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THE GROWING BLOCK CAN HARDLY EXPLAIN THE EXPERIENCE OF TIME FLOW

Every physical theory works with a concept of time that is perfectly, but formally inscribed within its mathematical apparatus. The fundamental problem what is the nature of time, and of space-time, is left for a more abstract theoretical reasoning, and chiefly for philosophy (metaphysics).

From a metaphysical point of view there are two different conceptions about the nature of time. The first is a *dynamic one*, and is elaborated by different, so called A-theories of time. Usually, they seriously speak about time as flowing. This conception stays in harmony with the classical view that the physical world is three dimensional and evolves through time. However, this classical view is taken to be obsolescent against the background of the ontologies of the special and of the general theory of relativity.

The second conception of time, *the static one*, is elaborated by different, so called B-theories of time. It postulates time to be a universal dimension of a basic physical reality – the space-time. So, time ceases to be accepted as flowing. The static conception stays in harmony with the ontologies of the special and of the general theory of relativity. However, it implies the view of the *block-universe*, which is somehow reluctantly accepted by scientists and philosophers, and raises a problem of its own – why then time *is experienced* as flowing?

Against the background of the embarrassments just mentioned, a third conception about the nature of space-time has emerged – the so called *growing block theory*. It shares parts of the ontology both of the static and of the dynamic conception of time. To this effect it is expected that this theory can provide a better understanding of the nature of time. And if so, one could also expect that the growing block is in a position to explain why time is perceived by us to be flowing.

I'll try to show that unfortunately this expectation does not hold water.

According to the growing block theory, the spatio-temporal aspect of the physical world is but a growing “block” of space-time filled with material events. This means that the universe remains static regarding all its states belonging to the past, while it is intrinsically dynamic regarding all its future states.

If the physical world is accepted to be a growing block, then a natural assumption is the experience of the flowing time to be referred to the effect of the growth of the spatio-

temporal block itself. *Time flow is explained by the process of addition of new slices of reality onto the block.* The curious question then can be posed “How fast does the block grow?” I am not sure that this question has obtained a definite answer.

Let us suppose, however, that the universal block grows at some definite rate. Then this rate could be taken to be at the base of our sense of time passage. But this contention can hardly be taken to be true, neither from a psychological, nor from a physical point of view.

For one reason, human experience of time flow does not seem to be fixed. It depends on our emotional states initiated by different life conditions.

And for another reason, because of the fact that for two observers, being in relative motion to one another, an event lying into the future of the first observer can be a present event for the other one. According to the growing block theory such an event must not have a real existence for the first observer. However, the same event is taken to be quite real for the other one.

Along the line of this consideration the conclusion comes to the fore that *the concept of real existence becomes relative.* And if this conclusion is unacceptable, then one has to assume one of the horns of the following *dilemma*: either there is something wrong with the theory of the growing block, or the universal block is really growing, but its enlargement cannot explain the human sensation of time flow.

The proponents of the growing block could wish to cope with the first horn of the dilemma, and to evade the conclusion about the relativization of reality. This could solely be done through the claim that the accreting slices of reality have some well-defined thickness, allowing one and the same event to be both present for one observer, and a future one for another observer. However, this supposed thickness of the block slices would be a *purely arbitrary assumption*, in so far as it is not an empirical consequence from any affirmed theoretical principle. This is an ontological difficulty.

But even more, if one would like to relate the growing block theory with what we know about the real expansion of the universe, then one would meet two other embarrassments. The first one is the alleged non uniform way of the universal expansion, and the other is concerned with putative local variations of the expansion, dependent on the matter and energy distribution along the boundaries of the universe (while the so called “dark energy” has a constant value).

Does this mean that the experienced passage of time will undergo a parallel change as well? An objection could here be raised that this question does not presuppose a reasonable answer, since if our subjective feeling of time passage is induced directly by the universal expansion, any observation of a change of our human subjective feeling would be impossible. But even if this were true, the very posing of the question is not meaningless. It comes out then that the changing rate of the universal expansion is somehow ontologically connected with the variable speed with which the time of our experience is contended to pass. Thus one becomes bound by another unsolved (and as it seems, unsolvable) problem about the speed of time passage.

In the face of the difficulties of the growing block to explain the reason why time is perceived to be flowing, it seems reasonable the second horn of the dilemma to be embraced. So, it comes out that the growing block theory, even if taken to be an adequate account of spatio-temporal reality, is not in a position to explain the human sensation of time passage.