

IN WHAT SENSE CAN WE SAY THAT MOVEMENT PRECEDES SPACE AND TIME?

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ABSTRACT

We believe that the question of time is still not satisfactorily addressed in the various fields of thought. Without claiming to solve all the difficulties associated with it, we propose to insist on the link between time and space, as the theory of relativity invites us to do; but going further into the idea of a conceptual unity (relativity still keeps two distinct concepts, two types of instruments, rulers and clocks, and always considers in advance two sets of variables). A reflection of this kind cannot avoid a discussion on how our rationality works in building our knowledge of the world. In composition with the more usual *substantial* rationality, it is appropriate to speak of a *relational* rationality: inside the world, we can only make comparisons / oppositions (time is not space, space is not time) without being able to assign to one or the other a list of characters of its own. In this context, we are led to give to movement a primary character (beginning with showing it, before defining it with words). Space and time are derived from it: space is associated with relatively slower movements than those on which we define time. To make our point of view understood, we will use thought experiments: according to the speed scales, mountains move like the waves of the sea, space is transformed into time; or, on the contrary, the grains of sand in the hourglass are motionless like the graduations of a ruler, time is transformed into space. We will discuss the epistemological status of such a point of view (role of images; use of fiction in science, in the sense of the philosopher Hans Vaihinger, 1852-1933).

This opens numerous consequences in physics. A first list will be proposed: a look at the "speed" of light; the twins paradox; Lorentz transformation and the construction of time; relations between quantum mechanics and general relativity from the point of view of their representations of time and space; composition of non-collinear Lorentz transformations; understanding thermodynamics ... Other avenues of research emerge in humanities and social sciences (anthropology, history, linguistics, mesology, psychology...).

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