

THE BUDDHIST CONCEPTION OF THE UNIVERSE

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THE early Indians and Greeks speculated about the nature, origin and extent of the universe. Anaximander, a Greek thinker of the 6th Century BC, is supposed to have contemplated the possibility of "innumerable worlds" successively coming out of (and passing away) into an Indefinite substance. About a century later, the Greek atomists, Leucippus and Democritus, who postulated the existence of innumerable atoms and an infinite void, conceived of worlds coming-to-be and passing away throughout the void. These speculations were the product of imagination and reason and the "worlds" they talked of were mere reproductions of the earth and the heavenly bodies such as the sun, moon and the stars.

The contemporary Indian speculations prior to Buddhism were on the same lines, except for the fact that some of them were claimed to be based on extra-sensory perception as well. Here there appears to have been even a wider variety of views than to be found among the Greeks.

The early Buddhist texts summarise their views according to the Buddhist logic of four alternatives. With regard to the extent of the universe, the following four types of views were current: (1) Those who held that the universe was finite in all dimensions, (2) those who held that the universe was infinite in all dimensions, (3) those who held that the universe was finite in some dimensions and infinite in others, and (4) those who rejected all the above three views and held that the universe was neither finite nor infinite.

This last view was held by thinkers who argued that the universe or space was unreal. If so, spatial epithets like 'finite' or 'infinite' cannot be applied to the universe. So the universe is neither finite nor infinite.

Similarly, with regard to the origin of the universe, there were thinkers who put forward all four possible views, viz. (1) Some held that the universe had a beginning or origin in time; (2) others that it had no beginning in time; (3) still others that the universe had in one sense a beginning in time and in another sense no beginning in time. This would be so if the universe had relative origins its substance being eternal while it came into being and passed away from time to time; (4) finally, there were those who put forward the theory that since time was unreal it did not make sense to say that the universe had an origin in time or no origin in time. For this last group of thinkers the universe was "neither eternal nor not eternal."

It is with original Buddhism that we get for the first time in the history of thought a conception of the universe, which can in any way be meaningfully compared with the modern picture of the universe as we know it in contemporary astronomy. This is all the more remarkable when we find no other such conception, which foreshadowed or forestalled modern discoveries in ancient or medieval thought of the East or West.

“The Universe”

Before we describe the essential features of the Buddhist account of the universe or cosmos, it is necessary to clarify what we today mean by the term "universe" for it did not mean what it means today at all times.

The conception of the universe in the West until the end of the medieval period was geocentric. It was mainly Aristotelian in origin. The earth was deemed to be the fixed centre of the universe and the moon, the planets, the sun and the stars were believed to move with uniform circular velocity in crystalline spheres around it. The universe was also finite in spatial extent. Apollonius and Ptolemy made some minor adjustments in an attempt to account for some of the movements of the planets but the basic conceptions remained the same.

This finite geocentric universe was later considered to be the orthodox theological view of the cosmos and attempts on the part of thinkers to change it were clamped down as heresy. A change came with Copernicus who was led by observational findings and the suggestions of early Greek thinkers like the Pythagorean Philolaus and Aristarchus of Samos to conceive of the sun as the centre of the universe. The "universe" was now the solar system (i.e. the sun with the planets going round it), encircled by the stars.

With the construction of larger telescopes since the time of Galileo, the next advance was made by Herschel in the late eighteenth century. His observations convinced him and others that the unit of the universe was not the solar system but the galaxy or galactic system composed of clusters of stars, the blazing sun that we see being only one among such stars. On the basis of his observations of stars and the calculation of their distances, he was the first to make a map of our galactic system or "island universe" (as he called it), known as the Milky Way.

He too placed our sun at the centre of the disc, though today we know that the Sun is about halfway between the centre and the edge of this huge galaxy. Astronomical distances are so large that they are measured not in terms of miles but in light-years. Light travels at the rate of about 186 000 miles per second.

It is held that light, travelling at this speed would take about 100,000 years to travel across the diameter of the Milky Way. In other words, our galactic system has a diameter of 100,000 years.

It was left to modern astronomy with its more powerful telescopes, aided by radio telescopes, to delve deeper into space and to make more accurate observations of relative locations and shapes of these galaxies.

In the light of these findings we know that the ten billion galaxies found in space are not found in isolation but in clusters. So when we survey the universe the units we have to deal with are the galaxies. They are now classified as regular and irregular galaxies on the grounds of shape, the regular galaxies being elliptical, round or spiral. The commonest of all galaxies (i.e. about three-fourths of them) are spiral. The majority of these galaxies are called 'dwarf galaxies' because they contain about a million stars.

The progress of astronomy has thus resulted in a gradual development of the concept of the "universe". The earliest conception was the geocentric, the "universe" being the earth and the celestial bodies around it. Next, the heliocentric conception concentrated on the solar system. The real advance was made in the next stage when the solar system was conceived as one of many such systems in an "island universe" or galaxy. Following this there was the concept of the cluster of galaxies and the present conception of the universe as consisting of a number of such clusters of galaxies.

Buddhist Conception

In the Buddhist texts the word used to denote the "world" or "cosmos" or the "universe" is **loka**. Its uses are as various as the English word "world". It would be tedious to enumerate them here since we are concerned only with the sense in which it is used to denote "the world in space". This is called *okasa-loka* or the "space-world" (i.e. the world in space) in the Commentaries, which illustrates this sense by reference to a relevant passage in the texts. In the *Visuddhimagga* (204), it is said that in the passage, "As far as these suns and moons revolve, shining and shedding their light in space, so far extends the thousand-fold universe" (*sahassadha-loko*) - the word 'loka' is used to denote "the world in space".

In one context of this passage, the universe is described in three tiers or stages. The smallest unit of the universe is here called *sahassi culanika loka-dhatu*, i.e. the Thousand-fold Minor World-System. This is defined as follows: As far as these suns and moons revolve, shining and shedding their light in space, so far extends the thousand-fold universe. In it are thousands of suns, thousands of

moons, thousands of Jambudipas, thousands of Aparagoyanas, thousands of Uttarakurus, thousands of Pubbavidehas... (A.1.227, V.59). Jambudipa, Aparagoyana, Uttarakuru and Pubbavideha are the four inhabited regions or the continents known to the people of North India at the time. From descriptions given about them, it appears to have been believed that these peoples had different temperaments and ways of living.

So it is as if one were to say today that there were "thousands of Indias, thousands of Arabias, thousands of Russias and thousands of Chinas". - Its significance is that there were thousands of inhabited places or planets since the earth was associated with one sun and one moon.

This Culanika Loka-dhatu or Minor World-System, which is the smallest unit in the universe though it contains thousands of suns, moons and inhabited planets, can only be compared with the modern conception of a galaxy, the majority of which have about a million suns.

Most modern astronomers believe that the chances are that there could be life of the form to be found on earth in planets of other solar systems in this as well as other galaxies. Professor Harlow Shapley says; after making a most conservative estimate: "We would still have after all that elimination, ten billion planets suitable for organic life something like that on earth" (**The View from a Distant Star**, New York, London, 1963, p.64.) Another well-known astronomer, Dr. Ernst J. Opik states: "Many planets may carry life on their surface. Even if there were only one inhabited system in every million, there would be 10,000 million abodes of life in the universe. What a variety of forms and conditions this implies !" (**The Oscillating Universe**, New York, 1960, p. 114).

Clusters of Galaxies

The next unit in the universe according to the early Buddhist texts is described as consisting of thousands of Minor World-Systems. This is called a "Twice-a-thousand Middling World-System" (Dvi-sahassi Majjhimika Loka-Dhatu). It would correspond to a cluster of galaxies according to modern conceptions.

This notion of a cluster of galaxies is a fairly recent one in modern astronomy. As Professor A.C.B. Lovell, the Director of the Jodrell Bank Experimental Station said in his B.B.C, Reith Lectures in 1958: "Some years ago we thought that these galaxies were isolated units in space, but now we believe that the galaxies exist in great groups or clusters. In the same way that the earth and planets are bound to the sun and move as a unit through space, so on an inconceivably vaster scale we think that the galaxies are contained in clusters as

connected physical systems. The local group contains the Milky Way system, the Andromeda Nebula, and perhaps two dozen others. It is not very populated, compared, for example, with the Virgo cluster of galaxies, which contains at least a thousand visible galaxies, although occupying only about twice the space of the local group." (**The Individual and the Universe**, Oxford University Press, London, 1958, pp. 6.7).

In the opinion of Professor Bonnor: "The Milky Way is one of a small cluster of galaxies called the Local Group, which includes all galaxies within about two million light-years from the Earth, and contains about twenty members. Beyond this distance one would have to travel about ten million light years before coming across another galaxy. Other galaxies, too, show a distinct tendency to cluster. The clusters may be small, like the Local Group, or may contain several hundreds or even thousands of galaxies" (William Bonnor. **The Mystery of the Expanding Universe**, New York, 1964, p. 32) .

We find that here "thousand" is practically the upper limit since many of the clusters of galaxies contain less. On the other with reference to the "Thousand-fold Minor World-System", "thousand" appeared to be too little. Since the Dhamma is summed up in stereotyped formula (which recur in the Pali Canonical texts) for easy memorisation, it is possible that 'thousand' was selected as a convenient common number to describe the hierarchy of units. However, elsewhere in the Canon smaller numbers of such "Thousand-fold Minor World-Systems" to be found in clusters are referred to.

In the Sankharuppatti Sutta of the Majjhima Nikaya, the basic unit is again the Thousand-fold World-System (Sahassi Lokadhatu, M. III. 101). But there is a reference to two, three, four....up to hundred such world-systems grouped together (e.g. sata-sahassi-loka-dhatu, *ibid.*).

Of frequent occurrence is the dasa sahasi-loka-dhatu, which should be translated as "the ten of thousand-fold world-systems". It is used with reference to the Local Group of galaxies, which consists of about 20 in all, of which about 10 cluster relatively close together. One text in fact refers to "the ten nearest island universes" (Rudolf Thiel, **And There Was Light**, New York, 1957, p.355).

Cosmos

While the Middling World-Systems consisted of a few up to a hundred or even thousand galaxies, the next unit is the whole cluster of Middling World-Systems. For it is said that thousands of Middling World Systems (i.e. clusters

of galaxies) go to form the vast universe or the Major World-System (Maha Lokadhatu), which some texts on astronomy refer to as the Metagalaxy.

Although some astronomers wonder whether there is a hierarchy of clusters of galaxies within the universe, the general opinion is against this. As Professor Bonnor points out: "One may ask whether clusters of galaxies are the last in the hierarchy. As stars aggregate into galaxies, and galaxies into clusters, do clusters aggregate into superclusters, and so on? Although astronomers are not quite unanimous, it seems that the clusters are the largest individual entities, and we should not be justified in speaking of clusters. Thus we have at last reached the unit of cosmology - cluster of galaxies. In practice the galaxy is usually taken as the unit because galaxies can be recognised more easily than clusters" (op.cit., p.32) .

The modern astronomical descriptions of the universe as well as those of the early Buddhist texts stop here. The modern accounts stop because there is a limit to observability on the part of the telescopes. If, as is inferred to be the case, the galaxies further and further away are receding at greater and greater speeds from us, then as they approach the speed of light, they would pass beyond the range of theoretical observability. So the theoretically observable universe is also limited and what happens beyond this would have to be pure speculation even according to science.

The early Buddhist texts too do not state that the Major World-System is all there is in the universe for the question as to whether the world is finite or infinite (ananto) in extent is left unanswered (avyakata).

The later commentarial tradition, however, goes a step further. One of the synonyms for a "World-System" or Loka-Dhatu is Cakkavala, a word of uncertain etymology meaning a 'wheel' 'circle' or 'sphere'. The Pali Society Dictionary commenting on Lokadhatu (s.v.) says that it means "constituent or unit of the Universe", "a world, sphere" and adds that Loka-Dhatu is another name for Cakkavala.

Calling a galaxy a "sphere" or a "wheel" is certainly appropriate for as we know from modern astronomy a galaxy is like a huge catharine wheel revolving round a centre or hub. But the commentary states that these galaxies or spheres (cakkavala) are infinite in number (anantani cakkavalani, Manorathapurani, II. 342). This is certainly going beyond the standpoint of the early Buddhist texts, which is uncommitted on the question of the origin or extent of the universe. While the later traditions of the Sarvastivada and Theravada suggest that the number of galaxies or world-systems is infinite in extent, the Mahayana texts

hold that the universe is infinite in time, stating that "the universe is without beginning or end" (anavaragra) .

Here again the standpoint of original Buddhism was merely to state that the universe was "without a known beginning" (anamatagga). The Buddha, it is said, could see worlds without limit "as far as he liked" (yavata akankheyva, Nid. 1. vol. II, 356). He could also probe into the past without limit for the further back that he looked into the past, there was the possibility of going back still further. But to say that the world or universe is infinite in time and space is to go beyond the stand of early Buddhism and give an answer to an "unanswered question" (avyakata).

While all schools of Buddhism retained the general picture of the universe as given in the early Buddhist texts, their detailed accounts and elaborations are not always to be trusted. The Sarvastivada accounts given in the Abhidharmakosa differ from those of the Theravadins. The reason for this is that the simple but stupendous conceptions of the early Buddhist view of the universe got mixed up with popular mythological geography and cosmogony in the commentarial traditions of the schools.

The Mahayana texts, for the most part, retain the early view of the galactic systems spread out through space. We only notice that "thousand" is replaced by "million". The Vajracchedika, for example, refers to the universe as "this sphere of a million millions of world-systems" (XIX, XXIV, XXX).

Myth and Fact

While the early Buddhist texts are, therefore, more reliable, we must not forget that the account given of the extent of the material universe exhausts the early Buddhist conception of the cosmos. The passage quoted above from the Anguttara Nikaya goes on to speak of the subtle-material worlds (rupa-loka) or the worlds of higher spirits or gods (deva) as being associated with the material worlds or galaxies. They cannot, however, be observed by human vision.

Are we going to dismiss this aspect of the universe as belonging to the realm of mythology? Did the Buddha have grounds for belief in the existence of devas or was this only a popular belief at the time, which he did not subscribe to? We can see the real attitude of the Buddha by the answers he gives to the Brahmin youth Sangarava who questions him on this subject:

Sangarava : "Tell me, Gotama, are there gods (deva)"?

Buddha : "I know on good grounds (thanaso) that there are gods."

Sangarava : “Why do you say when asked 'whether there are gods' that you know on good grounds that there are gods. Does this not imply that your statement is utterly false?”

Buddha : “When one is questioned as to whether there are gods, whether one replies that ‘there are gods' or that 'one knows on good grounds that there are gods', then surely the deduction to be made by an intelligent person is indubitable, namely that there are gods”.

Sangarava : “Then, why did not venerable Gotama, plainly say so from the very start?”

Buddha : “Because it is commonly taken for granted in the world that there are gods”.

The significance of this reply is that the Buddha holds that there are devas not because of a popular or traditional belief, which he took for granted, but because he was personally convinced of their existence on good grounds.

On the other hand, the Buddha had to make use of some of the traditional terms and coin others to describe the different types of worlds of these devas. There is other evidence to suggest that the Buddha did not take popular conceptions for granted. In one place he says that ignorant people believe that there is a "hell" (patala) but asserts that this belief was false. "Hell (patala) " the Buddha says is a term for painful bodily sensations (Samyutta Nikaya, IV, 206). "Heavens" are better than human forms of existence, where one experiences is pleasant (S. IV. 124) while "hells" are sub-human forms of existence where everything one experiences is unpleasant. The Buddha claims to "see" both these kinds of worlds" (S.N. *ibid.*). The danger of being born in these subhuman states of downfall (vinipata) is that it is difficult to emerge to human level after that. The reason is given: “Because there prevails no practice of the good life, no righteous living, no doing of good works, but just cannibalism the stronger preying on weaker creatures" (S.N.V. 455).'

Clairvoyance

It is stated that the Buddha's ability to see these World-Systems and the beings in them is due to his clairvoyance. It is said: "The Blessed One with his clairvoyant paranormal vision can see one world-system, two, three..... fifty world-systems - the Thousand-fold Minor World-System, the Twice-a-Thousand Middling World-System and the Thrice-a-Thousand Major World System. He could see as far out into space as he likes. So clear is the clairvoyant vision of the Blessed One. In this way is the Blessed One with his

clairvoyant vision one who has his eyes open (vivatacakkhu, Niddesa I, Vol. II, 356).

The clairvoyant powers of the disciples both according to texts and the commentaries are not unlimited like that of the Buddha. Anuruddha who was considered the foremost of those who had attained the faculty of clairvoyant vision could see only as far as the "Thousand-fold World- System": "It is by the fact of cultivating and developing these four arisings of mindfulness that I have acquired the ability to see the Thousand-fold World-System" (S.N.V. 302).

Cosmic Phenomena

Some of the casual statements made by the Buddha appear to come from one who has in fact observed aspects of cosmic space. In one place, the Buddha says : "Monks, there is a darkness of intergalactic space (Woodward has 'interstellar space') an impenetrable gloom, such a murk of darkness as cannot enjoy the splendour of this sun and moon" (S.N.V. 455). Modern astronomy would agree with this verdict. We see so much light because we are fortunate enough to be close to a sun.

The uncertainty of life in some of these worlds is sometimes stressed with graphic descriptions of cosmic phenomena. The Buddha says that there comes a time after a lapse of hundreds of thousands of years, when it would cease to rain and vegetable and animal life in the planet would be destroyed (A.N.V. 102). He also speaks of times when seven suns would appear and the earth including the biggest of mountains which appears so stable would go up in smoke without leaving any ashes at all. He speaks as though he has witnessed some of these phenomena. He says: "Who would think or believe that this earth or Sineru, the highest mountains would burn up and be destroyed except on the evidence of sight" (A. V. 103). Today we know that suns or stars could become cosmic hydrogen bombs, flare up and explode, burning up its planets, if any, and even affecting neighbouring solar systems. A student of astronomy commenting on this possibility says: "Humanity would at any rate enjoy a solemn and dramatic doom as the entire planet went up in a puff of smoke" (Rudolf Thiel, **And There Was Light**, p.329). These phenomena are called **novae** and **supernovae** which are observed from time to time in galaxies including our own. Colliding galaxies of which there is some evidence could also spell such disasters.

Time and Relativity

The destruction of the worlds, however, which will cause such phenomena to be manifested in all the world-systems comes only at the end of an epoch or eon, called a kappa. Several similes are given to illustrate what an immensely long period an eon is. One such passage reads as follows: "Suppose there were a city of iron walls one yojana in length, one in width, one yojana high filled up with mustard seed. Therefrom a man were to take out at the end of every hundred years a mustard seed. That pile of mustard seed would in this way be sooner done away with and ended than an eon. So very long is an eon. And of eons thus long more than one has passed, more than a hundred, more than a thousand, more than a hundred thousand" (S.N.II. 182).

The cosmos undergoes two major periods of change in time called the eons of expansion and contraction. The eon of expansion is the period in which the universe unfolds itself or opens out (vivattakappa). The other is the one in which the universe closes in and is destroyed (samvatta-kappa). Elsewhere they are described as the four stages of the universe: (1) the period of expansion (2) the period in which the universe remains in a state, of expansion, (3) the period of contraction and (4) the period in which the universe stays contracted.

There are several models according to which astronomers try to explain the movement within the universe in time. One of them is the cycloidal oscillating model according to which the universe expands and contracts until as Professor Bonnor says "the contraction slows down ceases and changes to expansion" again. The theory is currently favoured by many astronomers in the light of recent findings.

There is also a reference to the relativity of time in different parts of the universe. But this is a comparison of time on earth with time in the heavenly worlds. One day in one of these different worlds is equated with 50 years, 100 years, 200 years, 400 years and 1,600 years respectively on earth. Such brief outline is the early Buddhist conception of the universe.