

CHAPTER 3

Is 'Time' Definable ?

In the previous chapter we have discussed two opposite theories with regard to the nature of time - the Absolute and the Relational theories. For an understanding of the real nature of time it is essential that we analyse the concept of 'time' in some detail. It is usually convenient to introduce discussions on any subject with a suitable definition of it. So let us begin with Aristotle's definition of 'time.'

Aristotle defines 'time' as "the number of movement in respect of before and after"¹. In his definition Aristotle uses the Greek synonym of English 'number'. He says that we discriminate the more or less of anything by number. Similarly, we discriminate the more or less of movement by time. Time is the number of movement in the sense of that

which is numbered. That means that time is the numerable aspect of movement.

In Aristotle's conception only individual substances are existent. Motion is an attribute of the individual substance, and time is the attribute of motion.

Aristotle distinguishes 'time' from 'motion'. These are inseparable but not identical: time is one but movements are many; movements may be fast or slow, but time cannot be; time is not movement; it is the number of movement.

Time, Aristotle says, is intimately connected with motion or change. Movement is recognised by observing a single moving body successively at different points in space, and the passage of time is recognised by noting that the single character of 'nowness' has been attached to more than one experienced event. Thus it is only in movement or change that we notice a lapse of time. The before and after are two nows, and what is bounded by a 'now' is time.

It is, therefore, the 'now' that makes time continuous; it is again the 'now' that differentiates time into parts. But the 'nows', Aristotle says, are not really parts of time, just as points are not parts of a line. Each 'now' is by its very nature the beginning of a future as well as the end of a past; just as a mathematical point dissects a line by

serving as the end of one segment and the beginning of the other.

Aristotle deduces the continuity of time, its infinite divisibility from the continuity of motion, which in turn is deduced from the continuity of the space traversed. Since the space traversed is continuous, the motion must be continuous, and since the motion, the time that measures it must also be continuous, "because there is a one-to-one correspondence between each point of space and each moment of time.

Aristotle contends that past, present and future are in time as being parts of it; and events are in time as being measurable by it; so time must be greater than anything that is contained in it.

Aristotle then adds that since time is the measure of movement, it is the measure of rest as well. Anything is said to be at rest when it can be moved, though actually it is not moved. Here 'can be moved' means moveable or capable of being moved. It is not necessary that what is in time is necessarily in motion; for time is not motion, it is the number of motion. That which is at rest, but is capable of being moved, can, therefore, be the number of motion.

Aristotle raises another vital issue : would there be any time if there were nobody to count or measure movement ?

Then there would still be movement, but it would have no measurable aspect. So without a soul there would be no time.

It should be pointed out that Aristotle does not suggest that time is purely subjective. He simply denies that time is a substantial entity existing independently of other things. Time, according to Aristotle, is potentially in motion, and becomes actual when motion is noted and measured. This conception is to be distinguished from that of Kant. According to Kant time is subjective in the sense that it is an a priori form of our intuitions, while, for Aristotle, time is not subjective; it belongs to the objective world, though it requires the human mind to be noted and measured.

Several objections have been raised by Plotinus² against Aristotle's definition of 'time'.

First, since movement is continuous, it cannot be numbered; time may be called the measure of movement. Again, if time is said to be the measure of movement, we have some idea of the things of which time is a measure. But that does not lead us to any understanding of what time itself is. Moreover, if time is the measure of movement, how can it be the measure of rest also? Aristotle's explanation does not satisfy Plotinus.

It might be said that Plotinus, in the context, does not seem to follow the full implication of Aristotle's conception;

motion and rest are relative terms; rest implies the absence of motion of that, which is capable though not actually moving. Aristotle's idea is quite clear here.

But the most serious charge against Aristotle's definition of 'time' is that of circularity. We are told that time measures successive stages of movement, that is to say, the 'before' and the 'after' in succession. Yet there is also 'before' and 'after' in space by virtue of relative positions. So if the 'before' and 'after' are to refer to temporal relations, they must imply 'before' and 'after' in time rather than in the space traversed. So the definition of 'time' requires a reference to time which renders it circular.

Moreover, motion, in Aristotle's explanation, presupposes time, as 'motion' or 'locomotion' is defined by him as the occupation by an entity of a continuous series of places at a continuous series of times. This means that when a particular body is in motion it occupies consecutive points of space at consecutive moments of time. This is the Pythagorean conception of motion as accepted by Aristotle.

It can hence be said that Aristotle defines 'time' in terms of motion, and 'motion' in terms of time. Aristotle, himself is not unaware of this circularity; he himself says, "we measure the movement by time and vice versa".

It is however interesting to note that Plotinus does not get any further than Aristotle in his own definition of 'time'. He defines 'time' as "The life of the soul in movement as it passes from one stage of act or experience to another". But this definition too involves a reference to time. If we speak one state of consciousness passing into another, we must be able to distinguish between these states. And these different states of consciousness are distinguishable only as occurring at different moments of time. This means that the definition of 'time' formulated by Plotinus as well involves a reference to time.

St. Augustine³ realised this difficulty as surfacing in any attempt to define 'time', and consequently there is his famous expressions : "what, then, is time ? If no one asks me, I know; but if I wish to explain to one that asketh, I know not".

The situation is really puzzling. As Augustine admits, he has an immediate experimental awareness of time. He knows how to use temporal expressions about past, present and future; but when he tries to define 'time' verbally, he finds that the definition involves circularity.

There are many words that cannot be verbally defined. 'Yellow', for example, stands for a simple, verbally indefinable property. Such words, however, can be defined ostensively or demonstratively. One can point to an instance

of 'yellow' and make the hearer understand the meaning of the word. But 'time,' says Augustine, admits of no such straight-forward ostensive definition. There is nothing that one can point to and say 'This is time'; we cannot even ostensively define the 'past', 'present' and 'future' of which time is composed. Definitionally the past is that which is already over, and the future is that which is yet to become. Thus it is impossible for one to point to them. Can one point to the 'present'? Augustine contends that this is also impossible. Aristotle said that the present or now is the boundary of the past and the future, for it serves merely to connect them. This means that the present is an indivisible instant of zero duration having no sensible property that we can point to and say, 'this is the present'. This point needs further clarification.

Let us suppose that a particular event is occurring. It certainly does not occur all at once, but it must have parts or stages that occur one after another. When any one of these parts is occurring, among the other parts some have already occurred (past) and others are yet to occur (future). But which part of the event could properly be said to be occurring now? Ordinarily our use of the present tense and of the temporal adverb 'now' is not very strict. Events of fairly long duration and of very short duration are equally characterised as 'occurring now'. For examples, 'The

'Twentieth century is heading fast towards its end', 'The history of India is now repeating itself' or 'The National Anthem is now being sung'. We might be pressed to use the present tense and temporal adverb 'now' in stricter and stricter sense. In this way we might be persuaded to give up saying that anything which takes time is happening now. In other words, nothing of which a part lay in the past could properly be said to be happening now. For an event does not happen all at once; it must have stages that occur one after another. Some of its parts must have already occurred, while some other parts are yet to occur. If it is assumed that a whole cannot be said to be occurring now, unless all its component parts are also occurring now, then no occurrence which takes time can be said to be 'taking place', which ultimately amounts to saying that only that part of an event could be said to be occurring that does not take any time at all. Properly speaking, one cannot point to anything and say 'this is occurring now'. For on analysis 'the now' is found to be an instant of zero duration and even the act of pointing also requires time. In our ordinary discourse we use the temporal adverb 'now' without any confusion; we can communicate to other people what we mean by the word; but it eludes us whenever we try to point to it. If there happens to be no part of time that can be pointed at as 'now', then 'time' admits no ostensive definition of itself.

We may distinguish here three aspects of Augustine's bewilderment :

(1) He finds it difficult to understand how an accumulation of zeroes can be more than the zero, for each 'now' is of zero duration, and time is made up of 'now's. How can we hope to make something out of an accumulation of nothings ?

(2) The stages of an event that takes time never occur together. How can we say of a number of stages that are always apart to form a whole of any kind ?

(3) So, Augustine says, when we measure an interval of time, we must be measuring something of which a fast vanishing segment alone has reality; all the other segments of it are either not yet there or not there any longer. But how can we measure that which is no longer or which is not yet ? Both of these must be nothing to us at present.

Augustine is obviously puzzled with these paradoxical aspects of time and concludes that time is a 'protraction' of the mind, and that when we measure time we really measure a certain expanse in our memory. Time, for Augustine, is essentially subjective or belongs to one's mental history, i.e., it is psychological. Past, present and future times depend on the human mind. It is not proper to say that there

are three times. It might rather be said, as Augustine does, that there are a present of things past, memory; a present of things present, sight; and a present of things future, expectation.

But if all these are to be taken as the definition of 'time', then the matter suffers from circularity. We cannot talk about memory and expectation without making explicit reference to a past or future event which is remembered or anticipated. This shows that Augustine's account fails to avoid circularity.

So far we have discussed three attempts to define 'time' by three eminent philosophers. None of these attempts succeed in avoiding circularity. One at once realizes that to find a suitable definition of 'time' is really a taxing enterprise.

Among Indian thinkers the Nyāya-Vaiśeṣika philosophers have attempted to define the past, present and future times. It has already been discussed in the previous chapter that time, according to the Vaiśeṣika is one, infinite and indivisible. Whatever exists must be in time, but time is independent of all the events that occur in it. The divisions of time into past, present and future are not integral to real time, for they are essentially incompatible. These different temporal determinations are due to the association of time with limiting adjuncts.

The Vaiśeṣika suggests that the past, present and future are distinguishable only with reference to some external condition. A particular day, for example, is known as present owing to its relation to a particular solar motion; that very day is understood as past on the days that follow it, and as future on the days that precede it.

But it might be argued that the particular solar motion is common to all the three determinations. How could any relation to it serve as the condition for distinguishing between the different determinations? Hence a necessary qualification in respect of the relation has been made; that the present is the time of an event which is in actual relation to a solar motion; when the relation has already obtained and is no more, we have the past time; and the future is the time when the relation is yet to obtain⁴.

According to Śrīharṣa, an absolute Indian sceptic, the term 'actual' means existent, which is the same thing as 'present', whereas 'has been' and 'will be' are synonyms of 'past' and 'future'⁵.

The Vaiśeṣika has then suggested that the time determined by an action is present; the past and future are determined by the prenonexistence and post nonexistence of that action. But here the Vaiśeṣika thinkers get themselves involved in a circle. The terms 'pre-non-existence' and 'post-non-existence'

refer to the notions of the 'previous' and the 'subsequent'. But 'the previous' means 'the past' and 'the subsequent' means 'the future'.

The Vaiśeṣika then, as a next move, offers an amended definition of the 'present' : the present time is determined by a present action which is actually in progress and is not determined by any past and future action. But this definition is no less circular - for it defines the present time by using the term 'present'. Śrīharṣa reasonably contends that the different time - determinations cannot be defined.

From the above discussion it is clear that one of the problems related to time is that of defining it, and some ancient thinkers were quite well-aware of that.

Some modern western thinkers of linguist persuasion have also attempted to define the 'past', 'present' and the 'future' times. Ayer, for instance, contends that temporal precedence is an empirical fact given to us in experience. He also thinks that the 'present' may be defined ostensively. These two, he believes, are sufficient to yield the concepts of past and future. Ayer defines 'The present' as "the class of events which are contemporaneous with this, where 'this' is any event that one chooses to indicate at the given moment"⁶.

But Ayer's definition of 'the present' makes use of the word 'contemporaneous with' which has not been defined by

him. Moreover, a proper analysis of Ayer's definition shows that it involves contradiction. An ostensive definition must be unrestricted in its scope. When I ostensively define A's redness, for example as, 'This is red', it entails that if, at any time, a thing has the same colour as A, then at that time it is red; and negatively speaking, if a thing does not have the same colour as A, then at that time it is not red. But the negative formulation of Ayer's definition of the 'present' leads to a contradiction. In Ayer's definition 'the present is the class of events which are contemporaneous with this', where the 'this' is any event chosen at the given moment. It means that if at any time an event is not contemporaneous or simultaneous with A, then at that time it is not present. Let us now take another event B, which is not contemporaneous or simultaneous with A. Then even when B happens i.e., is present, B is not present, according to the negative formulation of the definition. This is a contradiction undisguised.

Following Ayer's definition of the present, the 'past' and the 'future' might now be defined as 'the class of events which are earlier than the present' and 'the class of events which are later than the present' respectively. As his definition of the 'present' involves circularity, and 'the past' and 'the future' have been defined in terms of the 'present', the charge of circularity applies to these definitions none the less.

It should be noted that temporal predicates like 'now', 'present' etc. and indexical terms like 'I', 'you', 'this' can neither be defined verbally, nor be identified ostensibly. To understand them we must know who uses the word, whom he speaks to, where and when does he point at something. They cannot be defined because they are not general terms. They are also different from non-indexical singular terms. So they cannot be identified ostensively. To define something ostensively is, in effect, to identify it.

This very fact had been the cause of Augustine's bewilderment. He could not find a suitable definition of time. He wanted to point to something called 'time' and being unable became mystified.

It was Śrīhaṛṣa who remarked that to define a thing is to mark it off from others; so, to say that something is indefinable is to admit that it has no recognizable specific character, and to say that, is to say that it is unreal.⁷

It is, however, an undeniable fact that time judgments are forced upon us by our experiences. We cannot express our experiences without employing temporal words. We cannot conceive of any intellectual activities without the concepts of time and temporal determinations. So it appears that the temporal characteristics are among the most fundamental in the objects of our experience. That is why we cannot find

any logically immaculate definition of 'time' or of the temporal determinations 'past', 'present' and 'future'. But whether they are fundamental or not, that is yet to be decided.

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