

**Block-universe and indeterminacy**  
**The Ontology of Knowledge and Relativity**  
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According to the Ontology of Knowledge (OK) reality is unspeakable, it is subject neither to form nor to time (see ref OK). The concepts of necessity and indeterminacy are central for the OK. It is important to understand their meaning in such a context.

Relativity offers a model of reality: The block-universe which is not "in" time but "contains" time. The same questions of necessity and indeterminacy therefore arise, but this time in the context of a model of sayable reality.

Although the operational model of relativity is not an ontological model, it is in the context of relativistic space-time that we will try to understand the place left to indeterminacy.

We will then try to transpose this understanding to the OK.

**Indeterminacy in the block universe :**

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 « forever already there » 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 is in the casino).

This raises a question that science too often fails to answer: "where to locate the knowing 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  $40^N$  (at  $N^{\text{th}}$  draw) 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 for the knowing subject 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 possible parties 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 that impose Alice's ruin as a necessity 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 R : (Alice's Ruin) will make sense with certainty (a certainty « contingent ad infinitum » according to the Leibnizian term), to such an extent that R could be attached to A as a predicate Alice is ruined <A is R> at the very instant of the experience A.

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

In this reality, however, and contrary to the universe of common sense, the paths leading from A 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 (the game rules).

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.

Generalization:

The block universe used by relativistic physics therefore leaves room for indeterminacy although the complexity it induces is not represented there.

Necessity, in its principle, must be considered as a singular mode of order of reality in general. It constitutes the stitch through which a complex universe projects itself into a logical sayable fact in a less complex space, ensuring the gradual transition between reality "in general" unfathomable, unfounded, unthinkable, interdependent and its thinkable representation by a subject.

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

In the block-universe, all possible paths to R knowing A are Actual as probabilistic expectations but will not necessarily come to Exist for the subject.

If, on one of these possible paths, the subject experiences a fact R', R' comes to Exist for the subject, it is no longer contingent but necessary, certain, and submitted to non-contradiction.

It follows that any fact R' such that R' → not-R' is impossible, its probabilistic expectation is zero.

The experience R' therefore eliminates all the paths to R which would be contradictory to it.

The law of probability of contingent paths to R knowing R' is the (extensional) meaning of R'

The "locus" of the general conditions of possibility is not the block-universe space-time. Its locus is reality in general, incommensurable with the space-time in which phenomena appear to the knowing subject.

Reality in general (unthinkable) should not be confused with the extensional meaning of the Whole of the Universe which, as we have seen above, is the law of probability over all possibilities attached to present experience.

OdC shows that the extensional meaning of the Whole of what Exists is subsumed by the necessity that imposes itself on the subject to become him(her)self and therefore that the law of probability over all possibilities merges into the certainty to become myself  $\Pr(I \text{ knowing } I) \approx 1$ .

It can be said that "the extensional meaning of the Whole of what Exists determines the conditions of possibility of the individuated fact just as much as the individuated fact participates in the meaning of the Whole of what Exists". This proposition takes on the hologrammatic principle thought by Edgar Morin about knowledge: a fact of knowledge only takes on meaning in its relation to the Whole of knowledge and the individuated meaning thus revealed contributes in turn to the meaning of the Whole. This principle also applies to complex physical systems (for example to the consistent development of living beings from a genome).

For OK, the boundaries between the physical world and the subject's conscience dissolve: The general conditions of possibility include in a single reality laws of the world and laws of knowledge\*, these like those not being considered for their seemingly irreconcilable meanings but for their inseparable reality.

*\*not the laws of knowledge considered as a good usage of consciousness but the probabilistic laws according to which the consciousness of the subject evolves.*

The necessity thus described is neither an opinion, nor a belief, nor a bet of the knowing subject, but a fact of probability: the necessity of R is induced from the knowledge of A.

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

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**Publications of the author** : available on Philpapers

Ref OdC [\*Introduction to Ontology of Knowledge\*](#)

Ref PLOC [\*The philosophy of language and the Ontology of Knowledge\*](#)

Ref TRANS [\*The Ontology of Knowledge and the transcendental\*](#)

Ref LAMG [\*The Ontology of Knowledge, logic, arithmetic, sets theory and geometry\*](#)

Ref BQOC [\*Beyond Qbism with the Ontology of Knowledge\*](#)

Ref MOND [\*The Ontology of Knowledge and the form of the world\*](#)

Ref LOGEX [\*From logical to Existing\*](#)

Ref SOLI [\*Is Ontology of Knowledge a solipsism ?\*](#)

Ref CNT [\*A natural concept of time\*](#)

**Author's book:**

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

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