectations of the arrival of Kalki and a new *satyayuga* are current even in modern times, usually with a universalistic tone no longer restricted to Brahmanical traditions or to the Indian subcontinent. From → Vivekananda and → Aurobindo to many popular movements today, a new *satyayuga* for all of humanity is proclaimed as imminent despite the fact that puranic chronology places such an event in the very distant future. The puranic durations of the *yugas* are reinterpreted, or even dismissed, in order

to announce this new *satyayuga* (González-Reimann, 2002, 180–187). In addition, the *yuga* theory – as that of the *kalpas* – has been appropriated by modern Western esoteric authors and New Age movements.

Indian cosmic cycles provided puranic authors with a means for solving contradictions by placing conflicting versions of events in different periods. Early on, the *manvantaras* allowed for divergent lists of seven *ṛṣis* to be situated in various *manvantaras* (Mitchiner, 1978), while alternate versions of creation were assigned to separate *kalpas*. This was sometimes achieved by using the term *kalpabheda* (*kalpa* difference) in the sense of “in a different *kalpa*.” The *Śivapurāṇa* (2.4.13.5–6), for instance, acknowledges the existence of two distinct versions of the birth of the god Gaṇeśa (→ Gaṇapati/Gaṇeśa), and it explains them through *kalpabheda*: they refer to different *kalpas*. Some commentators, both of the Purāṇas and of astronomical texts, use the same procedure. Śrīdharasvamin (c. 13th cent.) elucidates textual problems in the *Bhāgavatapurāṇa* (5.16.28; 12.11.39) by resorting to *kalpabheda*; and the astronomer Jñānarāja (16th cent.) explains that discrepancies between the Purāṇas and astronomical Siddhāntas with respect to the planets are due to *kalpabheda* (Minkowski, 2004, 355). More recently, Bhaktivedanta Swami (20th cent.; → Bhaktivedanta Prabhupad) allocates two supposedly separate fish incarnations of Viṣṇu to different *kalpas* when commenting on *Bhāgavatapurāṇa* 8.24.10.

Space

Cosmology and Cosmography

Vertical Space and the Egg of Brahmā

The dominant Ṛgvedic view of the physical world is uncomplicated. There exist three realms: earth (*ṛṥthivī*), sky (*dyaus*), and the intermediate region between them (*antarikṣa*). Hymn 1.160.1 describes earth and sky as two bowls facing each other, with the sun traveling between them. *Ṛgveda* 10.89.4 visualizes sky and earth as the two wheels of Indra's chariot, held in place by the axle, an image similar to that of sky and earth kept in place by a pillar after being separated at the time of creation. There is also mention of a threefold subdivision of the three regions, resulting in a

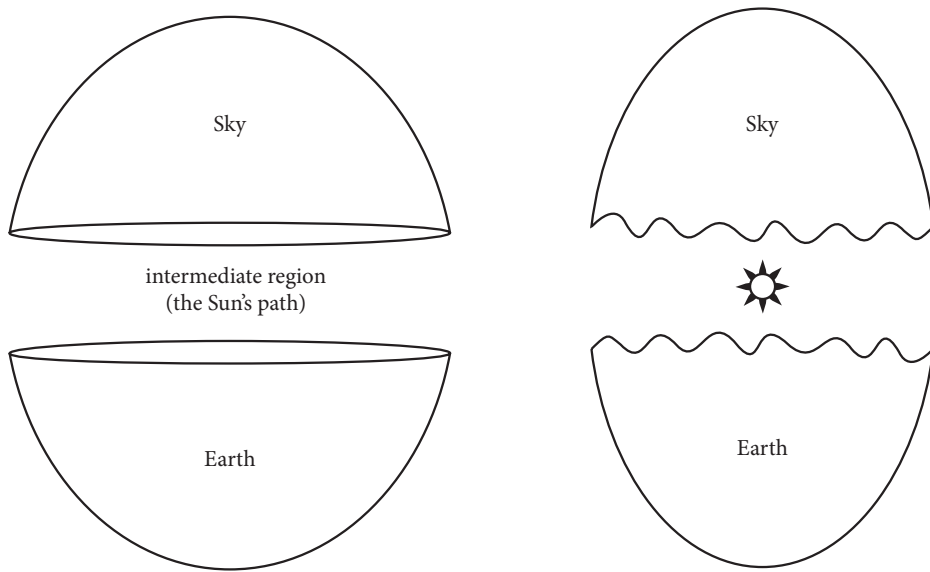


Fig. 5: The two bowls of *Rgveda* 1.160, and the two halves of the cosmic egg according to *Chāndogyopaniṣad* 3.19.

total of nine realms (*RV.* 4.53.5). In the Brāhmaṇas, earth, sky, and the intermediate region are often invoked with the ritual formula “*bhūr* (earth) *bhuvah* (intermediate region) *svah* (sky).” The *Atharvaveda* (12.3.20) uses the term *loka*, world, to designate these three main regions, and it also alludes to other *lokas*, without specifying their number (10.7.7; 19.54.5). The text includes what is probably the earliest mention of the Brahmaloka, the world of the *brahman* (19.71.1), which, according to the *Taittirīyabrāhmaṇa* (3.12.9.8), can be reached by means of a *soma* sacrificial ritual. The Brāhmaṇas list several *lokas*, usually seven. The *Jaiminīyabrāhmaṇa* (1.334) has the worlds of Agni, Vāyu, Āditya, Varuṇa, *mṛtyu* (death), *aśayā* (hunger), and *brahman*. The *Kauṣītakibrāhmaṇa* (20.1.5–13) names those of Agni, Vāyu, Indra, Varuṇa, *mṛtyu*, *brahman*, and *nāka* (vault of the sky), while the *Munḍakopaniṣad* (1.2.3, 2.1.8) simply alludes to seven *lokas*, without providing any details. Although some texts give other numbers, such as the 33 of *Mahābhārata* 3.247.25, the standard number of *lokas* in the Purāṇas is seven. They include the three Vedic levels, now often called the *trailokya* (triple world), plus a further four above them. The puranic list is as follows, in ascending order: Bhūrloka, Bhuvarloka, Svarloka, Maharloka, Janaloka, Tapoloka, and Satyaloka, with the Satyaloka generally identified with the Brahmaloka (*VāP.* 2.39.27, 39).

Sectarian elaborations often place an additional world above all others, such as the Goloka (world of cows) for followers of → Kṛṣṇa (*HV.* 62.18), the Rudraloka for Śaivas (*KūP.* 1.35.8), or the Vaikuṇṭha for Vaiṣṇavas (*BhāgP.* 8.5.5); but these are usually not part of the general cosmological plan of the Purāṇas.

As a counterpart to the seven *lokas*, there are seven netherworlds called *pātālas*. They are inhabited by various kinds of demons (*dānavas*, *daityas*; → *asuras* and *daityas*), supernatural beings (→ *yakṣas*), and snakes, who live luxuriously in grand palaces. According to the *Harivaṃśa* (62.24), snakes or elephants support the earth from below, an idea that found expression in the puranic notion that the serpent Śeṣa lies below the *pātālas* upholding them and the earth (*ViP.* 2.5.1–27). There are also many hells, called *narakas*, which are apparently to be located above the *pātālas*, although this is not always clear. The variant word *nāraka* appears already in the *Atharvaveda* (12.4.36) as the designation of an undesirable *loka*.

The conception that will bring all cosmological ideas together in the Purāṇas is a reworked version of the *Rgvedic* *hiranyagarbha*, the golden embryo. In the Brāhmaṇas, Prajāpati was sometimes said to have been born from a golden egg (*aṇḍa*) that floated on the cosmic waters (*ŚBr.* 11.1.6.1–2), and Brahṃā is explicitly identi-

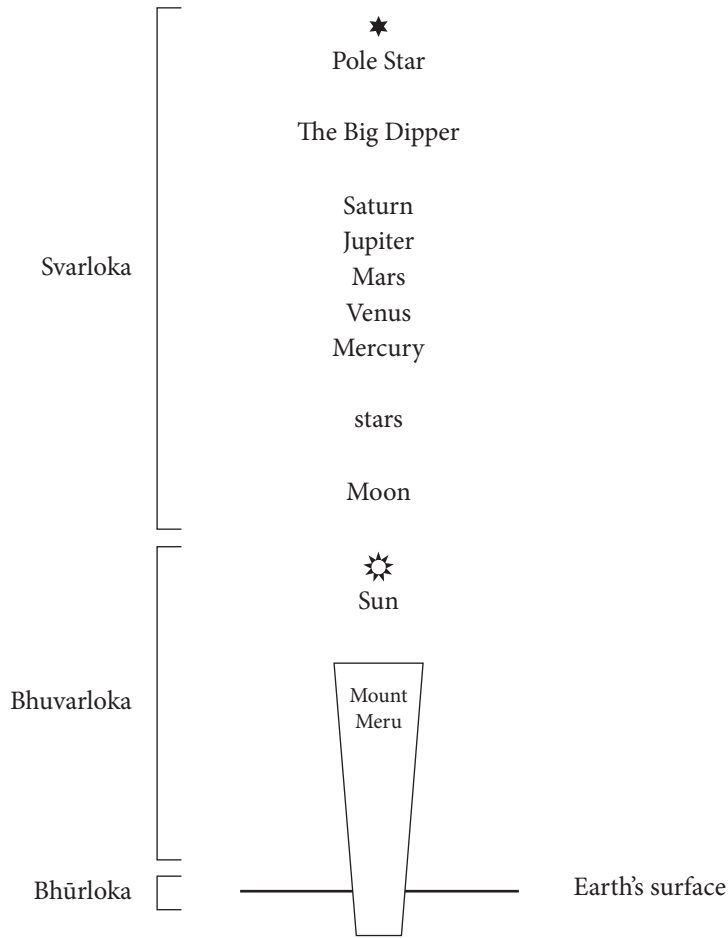


Fig. 6: The triple world, *trailokya*, according to the Purāṇas (not to scale).

fied with *hiranyagarbha* in the *Mahābhārata* (12.335.18–20). One of the Upaniṣads, the *Chāndogyaopaniṣad* (3.19), uses the egg metaphor for a cosmological depiction. It describes how the egg split in two when it hatched, with the upper half representing the sky and the lower half the earth, an image similar to the two bowls of the *Ṛgveda* (figure 5). The egg’s membrane is the mountains, the veins the rivers, and the fluid the ocean, while the hatchling is the sun, equated with the *brahman* by the text. In the Purāṇas, this egg – by then known as the egg of Brahmā (*brahmāṇḍa*) – is the gigantic receptacle that contains all the worlds of puranic cosmology.

In the puranic system, the physical world is located in the three lower *lokas*, the Vedic realms. It extends from the surface of the earth to the Pole Star (*dhruva*). The first world, Bhūrloka, is the surface of the earth itself. The second world, Bhūvarloka, reaches from the earth’s surface to the sun, the lowest of the celestial bodies. Above it,

the Svarloka includes, in ascending order, the moon, stars or constellations (*nakṣatras*), five planets (Mercury, Venus, Mars, Jupiter, Saturn; → *navagrahas*), constellation of the Big Dipper (known as the “Seven Sages,” *saptaṛṣi*), and Pole Star (figure 6). As for their dimensions, the Bhūvarloka is 100 thousand *yojanas* high, while the Svarloka is 14 times higher than that. The length of a *yojana* is not certain, but D. Pingree (2001) suggests approximately 11 km.

Above the triple world lie the remaining four *lokas*, with ever-increasing sizes. Maharloka measures 10 million *yojanas*, Janaloka 20 million, Tapoloka 40 million, and Satyaloka 60 million (figure 7). The *Vāyupurāṇa* (2.39.142) includes an additional distance of 15 million *yojanas* from the Svarloka to the shell of the cosmic egg.

The cosmic egg itself is then enveloped by the elements. The egg takes the place of the element earth, and it is surrounded by layers of water, fire, wind, space, and the Sāṃkhya principles of *mahat*,

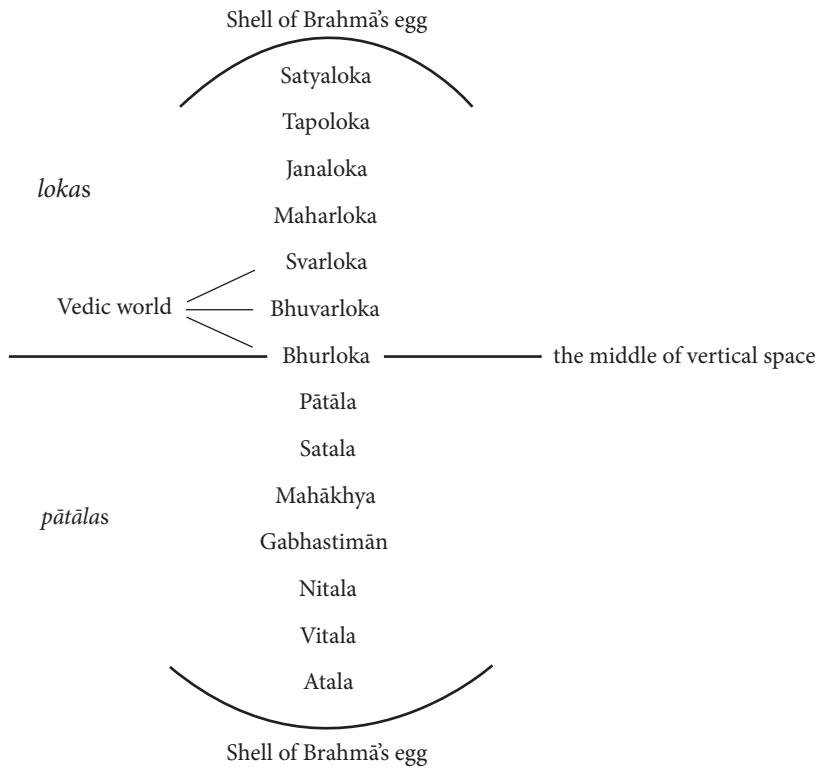


Fig. 7: The seven *lokas* and the seven *pātālas* of the Purāṇas.

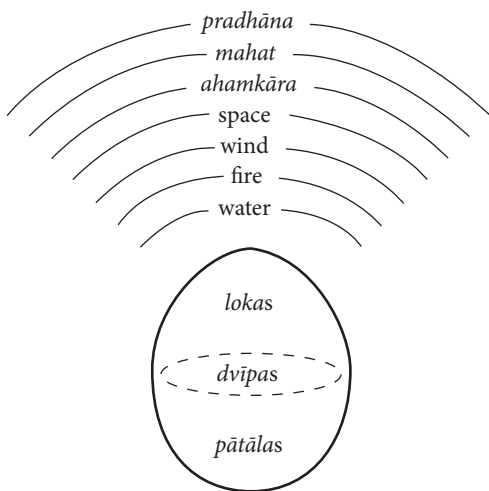


Fig. 8: The layers enveloping the puranic egg of Brahmā.

Horizontal Space

As in the case of cosmogony, water plays an important role in the cosmology of the Brāhmaṇas, according to which the waters are the foundation or resting place (*pratiṣṭhā*) of the earth and, indeed, of everything (ŚBr. 6.7.1.17; 12.5.2.14). The earth is also surrounded by the ocean (*samudra*; AitBr. 8.15). The prominent role of water continues in the Purāṇas, but this time the earth is not simply surrounded by one ocean. On the horizontal plane – the earth’s surface – there are seven concentric circular continents called *dvīpas*, with oceans separating them (see figure 8). The central continent in this vast cosmic circle is the Jambudvīpa, followed by the Plakṣadvīpa, Śālmalidvīpa, Kuśadvīpa, Krauñcadvīpa, Śākadvīpa, and Puṣkaradvīpa, although the order of the five central ones varies depending on the text. The oceans that separate them, also arranged concentrically, are the oceans of salt, sugarcane juice, liquor, clarified butter, curd, milk, and (in the outermost ring) the ocean of water. Beyond it lies a mountain range called *lokāloka* (world-nonworld) situated in a golden realm, followed by a region of darkness (*tamas*). Finally, after the dark region stands the shell of

ahamkāra, and *pradhāna* or *prakṛti* (ViP. 2.7.21–25; figure 8). Our egg is not the only one, however. There are said to be millions of them produced out of *prakṛti* (ViP. 2.7.27), resulting in the existence of myriad world systems.

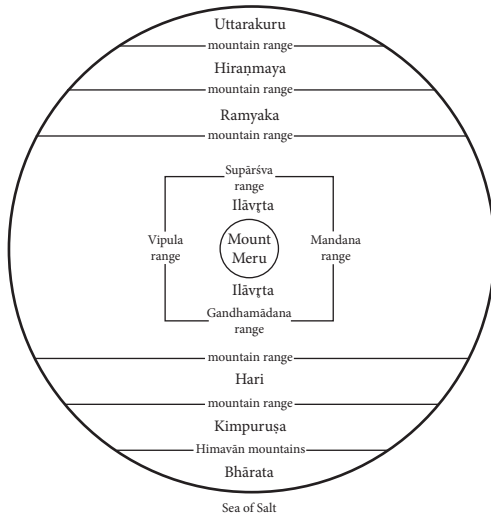


Fig. 9: The central continent of Jambudvīpa.

the cosmic egg. The width of each continent is twice that of the previous one, and the ocean surrounding each continent has the same width as the continent it encircles. The central Jambudvīpa measures 100 thousand *yojanas*, while the width of the seventh, the Puṣkaradvīpa, is 6,400,000 *yojanas*. The total distance from the center of the disk to the shell of Brahmā's egg is 500 million *yojanas*. This includes the golden realm and the region of darkness. Continents two through six are said to each contain seven mountains and seven rivers, and their inhabitants live for five thousand years. There are no rivers in the seventh and outermost continent, Puṣkaradvīpa, and in it is found a lofty mountain named Mānasottara. The life span of its inhabitants is ten thousand years. Some similarities with elements of the theory of cosmic cycles are evident, such as the presence of transitional regions (the oceans), which are the equivalent of the *saṃdhis* of time cycles, and the varying length of human life. In addition, this scheme of concentric continents situates South Asia at the center of horizontal space, while the arrangement of *lokas* and *pātālas* puts the earth in the middle of vertical space, just like the theory of *kalpas* and *manvantaras* places the puranic authors at the center of time.

The central continent, Jambudvīpa, is subdivided into seven territories or areas called *varṣas*. In the middle of Jambudvīpa is the region of Ilāvṛta. At its center rises Mount Meru (figure 6), and atop Meru lies the city of Brahmā. The remaining six *varṣas* run longitudinally from

east to west, three of them located to the north of Meru (Rāmyakavarṣa, Hiraṇmayavarṣa, Uttarakuruvarṣa) and three to its south (Harivarṣa, Kimpuruṣavarṣa, Bhāratavarṣa). These six territories are separated by six mountain ranges, just as the *dvīpas* are separated by oceans. Within the territory of Ilāvṛta – and surrounding Mount Meru – there are four mountain ranges: Mandara to the east, Gandhamādāna to the south, Vipula to the west, and Supārśva to the north. The southernmost country is Bhāratavarṣa, the Indian subcontinent, measuring nine thousand *yojanas* from the Himavāt (Himalayas) mountain range to the north, down to the Sea of Salt to the south (figure 9).

Bhāratavarṣa is, in turn, subdivided into nine regions, also called *dvīpas*, of one thousand *yojanas* each. It is at the center of Bhāratavarṣa that the four social classes live, and they are flanked by the Kirātas to the east and Yāvanas to the west. Other versions add the Andhras to the south and Turuṣkas (Turks) to the north. It is noteworthy that Bhārata is where the 14 Manus are born. It is known as Karmabhūmi (land of → *karman* [action]) and is considered the only place where actions can lead to either further rotation in *saṃsāra* or liberation from transmigration, making it a most desirable place to be born in (*VāP.* 1.45.69, 77; *ViP.* 2.3.23–24). This finds a parallel in the notion that the four *yugas* apply only to Bhārata (*MBh.* 6.11.3; *VāP.* 1.57.22; *ViP.* 2.3.19). Similarly, the lower *loka* (earth) is the region where rituals are performed, while their results can appear in any of the three lower worlds (*ViP.* 2.7.11).

Some Purāṇas describe a simpler – and probably earlier – version of the continents. In this case there are only four regions around Mount Meru. To the east lies Bhadrāśva, to the south Jambu – here assimilated to Bhārata – and to the west and north are Ketumāla and Uttara (or Uttarakuru), respectively. This arrangement coincides with Buddhist cosmological notions (Sircar, 1967, 38–47). The *Vāyupurāṇa* (1.34.42–46, 56–57) views these continents as the four petals of the lotus that grew from Viṣṇu's navel, and on which the creator god Brahmā was born.

Mount Meru plays a fundamental role in puranic cosmology, as it stands at the center of the entire system, a feature that allowed astronomers to identify it with the axis of the earth. It is shaped like an upside-down truncated cone, with a diameter of 32 thousand *yojanas* at the top

and 16 thousand at the base. Its total height is 100 thousand *yojanas*, 84 thousand of which rise above the earth's surface, while 16 thousand lie below it (figure 6). It is described as the calyx or pericarp (*karṇika*) of the cosmic lotus (*VāP.* 1.34.46; *ViP.* 2.2.10).

There are some differences and contradictions in the different Purāṇas regarding aspects of the general cosmological scheme outlined above, but most of the accounts seem to derive from two main versions that existed between the 2nd century BCE and the 5th century CE. These two versions were reconstructed by R. Kirfel (1954).

Space and Time Interlocked

Puranic cosmogony and cosmology are synchronized on a grand scale by tying the two main types of world destruction to the distribution of the *lokas*. The partial destruction that takes place at the end of a *kalpa* affects only the triple world – the three lower *lokas* – where physical reality resides. Catastrophic winds and fires rage, and then it rains until everything is flooded. The triple world is now covered by the water upon which Brahmā – or Viṣṇu – will sleep during his night. The tremendous heat of the fires sends the inhabitants of Maharloka, the fourth world, into the higher Janaloka, from where they can be born again in the following *kalpa*. By contrast, the complete dissolution in *prakṛti* (*prākṛta*), destruction that takes place at the end of the life of Brahmā reaches all the *lokas* and causes the elements to be sequentially reabsorbed into their source in *prakṛti* (primordial matter). We must point out that just as the return of the created world into *prakṛti* is a reflection of the process of yogic liberation, the four upper *lokas* (as well as the hells, *narakas*) have more to do with inner experiential states than with physical space, although they are included in the cosmological map. They pertain to realms where mortals reside after physical death.

The fantastic aspects of puranic cosmology were a concern for many astronomers. The first comprehensive study of this cosmology by an astronomer was carried out by Lalla (8th cent. CE), who dealt with some incongruous aspects of puranic cosmology by reinterpreting them. He placed the *pātālas* inside the earth, the *dvīpas* and oceans located beyond Jambudvīpa in the southern hemisphere, and the different features of

Jambudvīpa in the northern hemisphere (Pingree, 1990, 279). He also reinterpreted the *lokas* to bring them in line with astronomical concepts. At the same time, however, he refuted many tenets of puranic astronomy, and his refutations were repeated by other astronomers in subsequent centuries (Pingree, 1990, 297). The astronomer Jñānaraja (16th cent. CE), and others influenced by him, showed a predilection for puranic assertions and reinterpreted them in order to render them valid (Minkowski, 2004). However, the first independent work by a non-astronomer and defender of the Purāṇas that addressed the contradictions of puranic cosmology and cosmography was authored by Nilakaṇṭha, the famed 17th-century commentator of the *Mahābhārata*. He rejected the spherical earth and tried to defend variant measurements given for it in the epic and Purāṇas. He explained conflicting accounts of the size of men by saying that the *yojana* had divergent values in different *yugas* (Minkowski, 2000, 30, 36–37). In the 18th century, Kevalarāma, Jayasiṃha's court astronomer, attempted to reconcile the flat earth of puranic tradition with the round earth of astronomy by positing the existence of two earths: a large, flat one below, and a smaller, round one above, in which we live (Pingree, 2001, 721). In modern times, variant forms of the quest for reconciliation continue. They now mainly consist of attempts to find obscure and fanciful allusions to modern cosmological concepts in puranic and, especially, Vedic texts.

Concluding Remarks

The puranic Hindu conception of the cosmos – in both space and time – is the result of a long process of growth characterized by transformation, appropriation, reinterpretation, and adaptation. Throughout the centuries, Hinduism grew by inclusion. It absorbed both foreign and local elements by arranging them according to diverse systems of classification, often using symmetry as an organizing principle. In narratives of cosmogony and cosmology, this entailed creating expanding frameworks that would allow for every new element to be incorporated. In the case of theories of time, the *kalpas* served to bring together conflicting systems of cosmic cycles, while the egg of Brahmā served to encompass ideas about space. There is a tendency, evident already in

late Vedic texts (the Upaniṣads) but manifested strongly in post-Vedic literature, to engulf and absorb Vedic notions. The three realms of Vedic cosmology became merely the three lower worlds of the seven worlds of puranic cosmology, and the Vedic tradition of man's descent from Manu was reduced to only one of many genealogical lines derived from different Manus in different *manvantaras*. Thanks to the theory of the *yugas*, Vedic traditions were placed in a former era, thus making it possible to respect and revere them while simultaneously considering them unsuitable for present times. The emergence of the theory of transmigration in the Upaniṣads resulted in the growing importance of views concerning cyclical time – especially as they apply to humankind – and had an enormous impact on perceptions about the origin and future of the world. Inner experiences were mapped onto the cosmos, further enhancing earlier notions of correspondences between the inner and the outer, the individual and the cosmos. The end result of these processes is the complex, all-inclusive, and multi-layered world of puranic time and cosmology.

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