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# Ancient Indian Cosmology

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In 1835 Macaulay advocated English education as more likely to benefit Indians than what they could learn from their own traditional literature. Should the Government, he asked, 'countenance, at public expense . . . geography made up of seas of treacle and seas of butter'? On this point at least we may sympathise with Macaulay. Indian cosmology has not been a popular subject, even with modern Indologists. It does not lead anywhere. Its development had little or nothing to do with the achievements of Indian science; even Indian astronomy is conceptually separable from the rest of ancient Indian cosmology to a very large extent.<sup>1</sup> Moreover, it had no intimate connection with those currents of Indian religion which have attracted most attention in the West, and indeed been most successful in the East: Buddhism, the idealistic monism called *advaita vedānta*, and the devotional theism of *bhakti*. All these three movements, or complexes of movements, are soteriologies concerned with the individual's moral and metaphysical make-up, and very largely indifferent to the physical universe outside him. But the most discouraging feature of traditional Indian cosmology is not its fantastic and uncritical character but its complexity. Indeed, the title of this paper imposes the unenviable task of outlining not one but four cosmologies. The earliest known Indian cosmology, the Vedic, is very different from the

classical cosmologies which arose after the middle of the first millennium BC: the Hindu, the Buddhist and the Jain; and these three again, though not entirely unrelated, are quite distinct. Worse still, not one of these four major cosmological systems presents a single straightforward picture. Professor Kirfel's book *Die Kosmographie der Inder* (see bibliography) has over 400 large pages with hardly anything more than bare quotations and tables, and it covers only cosmography, the spatial arrangements of the universe. Forced to a choice, I have decided to devote three-quarters of this paper to Vedic and Hindu cosmology, not because Buddhists and Jains are any less interesting, but simply because the vast majority of Indians are and have been Hindus.

But first, why is Indian cosmology so complicated? Just as the Indian system of social organisation, caste, has grown throughout history by aggregation and inclusion, not abolishing the practices and customs of newly assimilated peoples but assigning them a low place in the social hierarchy, so Indian cosmology – which remained largely a branch of Indian mythology – rarely abandoned a theory or idea, but allowed it to remain alongside the new ideas, even if it was inconsistent with them. India is a very large and diverse area, which has been politically fragmented for most of its history, and Sanskrit civilisation took about two thousand years to spread over the whole of the sub-continent – indeed some peoples in remote areas remained little affected by it till the present century. Nevertheless, there are certain Hindu texts, the Purāṇas, composed since the beginning of our era, which concern themselves with five topics, of which two are the universe in space and time, that is cosmology; and the Purāṇas do make attempts to reconcile various versions and to present a systematised picture – though no two attempts give quite the same result. Systematisation proceeds, as I have just suggested, by aggregation and encapsulation; for instance, different cosmogonies are generally accommodated by making them occur successively, rather than by, say, interpreting one story as an allegorical alternative to another. It is this, I think, which



largely accounts for the notorious fact that the dimensions of both space and time in the classical Indian cosmologies are so unconscionably large; two systems are reconciled by putting the one inside the other, and making it a cosmographical or temporal part of a much larger whole. We are about to meet a universe of Chinese boxes. I fear that this paper will mainly convey an impression of the vastness and complexity of my subject; but if I have an idea to offer in compensation, it is this simple one: that the enormity and complexity are like those of the enormous and complex social system, and exemplify the Indian tendency not to supersede new cultural elements but to juxtapose them with the old, in a hierarchic ranking.

To proceed, then, to facts. The *R̥g Veda*, our earliest Indian document, dates from the second half of the second millennium BC. It contains two basic views about the construction of the universe: that it is bipartite, consisting of sky and earth; and that it is tripartite, consisting of earth, atmosphere and heaven. Kirfel thought that the former was the earlier, and he was probably right; certainly it was tripartition which became popular with later cosmologists. For already here the Chinese boxes start: sometimes the two, sky and earth, sometimes the three, earth, atmosphere and sky, are said each to consist of three strata, giving a total of six or nine.<sup>2</sup> When sky and earth are spoken of as the complementary pair they are called Dyaus and Pṛthivī respectively, Dyāvapṛthivī (in the dual) together. Pṛthivī means 'the broad one (feminine)', and Dyaus is masculine. He is addressed in the vocative, 'O Father Heaven', as Dyaus Pitar, which is easy to recognise as Ζεὺς Πατήρ or Jupiter; Father Heaven and Mother Earth are Indo-European figures. Dyāvapṛthivī play only a minor part in the *R̥g Veda*: but they are mentioned as the parents of the world, being compared for instance to bull and cow.<sup>3</sup> However, they are also said to be created in various ways. But this paper cannot explore cosmogony as well, and must neglect it except when it has a direct bearing on cosmology in the narrower sense. Dyaus and Pṛthivī are compared to the two wheels at the ends of an axle, in which case the earth must be conceived as flat, but also to

two bowls, and to two leather bags, in which case the earth is presumably concave. Kirfel interprets the two-bowl image as implying that the lower bowl is the underworld, with the earth as the diameter where the two bowls join, but evidence for his view seems weak. The cosmos consisting of earth and sky is compared to an edifice; besides building, the metaphors of weaving and sacrificing are used. The sky is said to be propped up, but there is also reference to the marvel of the unsupported sky. The earth is said to be fastened with bands or pegs.

If we turn now to the tri-partition, in this context earth, atmosphere and heaven are called *bhūr*, *bhuvaḥ* and *svar* respectively, although some synonyms are also used. These three words, in the nominative as just cited, are from very early times known as the three *vyāhṛti*, the three utterances, and every orthodox brahmin has to pronounce them twice daily, preceded by the sacred syllable *Om*, as part of his twilight ritual (*Manu*, II, 78). In this ritual context the meaning of the syllables has long been disregarded; but *bhū* and *sva* are good classical Sanskrit words for earth and sky, and the middle term, *bhuvaḥ*, is but the plural of *bhū*. This curious detail may suffice to show that it is the basic tri-partition which really pervades Indian cosmology. Moreover, the most ancient commentators of the *R̥g Veda* of whom we have any knowledge already divided the gods into three classes, according to whether they inhabited earth, atmosphere, or sky.

I turn now to the sub-divisions, and move from the bottom up. The *R̥g Veda* says that men inhabit the highest of the three earths; this would imply that there is an underworld, or rather that there are two underworlds; unfortunately there is nowhere in the *R̥g Veda* any explicit mention of an underworld, though there seem to be hints. Normal candidates for inhabiting an underworld would be demons and dead sinners. All Indian cosmologies believe in various kinds of ghouls and sprites who live here on earth; Vedic Indians also had a class antithetical to the gods, the *asuras*. The *asuras*, like the Greek Titans, lost a war with the gods; they are a kind of fallen angels, though not so clearly evil. The *R̥g Veda* associates the gods with light and



the *asuras* with darkness; but only later texts specify that they live in darkness below the earth. Similarly, the *Rg Veda* consigns the wicked dead to literal or metaphorical obscurity: hell is not mentioned. There is indeed one prayer (*RV*, VII, 104, 11) that the sacrificer's enemy may lie below the three earths; but this should perhaps be compared to the prayer in the *Atharva Veda* (VI, 75, 3) that the enemy go beyond the three heavens: the idea may be just to get him right out of the universe.

The sub-division of the atmosphere, which is after all visible, was problematic. To quote A. B. Keith (pp. 5-6):

'In the atmosphere also there are three spaces, or often only two - one the heavenly and one the earthly - and in either case the highest is sometimes treated as if it were the heaven or sky itself. Like the earth it has rocks and mountains; streams (clouds) flow in it; and the water-dripping clouds are constantly compared to and identified with cows. It seems clear that the earthly as well as the heavenly portion of the atmosphere is above, not below, the earth, so that the sun does not return from west to east underneath the earth, but goes back by the way it came, turning its light side up to the sky and thus leaving earth in darkness.'

It is only the *Aitareya Brāhmaṇa*, a slightly later text, which says that the sun shines upwards at night; but the same theory may be implied by the *Rg Vedic* statement that the sun's steeds draw both light and dark light. As for the heaven, in its highest third reside the ancestral spirits (the *pitāras*, literally 'fathers') with their king Yama and the divine form of *soma*, the hallucinogenic drink at the centre of the cult which the *Rg Vedic* hymns celebrate.

Before leaving the *Rg Veda* I must refer to two of the many remarkable hymns which occur in its tenth and last book. Both hymns are primarily cosmogonic. In one (*RV*, X, 129) the poet speculates about the origin of the world:<sup>4</sup>

There was not the non-existent nor the existent then; there was not the air nor the heaven which is beyond. What did it

contain? Where? In whose protection? Was there water, unfathomable, profound?

There was not death nor immortality then. There was not the beacon of night, nor of day. That one breathed, windless, by its power. Other than that there was not anything beyond. Darkness was in the beginning hidden by darkness; indistinguishable, all this was water. That which, coming into being, was covered with the void, that One arose through the power of heat.

Desire in the beginning came upon that, desire that was the first seed of mind. Sages seeking in their hearts with wisdom found out the bond of the existent in the non-existent.

Whence this creation has arisen; whether he founded it or did not: he who in the highest heaven is its surveyor, he only knows, or else he knows not.

One idea in this hymn which becomes common in the later Vedic literature is that the world started somehow with a golden germ of fire which sprang up within the water. Fire and water, heat and moisture, sun and rain: however expressed, this particular polarity has been crucial in Indian mythological thought from the earliest times. Philosophy was soon to add earth, air, and (usually) ether as the other material elements; but for the interpretation of both the macrocosm and the microcosm the contrast and interplay of fire and water have been most important - perhaps not surprisingly, given the Indian climate.

The other cosmogonic hymn I must mention is the *Puruṣasūkta* (*RV*, X, 90), the *Hymn of the Cosmic Man*, *Puruṣa*; for it is the earliest document for many major themes in Indian civilisation. In this hymn the gods sacrifice a giant to create the physical universe:<sup>5</sup>

*Puruṣa* is this all, that has been and that will be. And he is the lord of immortality, which he grows beyond through food.

Such is his greatness, and more than that is *Puruṣa*. A fourth of him is all beings, three-fourths of him are what is immortal in heaven.



From his navel was produced the air; from his head the sky was evolved; from his feet the earth, from his ear the quarters: thus they fashioned the worlds.

The four estates of society, brahmins, etc., were produced from his mouth, arms, thighs and feet respectively. I introduce this hymn mainly for its explicit equation of the macrocosm and the microcosm, an equation crucial to the development of Upaniṣadic thought which culminated in 'Thou art that' – a dictum which equates the individual spirit with the world spirit.

I must deal much more briefly with the rest of Vedic literature, the sacred texts which were composed approximately in the first half of the first millennium BC. The fourth and last Veda, the *Atharva Veda*, does know of hell, and in the Brāhmaṇas, the class of texts which chronologically follows the Vedas, it becomes clear that the good go to heaven, the bad to hell. The universe is gradually being ethicised. One text describes a hell where men cut up and eat each other; another says that the animal you eat here will eat you there. Even now hell is not clearly located, but it is dark, and presumably underneath the earth or the world. However, these texts clearly state that the *asuras*, the anti-gods, have been banished to the underworld; or alternatively that the gods, whose direction is the north, have banished them to the south. The south becomes the horizontal equivalent to the underworld; so that by transference it also becomes the region of death, and Yama, king of the dead, becomes (and remains throughout Hindu history) the guardian of the southern direction, even though he is less associated with hell than with the blessed dead in heaven.

The cosmography of the Brāhmaṇas is no more consistent than that of the *R̥g Veda*. There are still allusions to the world as bipartite: the world is a tortoise, its arched shell the heaven, its flat underside the earth. In the *Chāndogya Upaniṣad* – the Upaniṣads follow the Brāhmaṇas – the world is compared to two halves of an eggshell, the heavens one of gold, the earth one of silver. This simile springs from cosmogonic myths in which the world is, or starts off as, an egg. After this period

*Brahmānda*, 'the egg of Brahman', is the standard Sanskrit expression for 'the universe'. The eggshells also remind us of the earlier comparison of Dyāvāpṛthivī, sky and earth, to two bowls. In the Brāhmaṇas we get the first attempts to estimate the world's size: the distance from earth to sky is a thousand days' journey by horse (*Āitareya Brāhmaṇa*, II, 17, 8), or, more modestly, the height of a thousand cows standing one on the other (*Pañcaviṃśa Brāhmaṇa*, XX, 1, 9).

The tripartite universe is also going strong. But there are two interesting variants. By one, the three worlds of *bhūr*, *bhuvah* and *sva* are increased to seven: on top are added (going upwards) *mahar*, *janas*, *tapas* and *satyam*. These words mean 'might', 'people', 'penance' and 'truth' respectively. I suggest that here we may be dealing with an original metaphor; one can easily imagine saying that the practice of austerities takes man above the highest heaven; or that higher still than penance lies the world of truth. 'Might' and 'people' are more difficult; but such metaphors are common in this class of speculative religious literature, which gives symbolic interpretations of the sacrifice and all associated with it. Be that as it may, the division into seven planes was to become standard in Indian cosmology.

The other interesting variant is perhaps rather a variant on bipartition, for it cuts the universe into four layers: the water above the sky, the sky, the earth, and the waters under the earth. This quadripartite cosmology did not find general acceptance, but deserves mention for the waters above and below the rest of the world. The idea that there is water above the sky, not merely in the atmosphere, occurs in the *R̥g Veda*. The waters under the earth, which of course remind us of Thales, do not; but they are alluded to several times in later Vedic literature, and we shall meet them in the earliest Buddhist texts. Late Vedic texts also state that the earth is surrounded by water, and this idea may be implicit in some passages of the *R̥g Veda*. Other passages in the *R̥g Veda* speak of two oceans, east and west, and others of four, perhaps at the cardinal points.

Kizifel concluded that Vedic cosmology showed Babylonian influence. He laid stress on the waters over the sky, a far from



universal idea but found in Babylon as in India, and wrote that the Babylonians too believed the earth to rest on and be surrounded by water. He wrote that in Babylonian cosmology too the number three was important at first, and was then overlaid by the number seven – under the influence of the seven planets. But we cannot with certainty date the consideration of the planets as a distinct group of *seven* to before the eighth century in Babylon. The other similarities which he alleged are chronologically even more dubious. Babylonian influence there must have been; but I think not before the end of the Vedic period; tri-partition calls for no particular explanation; and there is no evidence that the seven planets are known to Vedic literature. Moreover, the seven heavens could well have developed without them, for seven is a favourite Vedic number: it occurs more often in the *Rg Veda* (on a simple word count) than any other number between three and ten, and there are seven heavenly rivers, seven horses of the sun, etc. My guess, then, would be that external influence may account for the major changes between Vedic cosmology and the cosmologies which followed; and this fits the received idea that Indian trade with lands further west began in the middle of the first millennium BC.

The classical cosmologies of Hinduism, Buddhism and Jainism all arose after about 500 BC (the Buddha and Mahāvīra, the founder of Jainism, died shortly after that date), though our evidence for them is mostly very much later. In particular the Jain evidence does not antedate the first century AD; but that may be mainly because the earlier Jain texts were lost. In the second half of the first millennium AD, the Purāṇic Hindu cosmology was gradually superseded, in secular contexts, by quite a different cosmology, under the influence of Greek astronomy, and in modern times, of course, western cosmology has penetrated similar educated circles; but by and large it is the classical cosmologies which have permeated the culture and are still accepted by the mass of the population. Hindu and Jain cosmology have been virtually confined to India, and by

the same token have perhaps more in common than either has with Buddhist cosmology; Buddhism on the other hand penetrated virtually all points east. As a necessary economy, I shall ignore what used to be called northern Buddhism – the Buddhism of Nepal, Tibet, China, north Viet-Nam and Japan, and confine myself to Theravāda Buddhism, the school dominant in Ceylon and most of South-East Asia.

Although the three cosmologies – classical Hindu, Buddhist and Jain – differ, I can offer a few generalisations to help as guides through the morass. In general the universe is ethicised, so that with various important exceptions the good go up and the bad go down, the higher up you are the better, and so on. Basically tri-partition continues, but now with the human world, the world we can see, in the middle; the heavens are above it and the hells below. To us Europeans this scheme, unlike the Vedic one, is familiar, and so easily intelligible. All cosmologies also agree that there is a world mountain running through the middle, its centre at our level but its top and bottom reaching at least one heaven and hell; this *axis mundi* is called Mount Meru<sup>6</sup> in Sanskrit, Sineru or Sumeru in Pali, the classical language of Theravāda Buddhism. Mount Meru is so important that even the astronomers who accepted the Greek idea that the earth is a sphere in space tended to leave a golden Mount Meru with gods living on it at the North Pole;<sup>7</sup> at the South Pole the *asuras* dwell, at the submarine 'Mare's Head' fire.<sup>8</sup> The cosmologies also tend to agree that the world at our level contains oceans in concentric rings, usually seven of them – though our own position in all this varies greatly – and all agree that the edge of our level is ringed by a circular range of mountains; thus our level is a vast disc, with a mountain in the middle and a mountain range round the edge. For Buddhists and for some Hindus there are innumerable worlds, but they all repeat the pattern of ours. Above all, the three cosmologies share a predilection for vast figures to measure both cosmic space and cosmic time. The Vedas have apparently no particular theory about cosmic time. However, all three classical systems agree that the universe moves in vast cycles, though there is



disagreement about whether these cycles go on for ever; and that we are living in a period of decline, during which human life is getting shorter and things generally are going from bad to worse; Hindus and Buddhists also believe that major periods end in the destruction of the universe by fire and/or flood (fire and water). The time schemes of the developed cosmologies are however all so vast that from the cosmic point of view our era of decline is trivial; innumerable better times are ahead. For all cosmologies the inhabitants of the universe, non-human as well as human, are mortal, and are reincarnated after death in some sort of relation to the moral quality of their previous acts, their *karma*, until they are released from this cycle by whatever liberation the particular soteriology recommends; for most Hindus and for all Jains those released stay in the universe, near or at the top, but in Buddhist belief they leave it entirely.

I begin now with the Hindu view of the world, what is often known as Pūrāṇic cosmology. The Pūrāṇas were mostly composed in the first millennium AD. However, most of the matter of Pūrāṇic cosmology occurs, at least in inchoate form, scattered through India's great epic, the *Mahābhārata*. The *Mahābhārata* was also compiled over a very long period, but generally ante-dates even the early Pūrāṇas; let me just say that the *Mahābhārata* material I am about to quote is probably BC. Another very influential cosmological text is the first chapter of the *Mānava Dharmasāstra*, the Laws of Manu, the most famous and authoritative of the Hindu codes of law and conduct; this must date from fairly early in the first millennium AD.

I shall now present *in extenso* a passage from the *Mahābhārata*, as systematised by Professor Frauwallner, because it is a relatively early passage which gives a not untypical cosmogony combined with a basic cosmology of both space and time. This account occurs in the Inquiry of Śuka, a section in the twelfth book of the *Mahābhārata*, and it is closely related to that in the first book of Manu. It rests on the theory of the four ages of the world, the four *yuga*. The *yuga* are named after the four throws of the dice, 4, 3, 2, 1; in descending order they are called *krta*, *trētā*, *dvāpāra* and *kali*. These four dicing

terms are already referred to the four *yuga* by an ancient commentator on a Brāhmaṇa text, so this theory probably antedates even the *Mahābhārata*. The first, the *krta*, is the golden age, whereas we live in the *kali yuga*, which started with the great war which is the main theme of the *Mahābhārata*; this date was later identified as 17 February, 3102 BC.<sup>9</sup> I cannot here describe the golden age when the bull of Dharmā, cosmic righteousness, stood on all four feet; and the *kali yuga* we know all too well; I must confine myself to temporal proportions and dimensions. The golden age lasts 4,000 years, with a dawn and twilight of 400 years each; during it, men live to an age of 400 years. The four *yuga* are related in the proportion 4:3:2:1, so that the maximum life-span is now 100 years, and the total length of our *kali yuga*, counting dawn and twilight, is 1,200 years. The four *yuga* together thus total 12,000 years; this period is called a *mahāyuga* (great *yuga*). This basic scheme of the four ages reminds us of Hesiod; and, if I may obtrude a personal detail, I distinctly remember being taught in primary school that there were four ages of man, old stone, new stone, bronze and iron, and that we live in the iron age.

The only difference was that this was progress. We shall see, however, how this simple scheme of four declining *yuga* was varied and encapsulated in larger systems. Already in our *Mahābhārata* passage it is vastly inflated, and it is easy to see why: once the beginning of the *kali yuga* was dated by astronomers at 3102 BC, simple arithmetic showed the epic bards that the *kali yuga* would already be over if it lasted only 1,200 years. The Inquiry of Śuka explains the Indian computation of time, building it up from the smallest unit, the blink, which is about 1/5 of a second. I translate Frauwallner (p. 117): 'A day of 30 *muhūrta* [a *muhūrta*, the nearest unit to our hour, has 48 of our minutes, so 30 *muhūrta* = 24 hours] is a day for men. It consists of day and night. The day is for work, the night for rest. Just so a month is a day of the fathers (*pitaraḥ*), the spirits of the departed. The light half of the month . . . in which the moon waxes, is their day and serves them for activity. The dark half, when the moon wanes, is their night and serves



for rest. Finally a year is a day of the gods. The passage northwards (*uttarāyanam*), that is the half-year in which the sun moves northwards and the day lengthens, is their day. The passage southwards (*dakṣiṇāyanam*) . . . is their night. Such days of the gods are the units according to which the ages of the world (*yuga*) are reckoned.' Obviously this immediately multiplies our 12,000 years for a *mahāyuga* by 360, the number of days in an Indian year at that period,<sup>10</sup> and makes the *kalī yuga* alone last  $1200 \times 360$ , that is 432,000 human years, while the *mahāyuga* lasts 4,320,000 human years. To return to Frauwallner (p. 118): 'A thousand such world ages [*mahāyuga*] are a day of Brahma [the world spirit - neuter] which thus lasts 12 million years.' (Frauwallner is using divine years; to get human years, multiply by 360). 'A night of Brahma is the same length. A day is introduced by a creation of the world, which perdures throughout the day, the eras constantly rotating. The night begins with the destruction of the world, and while it lasts cosmic quietude reigns. One day and one night of Brahma constitute a world period (*kalpa*), with a total duration of 24 million [divine] years. This is the highest unit of time . . . the creation and destruction of the world follow each other eternally.'

At this point we leave Frauwallner and the *Mahābhārata* for a moment. We have here, combined with the theory of four declining ages, the theory of the *kalpa*, a period which starts with the creation and ends with the destruction of the world. The *mahāyuga* is simply made a sub-section of the *kalpa*. The Purāṇas also have another kind of vast period, the *manvantara*, or Interval of Manu. Manu is the primeval (and eponymous) ancestor of man, the first law-giver; he has many epithets, and Jacobi plausibly suggested that these gave rise to a theory of many Manus - a common development in mythology, especially in Indian mythology - which in turn led to a theory of many successive eras in which the various Manus could operate. Seventy-one *mahāyuga* make one *manvantara*, which sounds very odd till we realise that fourteen *manvantara* make one *kalpa* (994 *mahāyuga* and their dawns and twilights lasting six

*mahāyuga*); we then realise that the number seventy-one was reached by dividing the 1,000 *mahāyuga* of a *kalpa* by fourteen, to accommodate fourteen Manus, and fiddling round with what was left over. The *manvantara* is thus a sub-division of a *kalpa*.<sup>11</sup> The Purāṇas also know of a larger unit than the *kalpa*, the *para*. The *kalpa*, we have seen, is the day of Brahma, who creates the universe each day at dawn. According to the *Vāyu Purāṇa* his life lasts for a *para*, which is 100 such years, and then that is the end. The world is finite in time. At the beginning of our present *kalpa* half the *para* had elapsed, that is, Brahma had his or its fiftieth birthday.

Though this is the majority view, one major school of Hindu philosophy, the *Mīmāṃsā*, holds that the world is eternal. This school is atheist, and argues against the notion of a creator god. These positions it shares with the Jains (see below).

Let us return to the Inquiry of Suka. Its cosmogony is largely expressed in the categories which became particularly associated with the classical school of philosophy called Sāṃkhya 'enumerative'. Sāṃkhya holds that all matter, which includes mental phenomena - everything indeed but the soul - evolves from an undifferentiated state, often called *avyaktam*; that there are five material elements: ether, air, fire, water and earth, which appear first in their most subtle, later in their grosser forms; and that throughout all this there operate three principles, which are intertwined like the strands of a rope. The three principles, which go back to the Upaniṣads and play a large part in the *Bhagavad Gītā*, are *sattva*, literally meaning 'goodness', or 'existence', which is also light, *rajas*, literally 'lust', which is passion, energy and activity, and *tamas*, literally 'darkness', which is also heaviness and inertia. This said, I translate Frauwallner (pp. 118-19):

'When the world-night comes to an end, Brahma wakes up and has the world come out of him. There arises from him first the great being (*mahad bhūtam* - neuter), which still counts as the undifferentiated (*avyaktam*). From the great being springs thought (*manas*), which already belongs to the



realm of the differentiated (*vyaktam*). Thought is then the origin of the elements. From it comes ether, from ether wind, from wind fire, from fire water and from water earth. Each of these elements has its own characteristic property: ether has sound, wind has feel, fire visibility, water taste and earth smell. But they do not have these properties alone. Wind as well as feel has sound, fire as well as visibility has feel and sound, water as well as taste has visibility, feel and sound, and earth as well as smell has all the other properties . . . This concludes the creation of the underlying essences of which all things are constituted, and the creation of living creatures and worlds begins. First there arises the creator god Brahmā, alias Prajāpati. He creates the gods, the fathers, and mankind; also the worlds with all that fills them . . . finally he creates the Vedas and sacrifices, the orders of society and the stages of life.'

Here a theistic cosmogony has been added as a second stage to the more naturalistic model; the activity of the personified Brahmā, masculine, follows the events which proceed from the neuter Brahma, the world spirit, which or who is semi-personified only as it or he wakes from cosmic sleep. I may add that from the *Mbh.* on it is generally accepted that the personified Brahmā creates the universe with the cosmic principle of *rajas*; Viṣṇu preserves it with *sattva*; and Śiva destroys it with *tamas*.<sup>12</sup> The three principles of Sāṃkhya philosophy are thus paired off with three gods, whose appearance in this context as a Trinity so misled early European observers.

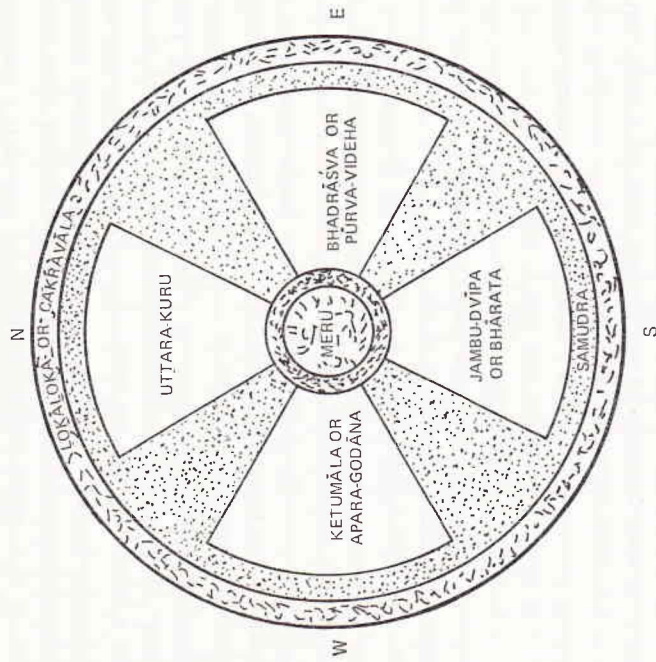
The text also describes the destruction of the world. Such destruction occurs at the end of a *kalpa*, but presumably was originally conceived as bringing the world to an end at the close of a *mahāyuga*, the smaller unit. Seven suns appear in the sky, and set the world on fire. Everything on earth is burnt, till the earth is as bare as the back of a tortoise. Now water re-assumes smell, the property of earth, and so on in the inverse order to that of creation. Finally the undifferentiated dissolves once more into Brahma, and Brahma alone remains.

How do the Hindus conceive of the construction of the

universe? The world is commonly called *tribhuvana*, the triple earth, and there is a basic tri-partition into the earth, the heavens above it, and the nether worlds below it. Consonant with the cosmogony just reported, though reflecting a more classical form of Sāṃkhya, there is a common theory that the world is shaped like an egg, the outermost shell of which is undifferentiated matter; within this is a layer of intelligence and within this egoicity; and within this again in due order are layers of ether, wind, fire and water. Each layer is ten times as thick as the next one in. The outermost layer of undifferentiated matter is sometimes omitted, but to include it gives the satisfactory number of seven layers. These layers envelop the entire universe; the water thus merges in cosmographic tradition with the water which in Vedic times was believed to be above the heavens and below and around the earth.

The earth, the element which comes into being last, does not encircle the universe, but forms a mass in the centre. Its basic shape might be described as a huge flat disc, as it was in the Vedas, but this disc is now broken up into a system of concentric oceans and continents. We – the cosmologists – live on Jambudvīpa, the rose-apple continent, so named after a giant rose-apple tree which stands to the south of Mount Meru. In some versions the name Jambudvīpa applies to all the land mass round Mount Meru, within the first ring of ocean, which is the ocean of salt; while in other versions Jambudvīpa denotes only the southern quarter of that land mass, namely India. In Buddhist literature Jambudvīpa definitely means India. But in Puranic cosmology the more normal nomenclature is for the whole middle continent, centring on Mount Meru, to be called Jambudvīpa, while the southern quarter of it, that is India, is called Bhāratavarṣa. (Bharat is the modern Hindi name and so the official name now of India.) Using this terminology, one can say that Jambudvīpa comprises four vast countries arranged round Mount Meru, one centred on each cardinal point of the compass. To the north of Meru are the Uttarakurus, reminiscent of the Hyperboreans; the lands to the east and west are commonly called East and West Videha.





9. The Catur-dvīpā vasumatī. The earth consisting of four continents (see pp. 136 and 142)<sup>13</sup>

Outside the ocean of salt are six other continents, all ring-shaped and forming concentric circles round Mount Meru and Jambudvīpa. Dimensions increase in geometrical progression as one moves outwards. To quote L. D. Barnett (pp. 196-7) (and to recall Macaulay), the continents

are divided one from another by ring-shaped oceans of sugar-cane juice [which I take it is Macaulay's treacle], wine, clarified butter, milk, whey (or whey and milk), and fresh water respectively. These circles are enclosed in a ring of mountains, called Lokāloka, beyond which is a realm of darkness that extends to the uttermost bounds of the universe . . . The heavenly bodies were supposed to have their orbits in planes parallel to that of

the earth . . . and to move round Meru at their centre. Their light is intercepted by Meru, and thus night and day arise. The variation in the height of the sun above the horizon is explained by the supposition that the sun's orbit round Meru varies, being narrowest at the summer solstice and widest at the winter solstice. The sun is imagined to move in summer more slowly by day than by night, and in winter more slowly by night than by day, the motions being equal only at the equinoxes.

Mount Meru itself is generally said to be round and made of gold; it is 84,000 *yojanas* high and 84,000 *yojanas* deep, and it is the pleasure-ground of gods and demi-gods. There is a vast mass of mythical geography attached to it, as indeed to the rest of the world, but we may pass it over. The idea that a great mountain lies to the north of India is of course natural; the Himalayas themselves are generally accommodated as southern foothills to Mount Meru, with or without an intervening paradise. The Ganges drops from heaven – remember the Vedic waters of heaven – on to Śiva's head as he sits on Mount Kailāsa in the Himalayas, and thence flows down into India.

If the height and depth of Meru are 84,000 *yojanas*, the reader may wonder what a *yojana* is. It is generally translated as 'league', and unfortunately there are two classical Indian tables of measures of length: according to one the *yojana* would be about nine miles; according to the other, just half that. As a *yojana* is also used to denote a day's march the longer measure was probably the commoner; but in our context the matter is immovable. The diameter of a *brahmāṇḍa* in Purāṇic cosmology is 500 million *yojanas* – the cosmic egg is apparently round, not ovoid; and I should perhaps mention that some texts would have it that there are an infinite number of them in space, though I suspect that this may be a late idea borrowed from the Buddhists.

For heavens, the Purāṇic cosmology generally retains the idea of the seven worlds which we found in the later Vedic literature. Above *bhūr*, that is us, *bhuvāḥ* extends as far as the



sun, *svar* from the sun to the pole star. The demarcation between these three and the four super-added planes is still clear, for it is only the bottom three levels that are destroyed at the end of each *kalpa*. Of course this is inconsistent with the idea of the seven envelopes round the whole universe and all within them being created anew for each *kalpa*. The destruction of the world proceeds first by fire and then by flood. The inhabitants of the *maharloka*, the fourth one up, though their abode is not destroyed, apparently find it is too hot and wet for comfort, for they move up to *Janaloka* for the time being. *Maharloka* is ten million *yojanas* above the Pole Star, *Janaloka* 20 million above *Maharloka*, *Tapaloka* or *Tapoloka*, 80 million above *Janaloka*, and *Satyaloka*, 120 million *yojanas* above *Tapoloka*. *Satyaloka* is also called *Brahmaloka* and its inhabitants are truly immortal. They are the mythological equivalents of those souls who have attained salvation by realising their unity with Brahma, the world-spirit.

There are seven tiers of worlds underneath the earth; there are many references to the universe as containing fourteen worlds in all. These seven would correspond in a sense to the seven upper worlds, from *bhūr* the earth to *satyaloka* the world of truth; but the nether worlds are each only 10,000 *yojanas* deep, a trifle compared to the heavens. Moreover there is great confusion about the precise nature of these nether worlds, a confusion which, as we saw above, already obtained in the Vedic texts. There is an ancient and enduring class of demi-gods important in the *Mahābhārata*, divine cobras called *nāgas* who live at the bottom of river and seas, and/or underneath the earth. These *nāgas* now join the archaic *asuras* and the wicked dead as potential inhabitants of underworlds. Their kind of nether world is called a *pātāla*. In Purāṇic cosmology the seven levels below the earth are sometimes called *pātāla* collectively, but they also have separate names, the lowest one being *Pātāla*. The seven *pātālas* are splendid places, like heavens; the lower ones are inhabited by *nāgas*, the higher ones by various *asuras*. The *asuras* remain in most classical cosmologies as a Vedic survival, but the cosmologers are hard put

to fit them in. Below the bottom level, *Pātāla* proper, lies a particularly important *nāga* called Śeṣa, who plays a major part in Vaiṣṇavite cosmogony: he carries the world on his hood.

If the lower worlds are inhabited by semi-divine cobras, etc., where are the hells? Like the *pātālas*, they were presumably one at first, but have become seven, or multiples of seven – Manu gives twenty-one. As the addition of hells carries the total number of levels past fourteen, there is some doubt whether the hells come immediately below the *pātālas* or even lower down, outside the envelope of cosmic waters. This latter solution reminds us of the *Rg Vedic* prayer that one's enemy may lie below the three earths.<sup>14</sup>

The reader may be wondering where in the world one goes after death and how the heavens and hells fit in with reincarnation. When generalising I stated that all the inhabitants of the universe are reincarnated, and with the exception of the top heaven, *satyaloka*, that is true; but for Hinduism it is too simple a statement. When the doctrine of reincarnation appears in the Upanisads, the idea is that of those who do not have the liberating knowledge, the good are reborn on earth in a good situation, presumably as well-off human beings, the bad as bugs, worms and so on. The idea of immediate rebirth on earth competes with that of reward in heaven or punishment in hell; and generally in the epics and Purāṇas we find both, so that the general picture is that a bad man suffers in hell and then is reborn on earth, e.g. as an outcaste. The good man may similarly go to heaven and then be reborn as a brahmin. But as ideas are hardly ever quite superseded, the Vedic king of the dead, Yama, must be fitted in even though the moral causation of *karma* is in principle automatic. In the *Rg Veda*, as we have seen, Yama and the blessed ancestors inhabit the top third of heaven. In the later Vedic literature there are also classes of ancestors who live in the earth, atmosphere and sky; besides which the souls of pious ancestors are sometimes said to be visible as the stars. Yama is the god of death, and he lives in heaven – the opposite of hell, according to the *Atharva Veda*; the two ideas,



his heavenly abode and his frightening character as Death, are not well integrated. In the *Mahābhārata* the good, especially good warriors, are said to go at death to Indra's heaven rather than to Yama's; Indra is the old warrior god, and his heaven is not firmly located, for the world of soteriology does not fit well with the world of systematic cosmology. Similarly, in late classical times the devout sectarian worshippers of Śiva and Viṣṇu believed that after death they might enjoy eternal bliss in the heaven of their god – but these heavens find no place in contemporary Purāṇic cosmology. But to return to Yama: he gradually loses his place as killer to a personification called Death, and retires to an apparent sinecure in his high heaven. This development is interestingly duplicated in Buddhism, where Yama's heaven is located immediately above Indra's but has no function. But there is an alternative theory that when the good die they go straight to the world of Indra, whereas the bad go to Yama, who condemns them to hell.

There are only about two million Jains in India now. But the Jains have devoted an extraordinary amount of attention to cosmography; I am told that it is a subject of absorbing interest even to contemporary laity, and that cosmographic diagrams appear in all Jain temples. This enables me to summarise a great deal by means of illustrations (see frontispiece and plates 21, 22). The universe is conceived of as a human being, either man or woman. Although the universe has a very odd – a unique – shape, I need hardly point out that this shape does not necessarily suggest the human figure; that image must rather derive from the tradition which we met in the Vedic hymn of the cosmic giant.

The Jain universe is measured in terms of a peculiar unit, the *rejju*, which is defined as the space covered by a god in six months if he flies at 2,957,152 *yojana* in a 'blink', that is about ten million *yojanas* a second. The measurements are all given in the most careful detail and the complications are enormous. The hells get wider towards the bottom, and there are vast

inhabited gaps between them; the heavens, as you go up, get first wider and then narrower, and most of them are also bisected vertically. This bizarre structure must be the result of successive aggregations. We cannot unravel them all here; but Kirfel has found his favourite global shape encapsulated at the heart of this structure. Let me explain. The Jains, too, consider the terrestrial disc to consist of concentric continents and oceans round Mount Meru, though they differ from the Hindus in detail; one peculiarity is that only two-and-a-half continents, counting out from the centre, are inhabited. Moreover the gods in the heavens live in vast celestial palaces, and the hells have similar sub-divisions, hells within hells as it were. Kirfel has pointed out that the bottom of the centre celestial palace of the lowest heaven precisely covers the two and a half continents of the inhabited terrestrial plane, including the intervening seas of salt and black water, while the top precisely covers the central terrestrial continent, Jambudvīpā, and the top nether world corresponds, so that we can find a simple tripartite structure with the inhabited world at our level sandwiched between one heaven and one hell. Jain authorities themselves posit a kind of world within a world, though not in quite the same way as Kirfel; they say that although the entire world is packed with living things, those endowed with voluntary motion are confined to an area one *rajju* square which runs, like a funnel, right down the centre of the universe.

The Jains have no cosmogony; their doctrine denies a creator god. They hold time to be eternal. It is like a wheel with twelve spokes. The twelve spokes are twelve ages, divided into two sets of six: first there is the *avasarpīni* or 'descending' series, the era of decline, then the *utsarpīni* or 'ascending' series. This arrangement may be modelled on the twelve-month year divided into the *uttarāyana* when the sun goes north and the *dakṣiṇāyana* when the sun goes south. At the same time, the ages are influenced by the four *yuga*, because if Jain ages 4, 5, and 6 in an era of decline are fused into one, we arrive at four ages with lengths in the proportion of 4:3:2:1. The dimensions dwarf even the Hindu estimates. We live in the fifth age of an



era of decline. In the sixth age, at the end of the descending era, human stature finally descends to about a foot, the human life span to sixteen years, and men live brutishly in caves, feeding on raw flesh. As this is immediately followed by the ascending era, which starts with those same cosmic conditions, it follows that there can be no cosmic conflagration at the end of the era; but some Jain cosmologers do insert forty-nine days of corrosive rain (i.e. fiery water!) to mark the turning point, the nadir. Tīrthamkaras, the Jain saints who, like Buddhas, not only achieve enlightenment but broadcast the truth and establish it among men, are born, at least in one view, only in the third and fourth of the six ages. Buddhists hold a similar view. The idea is that in a golden age men do not feel the need of salvation, whereas in a really bad age the seed will fall on stony ground. The cycle of the six ages only takes place in Bhāratavarsa, where we live; the other parts of the human world variously enjoy without change the conditions specified for one of the four better ages.

In contrast to Jaina time, Jaina space is strictly finite. Going from inside to out, the world is surrounded by layers of thick water, thick air, and thin air. Outside that is non-world, which is impenetrable, for it permits of neither rest nor motion, which in Jain philosophy are both substances. The top of the universe is interesting. Approaching the top we reach the gods 'of the neck' (the name refers to the cosmic giant), then the 'supreme' gods, who will be reborn not more than twice, and finally a comparatively small region, shaped like an open umbrella, in which liberated souls float in infinite knowledge and bliss just under the top edge of the universe.

A final bizarre detail: Jain astronomy posits that there are two suns, two moons, and two sets of the other heavenly bodies rotating round Mount Meru.

The cosmology of Theravāda Buddhism is fully evolved only in commentaries on the Pali Canon and in Buddhaghosa's *Visuddhimagga*, written in about 400 AD. A similar but rather more elaborate cosmology is to be found in the third chapter

of Vasubandhu's *Abhidharmakośa* (fifth century). But the salient features of both are present piecemeal in the Canon, and have merely been systematised by commentators. Much of Buddhist cosmology thus has roots as old as the older parts of the *Mahābhārata*, and it developed fairly independently. Here we shall mainly follow Buddhaghosa.

For Buddhists, in contrast to Jains, cosmography is a secular subject in which interest should if anything be discouraged. For Buddhists, 'the world' can mean either 'the world of living beings' or the 'receptacle world',<sup>15</sup> i.e. space and time. Only the living beings are of religious concern, for the Buddha's message tells of the unsatisfactoriness of life, impermanent as it is, and of the way to escape rebirth by insight into the nature of things. Where other traditions talk of the world, therefore, in some such cosmological terms as 'heaven and earth', early Buddhist texts refer to the five *gati*, 'destinations', i.e. kinds of rebirth: gods, men, ghosts, animals and hell.<sup>16</sup> The first four of these terms refer to kinds of beings, of whom three – men, ghosts, and animals – are found on this earth; only hell is a locational term. It alludes primarily to the tortured sinner; but there are also demons inflicting the tortures, about whose cosmological position Buddhism has always been rather vague. We have here a three-tier universe with the earth between heaven and hell; its spatial and temporal dimensions are of no interest, and it is full of transmigrating beings who wish or should wish to escape it altogether.

Nevertheless, Buddhism soon constructed a fairly elaborate picture of the 'receptacle world', on the basis of hints and stray remarks in the Canon, and the reader will not be surprised that the universe of the five *gati* which I have just explained became incorporated in a much larger and more detailed scheme. But this incorporation took place in a very particular way. The universe was divided into three layers, called *kāmadhātu*, sphere of desire, *rūpadhātu*, sphere of form, and *arūpadhātu*, sphere of non-form. The world of the five destinations falls within – in fact it comprises – the bottom third, the sphere of desire. (The word which I have translated 'sphere', *dhātu*, is a



term which only the Buddhists introduced into cosmology; its usual meaning is something like 'element', e.g. an essential ingredient of the body, or a grammatical root, and in classical Sanskrit has no spatial significance.) What we have here, I think, is a metaphor taken literally, the reification of a way of looking at spiritual progress. This becomes clearer when we look at details. At the top of the sphere of desire are the six heavens inhabited by gods; and in the highest of them dwells Māra, or Death, the personification who tempted the Buddha not to preach but to die, and whose daughters are the forces of desire, especially sexual desire. To put Māra in the highest of the six heavens gives the game away; it is a mythological restatement of the fundamental Buddhist message that just as Death and Desire are the two sides of one coin, so the entire world of transmigration, the sphere of desire, is presided over by Death. But Buddhist exegetes were puzzled that a palpably bad character like Māra should be in such a high heaven; hence the later idea that he lives in a remote part of this heaven with his hosts, like a rebel with his bands of brigands,<sup>17</sup> an apparent anomaly.

If the sphere of desire contains six heavens and all the old gods, one may well wonder what is in the two higher spheres, of form and no-form. The sphere of no-form, at the top, consists of levels with the same names – plane of neither perception nor non-perception, plane of nothingness, etc. – as denote various enstatic states which the Buddhist passes through on his way to the realisation of *nirvāṇa*. Clearly the heavens are not merely homologous with the states of yogic trance: they are reifications of the mystical terminology. They are inhabited by beings of pure mind, who died just short of the realisation of *nirvāṇa*, and are now not liable to a lower rebirth, but dwell in pure meditation which will ultimately be successful. The sphere of no-form, then, is merely an elaborate spatial metaphor for spiritual progress. Vasubandhu's *Abhidharmakośa* (2, 14, 4) is explicit that the sphere of no-form is non-spatial, and 'above' the sphere of form only in a figurative sense. However, the popular picture of the world is unlikely to be so sophisticated.

The sphere of form, between this and the sphere of desire, was a bit of a conundrum for cosmologists, who finally filled it with specially refined gods who derive from Mahā (great) Brahmā. We explained above that for the Hindus Brahmā, masculine, is the personal creator of the universe. The same god is often mentioned in the Buddhist Canon, a mere god but the highest one, who paid much honour to the Buddha. At first he was just the god of the highest heaven (so that with the six heavens of the world of desire there were in the Canon<sup>18</sup> seven heavens altogether); but then cosmologists lifted his heaven above the world of desire, and gradually elaborated and sub-divided it. It was not just that the sphere of form had to be filled: there was a more particular reason for putting Brahmā in it. Like Jains, Buddhists disbelieve in a creator god; but like the Hindus they believe that the world, or rather our part of it, is periodically destroyed. In the Canon<sup>19</sup> there is an amusing story at Brahmā's expense, a straight take-off of the Hindu view of personal creation: after the period of void (see below), Brahmā, because of previous *karma*, is the first being to be reborn; he is then lonely, and wishes for company, as in the *Bṛhadāraṇyaka Upaniṣad*; in the Upaniṣad other beings arise because of his desire, but for Buddhists this is a megalomaniac delusion; the other beings too arise spontaneously because of their *karma*, but Brahmā fallaciously concludes 'post me propter me'. Thus he is outside the sphere of desire, but did not, as he believes, create it.

For Buddhists both space and time are infinite, although in the text just cited the Buddha reports both opinions but takes no position towards them beyond saying that his own insights are more valuable. There are infinitely many world systems, and post-canonical texts say that they are round spheres, which touch, and that the three-cornered interstices are special dark hells. This recalls the Hindu tendency to locate hell outside the bounded universe. However, the older idea was that the world (or a world) was bounded horizontally by a world-mountain with the relatively modest diameter of rather over a million *yojanas*, but the vertical dimension was not quantified,



presumably because of the unmeasurable nature of the sphere of no-form. These two conceptions were combined by saying that the Brahmā heavens, or some of them, extended over many world-systems. In the Canon the earth rests on water, which rests on air, which rests on space;<sup>18</sup> this is all later applied to a world-system, so as to leave room for the hells under the earth. For Buddhaghosa (*Vism.* XIII, 31) ten thousand such world-spheres constitute a 'field of birth', and a hundred thousand million constitute a 'field of command', over which the recitation of Buddhist texts to avert evil is efficacious. It is a 'field of command' which is destroyed at the end of an era (*kappa*). There is also a 'field of scope', the scope of a Buddha's knowledge; that is infinite.

World geography at our level was unlike that of the Hindus and Jains. Immediately round the cosmic axial mountain are seven concentric rings of mountains, which originally perhaps did not have seas between them; then between this central land mass and the world-mountain at the edge is just one large sea, in which four continents are situated as islands at the four cardinal points, ours of course being the southern one. This must be the kernel which has been encapsulated in a larger scheme by the other traditions: the four-fold earth, a symmetrical scheme based on the four cardinal points of the compass, has been put inside a seven-fold earth. The seven-fold earth has developed by taking the seven mountain rings which encircle Mount Meru and interposing them between Mount Meru and the mountain range round the edge, as seven circular continents separated by seven seas. To keep the original four continents, and to prevent the cosmographers' own country from being consigned to some obscure peripheral point, the four continents then became part of the central land mass, with various mountain ranges, etc., intervening between them and Mount Meru. All this is not pure conjecture, for schemes with just the four continents occur in the older Purānas (see Fig. 9). If the four continents are not islands but attached to one land mass the problem of their boundaries arises; hence the Purānic idea that they radiate from the centre like petals from a lotus.<sup>20</sup>

But that they did start off as islands is in my view proven, for the very word for continent in Sanskrit, *dvīpa*, basically means 'island'.

'Buddhism knows neither a first cause of the world, nor an all-embracing spiritual substance giving rise to all that is. It is rather that something comes into being in dependence on and conditioned by something else. A first beginning is as impossible as is a definite end. The Buddhist, therefore, regards all attempts to explain the world or the individual by means of one or more 'eternal substances' (such as God, soul, original matter, atoms, etc.) just as useless . . .<sup>21</sup> It is this teaching of impermanence which for Buddhists is the *raison d'être* of their teachings concerning cosmic time. They combine in a complex and colourful way Jain-like ideas of ascending and descending eras with Hindu-like ideas of periodic conflagration and floods, followed by cosmic voids. Their scheme appears to systematise several ideas which appear in the Canon, where they are not coordinated. The main ideas may be listed:

1. The world periodically contracts (*samvattati*) and evolves (*vivattati*). (E.g. *Brahmajāla* and *Aggāṇña suttas*, *Digha Nikāya*.)
2. Time is divided into eons (*mahā-kappa*), each of which consists of four periods, called uncountables (*asamkheyya*):
  - (i) the uncountable of contraction;
  - (ii) the uncountable in a contracted state;
  - (iii) the uncountable of evolution;
  - (iv) the uncountable in an evolved state.
3. There are (unnamed) cycles in which the human life-span increases and decreases between the limits of eighty thousand and ten years, with corresponding improvement and deterioration in conditions. Decline is directly due to loss of virtue. At the nadir there is a period (*antara-kappa*) of a week during which people massacre each other or suffer some other disaster.
4. Even the sun and Mt. Sineru are impermanent: one day seven suns will appear and burn them up.



5. Even the four great elements – earth, water, fire and air – are impermanent. Of the last three it is said in identical terms that they may carry away anything from a village to a whole country; they may also be totally lacking.

Buddhaghosa's scheme (*Vism.* XIII) does not include the data from 3 (the *Cakkavattisihanāda sutta*, *Digha Nikāya*); but he combines and reconciles the other ideas, plus a few minor points. The result is a scheme of an infinite series of great eons (*mahākappa*) which can be considered in sets of sixty-four. In these sixty-four great eons there is a cycle of types of destruction: seven by fire (by seven suns) are always followed by one by water; there are seven such octads; and then finally there are seven by fire followed by one by air. Destructions by fire, water and air follow the preponderance in the world of greed, hatred and delusion respectively. Each destruction (or 'contraction') destroys the 'field of command' up to a certain Brahmā world; water destroys higher than fire, and air than water. All beings are warned of each impending destruction, and this concentrates their minds to good effect, so that they are reborn high enough each time to escape the annihilation of their normal environment. The destruction of our physical world thus occurs at, or rather occasions, a high-point of religious progress; this odd doctrine was of course evolved to reconcile the destruction of the world with the indestructible chain of rebirth of unenlightened beings.

Each great eon begins with the uncountable of contraction, which itself starts with the appearance of a cloud of doom. There is then a great rain (which is welcome) followed by a great drought – fire and water again. Then follow either six more suns, or floods of caustic water, or a cataclysmic wind; these destroy the lower parts of the 'receptacle world' for the rest of the uncountable. The next uncountable is void. The next, that of evolution, begins with a great rain, which is compressed by air, and the world reappears from the top down. At our level there is at first only water, supported by air, but gradually scum appears on it and solidifies into earth. Beings

die in the Brahmā Heaven of Radiance and are reborn in the sky; they are luminous, but on eating the scum lose their luminosity. Then the sun and moon appear, which marks the beginning of the fourth uncountable. From now on things decline and human institutions evolve; but this takes us from our subject.

Vasubandhu adds further elements. Each uncountable is subdivided into twenty intermediate periods (*antaḥkalpa* = *antarākappa*) and this leads to much scholastic elaboration. He works in the canonical idea of cycles of the human life-span (see 3. above), the Hindu theory of the four ages (*yuga*), and the Jain terminology of 'descending' and 'ascending' eras. Thus, at the start of the fourth uncountable the human expectation of life is 80,000 years. The first intermediate period is a descending one, and the life-span decreases to ten years. The next intermediate period is an ascending one; and this cycle is repeated nine times (giving ten cycles in all) to complete the uncountable. A descending intermediate period is divided again into the four *yuga*, and the *kali yuga* begins when human life expectancy is 100 years. We are now in the *kali yuga* of the first descending intermediate period of our 'uncountable in an evolved state'.

But our situation is not altogether bad. At the beginning of each great eon, as many lotuses appear on the surface of the primordial waters as there will be Buddhas in the eon – anything from nil to five. Before our eon there was a run of twenty-nine 'empty' ones, with no Buddha. In our eon, however, there are five, the maximum, of whom Gotama Buddha was the fourth. There is one to come, and then – who knows? After Maitrī Buddha the next Buddha will be infinitely, unthinkably, remote. We are very close to our last chance for salvation.



## Notes

1. I would like to thank my friend Professor David Pingree for valuable comments on this paper. He writes: 'Indian astronomers were bothered by accusations that their acceptance of a Greek geocentric  $\kappa\acute{o}\sigma\mu\omicron\varsigma$  contradicted *smṛti*; one will find attempts to justify their system in terms of Purāṇic concepts, especially in Brahmagupta's *Brāhmasphuṭa-siddhānta* XXI (AD 628) and in the eighth century commentator on this, Pṛthūdakaśvāmin' (private communication).

2. For citations see Kirfel, pp. 4-5.

3. Contrary to my general proposition that concepts are not superseded, I should note that in classical times the idea of heaven and earth as the original parents become obsolete - so obsolete that in classical Sanskrit *dyaus* 'sky' is feminine.

4. Verses 1-4 and 7 are quoted in Macdonell's translation (1951).

5. Verses 2, 3 and 14 are quoted in Macdonell's translation (1951).

6. Mount Meru is mentioned in late Vedic literature - *Taittirīya Āraṇyaka* I, 7, 1 and 3.

7. With similar incongruity the Ionian Anaximenes, though he otherwise pictured the earth as a flat disc, seems to have posited a great mountain at the North Pole.

8. For much interesting information on this unusual combination of fire and water, see Wendy Doniger O'Flaherty, 'The Submarine Mare in the Mythology of Śiva', *Journal of the Royal Asiatic Society*, 1971, No. 1, 9-27.

9. Professor Pingree writes: 'The astronomical date for the beginning of Kaliyuga is 17/18 February 3101 (= 3102 BC); the date of the beginning of the Bharata war is generally placed later in astronomical texts. Only astronomers from the fifth century AD on and their imitators begin the Kaliyuga on 17/18 February 3101; others (including the author of *Mahābhārata* XII) give no specific date.'

10. '360 is the number of *saura* days in a sidereal year, where a *saura* day is defined as the time required for the mean Sun to traverse 1° of the sidereal ecliptic' (Pingree).

11. Astronomers, too, use the *manvantara*, but not always with 14 to a kalpa (Pingree).

12. It seems reasonable to assume that this idea is late in the *Mbh.*, and perhaps does not antedate the Christian era.

13. After D. C. Sircar (see Bibliographical note).

14. That there is a confusion between the *pātālas* and the hells was pointed out by Jacobi; he showed that the Jains have seven hells where

the Purāṇas put the seventeen *pātālas*, and accommodate the awkward archaic *asuras* in caves between the earth and the top hell - a much tidier solution.

15. This is the Sanskrit terminology. Cf. *Viśuddhimagga*, VII, 37; in Theravāda Buddhism 'world' is said to have three meanings: all compounded things; living beings; and space (= our 'receptacle world').

16. Occasionally the awkward *asuras* form a sixth *gati*, between men and ghosts, but they are generally ignored in systematic cosmology.

17. See Nānamoḷi's note, *The Path of Purity*, 219.

18. For example, *Anguttara Nikāya*, I, 227.

19. *Brahmajāla Sutta*, *Dīgha Nikāya*, I, 17-18.

20. In Theravāda, *akāśa*, which is the fifth element 'ether' in most Indian schools, is not an element, but space.

21. This is the lotus which springs from Viṣṇu's navel; see Sircar, 264.

22. H. von Glasenapp, *Buddhism: a non-Theistic religion*, 50.

## Bibliographical Note

The following bibliography may serve also as a list of suggestions for further reading.

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