

Block-universe and indeterminacy
The Ontology of Knowledge and Relativity
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The concept of necessity is central to the Ontology of Knowledge (OK). It is important to understand its meaning in the context of this theory where reality is not subject to time.

Let us quote Einstein about the concept of space-time imposed by relativity:

-Die Physik wird aus einem Geschehen im dreidimensionalen Raum gewissermaßen ein Sein in der vierdimensionalen "Welt".

-Literal translation: Physics, instead of a "Becoming" in three-dimensional space becomes somehow a "Being" in the four-dimensional world.

-Interpreted translation: [For physics] reality is no longer a three-dimensional spatial world that becomes, i.e. where changes occur, but a four-dimensional world that is. A world without becoming, therefore immutable, where past, present and future are determined as a whole. A world where succession is only an appearance.

Note 1: The addition of [For physics] emphasizes that on the one hand Einstein deals not with reality itself but with its description by physical science and that on the other hand the split made inevitable by relativity is located between physical science and common sense.

Note 2: Words necessarily betray such a thought: Being, in common language, is situated in time: to be immutable is to be identical to oneself according to time. However, in Einstein's block universe, time does not pass and is not *a priori* distinct from the other three dimensions. Einstein's world is therefore not "immutable" but "contains the time"

Note 3: What then is the possible meaning of what language designates by determination or *causal relation*? How much room is left to *chance*, to *indeterminacy*?

Isn't Einstein's famous expression "God does not play dice" incongruous if everything is already played forever and if Human only discovers facts according to his own order of succession?

To answer this question let's imagine a version of the roulette game adapted and even going beyond the block-universe concept: consider all the possible sequences from the event (A: Alice enters the casino).

This raises a question that science too often fails to answer: "where to locate the subject?".

Is he « overhanging » this Whole, able to visualize all its contradictory alternatives or is he, like Alice, a « participant » in the Whole, subject to the Kantian principle of transcendental apperception, to the "in mundo non datur...", to the non-contradiction which allows him to know only one succession of draws?

Unless the two points of view turn out to be equivalent...

In the "overhang" hypothesis, the proliferation of possible games is extraordinary: of the order of 40^N (N number of draws) and each possible game counts as one in this sum.

In the hypothesis of "participation", since the fusion of possibilities can only take on meaning under the constraint of transcendental apperception: without leaps, without voids, without contradictions, the composition of probabilities cannot exceed 1: the simple certainty of the existing fact for the subject.

The realization of one of the possibilities in particular is negligible, almost nil.

But the rules of the game are well known and Alice's ruin is inevitable despite the infinite diversity of the games leading up to it and the tiny probability of each.

Note that the rules and devices of the game are neither in the time nor in the space of the game.

They are always and everywhere "already there" as conditions of possibility not represented in the "game" phenomenon itself.

Thus, although in the hypothesis "participation" each of the parts has a tiny probability of making sense for the subject (of appearing to him as existing), the experience : (Alice's Ruin) will make

sense with certainty (a certainty « contingent ad infinitum » according to the Leibnitzian term), to such an extent that R could be attached to A as a predicate <A is R, Alice is ruined> at the very instant she enters the casino.

Alice's ruin is a necessity although the paths that fulfill it are contingent, incalculable, random. It is a "judgment of necessity" in OK terminology.

In this reality, however, and contrary to the universe of common sense, the paths leading to Alice's ruin are not subject *a priori* to non-contradiction, they are all there, out of time, Actual as possible modes of order, but the probability of each appearing (existing for the subject) is close to impossibility. Only a singularity combining these modes of order and merging their probability will appear to the subject as R does.

This singularity is imposed by general conditions of possibility.

In the block-universe the necessity of R knowing A is no longer determined by a succession of causal relations but induced by general conditions of possibility, not subject to the time of the phenomenon. All possible paths to R given A are Actual but will not come to exist for the subject.

The block universe used by relativistic physics therefore leaves room for indeterminacy, although the exhaustive representation of the complexity it induces is impossible.

The necessity of the fact R "knowing A" is not determined by the succession of causal relations proper to the phenomenon, but induced by the general conditions of possibility which link the phenomenon to reality in general. In other words the predicate <A is R> is not intensional but only extensional.

The general conditions of possibility are outside the time and space of the phenomenon.

They integrate in a single reality, laws of the world and laws of knowledge, these like those not being considered for their *senses* but for their *reality*.

The reader familiar with the philosophy of science will understand that this vision makes the relativistic universe and the quantum universe compatible.

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Author's book:

Ref UPF : *L'Univers n'a pas la forme*
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