A natural concept of time (issue 20200403)
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In the following lines is outlined the concept of time according to the Ontology of Knowledge (OK)

introduction:
"The earth revolved around the sun long before man and all conscious beings appeared on its surface." Yes really, how could I imagine otherwise?
The problem is, "How could I imagine?"
The difficulty is indeed twofold: 1) Whenever we represent the world without us, we are in fact at the very centre of this representation and 2) Nothing can be said of the world that is not previously submitted to the laws of meaning.
Not only can the knowing subject in no way escape from his representation of the world, but he has no concept of representation that is not subject to the prior laws of the formation of meaning.
As a result, the proposition : "reality has form" is no more provable than the Euclidian postulate of parallels.
We will not rehearse the idea that time and space are "something" in which reality would bathe, something "in addition" to reality.
Time and space cannot be prerequisites for reality and are therefore subject to the constraints mentioned:
1) the necessary presence of the subject at the centre of any representation,
2) the precedence of the laws of formation of meaning over meaning and therefore over form.

The Ontology of Knowledge (OdC) does not claim to make possible what is impossible by describing the formless.
The OdC proposes an ontological model that reflects these two constraints.

Since tabula rasa is impossible for us, the OdC proposes to choose Interdependence as the primary "substance" of reality.
The reasons for this choice are given in ref OdC.
A simple heuristic model is proposed in Appendix I hereafter. Its discreet form has no scientific value. The reader will, I hope, find in there the useful elements to appreciate the overall coherence of the following paragraphs

The reality is Interdependence:
Interdependence is the only "substance" of reality.
Part of the reality is interdependent of another part in that it contributes to its reality and vice versa.
The reality is unfounded: there are no beings but only infinitely divisible parts that are interdependent.
The concept of "part" is specified in Appendix I.
There is nothing but reality: no prior repository against which parties could be ordained or qualified.

The meaning:
Without an ordained space, the notion of disorder makes no sense since there is no reference to describe a disorder.
However, one can name order the logical web derived from a part and ordered according to the interdependence relationships.
Reality presents an infinite number of infinite possibilities of such orders.
A Knowledge is such an orderly web derived from a part called "point of view."
Knowing a partial web, an infinite number of extensions are possible according to the interdependence links but not all extensions are equiprobable.
Reality is not subject to time, all possible are actually real, they are In-act.

Meaning is the complex law of probability that binds a Knowledge to its possible extensions in its interdependent neighbourhood.
Reality is not affected by knowledge or meaning. Knowledge is only one way to explore reality.
Meaning is not the attribute of a state of knowledge but the law of action that animates and directs its expansion.

The Individuation:
The meaning of knowledge is subject to two contradictory principles:
1) If knowledge is such that each of its parts makes possible at least $1+\varepsilon$ 'other parts', the meaning of that knowledge tends towards complexity (its entropy grows infinitely).
In fact, if at rank 1 a beam presents $1+\varepsilon$ possible, at the n-rank it presents $(1+\varepsilon)^n$ possible.
The entropy that qualifies the abounding of the beam can be written at the n rank:
$E = K.\ln(1+\varepsilon)^n = K.n.\ln(1+\varepsilon)$

2) If a knowledge is complex, it has cuts that reduce its complexity (see ref OdC).
Indeed, without an orderly space, the probability of "loops" of interdependence increases with the complexity of the web. A "loop" of interdependence reduces the degrees of freedom available along a "surface" called a cut.
Such a cut then delineates a less complex part that can re-associate with other parts to reveal new cuts reducing again complexity.
This process of "clusterring" the meaning only ceases when the web tends towards an asymptote such that each part makes possible only one part such as $P_i \rightarrow P_{i+1} \rightarrow P_{i+2}$ ...
Complexity is metastable, it collapses by successive cuts to an asymptotic path presenting one only degree of freedom called Individuation. Then the entropy that qualifies the abounding tends towards zero.
There are infinity of infinities of possible solutions to this collapse.
The existence of cuts that reduce complexity is the very condition of the world's representability
The existence of a knowing subject is one of the possible solutions.
The existence of the subject is Individuation of meaning.
Neither existence, nor Individuation, nor meaning affect reality.

The "I":
The subject is not a being to whom it happens to know, he is a knowledge whose individuation of meaning is the necessary mode.
It does not happen to the knowledge of the subject to have meaning, to exist is to get meaning.
It does not happen to the meaning to individuate in a subject, the subject is the individuation of meaning.
The "I" is the virtual asymptote of the individuation of meaning.
The "I" is an ideal one-dimensional path with zero entropy.
The meaning of the "I" is $\Pr(\ll I\gg | \ll I\gg) = 1$ with « I » ≠ « I ».
"I" is not a being but a bond of interdependence, a vector, an act, a certainty.
The subject's time is carried by this vector.
Time is a change of meaning along the axis of the subject's individuation, the Becoming myself.
However, the subject's time does not change anything to the reality.

The anima :
    The meaning of the "I" is $\Pr(\ll I\gg | \ll I\gg) = 1$
    I am nothing but the representation , i.e. the meaning, of the world and myself as they appear to me, with the "I" as focal point
    The world and myself only get meaning through a probability relationship between a meaning com-prehended and a meaning non com-prehended.
    The meaning is an Act. Without the Act of giving Meaning, there is no Meaning.
    This relationship is subsummed by my Becoming, by this monodimensionnal $\Pr(\ll I\gg | \ll I\gg) = 1$

but its in depth reality is the Individuation of an extraordinary bundle of interdependancies. It is therefore not an external time that animate my representation but the very nature of Meaning as probability of a non com-prehended nowing what is com-prehended Desppite terms like "I, Meaning, com-prehend, knowing" the **Anima** how nothing to subject's understanding or psychology, it is pure logic.

The facts of the world:
Because we are Individuation of knowledge, because it is the very nature of our being-in-the-world, only the facts that participate in his existence can make sense for the subject.
The facts of the world exist for the subject only according to their participation in his individuation.
The meaning of a fact F is identified with $Pr(«I»|F)$
For the subject, the fusion of the meaning of all facts ($\cup$ Fi) is subsumed by its individuation:

$$Pr(«I»|(\cup Fi)) = Pr(«I»|«I») = 1 << \Sigma_i Pr(«I»|(Fi))$$

The probability resulting from the merging of the meaning of the facts is much less than the sum of probabilities resulting from the independent facts.
The facts of his knowledge thus form for the subject a whole made globally interdependent by the constraint of individualization.
A fact of knowledge makes sense for the subject only on the basis of a perspective, a context constrained by the individuation of all his knowledge.
Our representation of reality grains towards the specific low entropy states (i.e. with a minimum number of degrees of freedom) that are the objects of the world.
This structure of graining/merger of probabilities is the meaning of the representation of the world by the subject.
This perspective projects on the time of the subject his representation of the world and of himself.
The representation of the world by the subject is orthogonal to the time of the subject.
Individuation is an asymptote never reached.
Since zero entropy cannot be achieved, the graining of our representation leaves a residue of which one aspect is space, offering three additional degrees of freedom to the objects of the world to exist.
Although the subject's representation of the world is constantly changing, nothing changes of reality.

Conclusion:
So there is not a "world" with a form that our science would attempt to represent.
Nor is there a space-time in which reality would "float."
There is only reality: formless, unfounded, interdependent.
Every part of reality is the origin of webs of interdependence.
The exponential complexity of these webs collapses in a necessary way, by individuation towards a single-dimensional asymptote.
The existence of the subject is a representation: this representation takes on the meaning of a world and of the subject itself as a physical and psychic being and as a becoming carried by the single-dimensional asymptote of one's individuation.
The vector that carries the individuated becoming of the subject is also the time of the world he represents.
The laws that bind the "things" of the world of representation to the time of the subject emerge from the laws of the meaning by which knowledge is animated and individuated.

Some will reject this model arguing the obvious that the physical world would be "the existing", the "hardware" with rigid and consistent laws while consciousness would be "software" with rules by nature inconsistent.
This idea is wrong. It is not supported by experience or reflection.
Poincaré showed us that, when it comes to large numbers of interactions, the laws of the physical world, whether elementary and deterministic, are no more rigid than the laws of chaos, whereas the

process of formation of meaning, the Logos perpetuates the Individuation of representations with extraordinary persistence, through billions of billions of random interactions.
The laws of Logos are infinitely more consistant as the (supposed) physical laws of the world.

Appendix I
A simple heuristic model

Imagine a purely logical Reality (logic is not subject to time, let's say it is In-act).
To model this Reality let's create two heuristic concepts: the element and the interdependence.
If two elements of Reality A and B are interdependent, the reality of A depends on the reality of B and vice versa. A $\leftrightarrow$ B
This interdependence is In-act.
This link applies only to the instanciated relationship between the individual elements A and B.
The sign does not introduce a condition "if A then B" but the Interdependence "A because B and vice versa" that one could also write $Pr(A|B) \neq 0$ and $Pr(B|A) \neq 0$
Let's also consider other interdependencies B $\leftrightarrow$ C, C $\leftrightarrow$ D, C $\leftrightarrow$ E, etc....
We will then be able to build a web from A (which then plays the role of **Point of View**) by adding, from near to near, the interdependent elements. At the nth addition, this web will naturally constitute a part of Reality.
We will name Knowledge such a web from A.
Knowledge is a web of Interdependencies stamming from a Viewpoint

Abundance: This new heuristic concept means that one element is statistically interdependent with $2+\varepsilon$ other elements. It can also be said that the web has $1+\varepsilon$ degrees of freedom.

Foisonnement nul

Foisonnement non nul
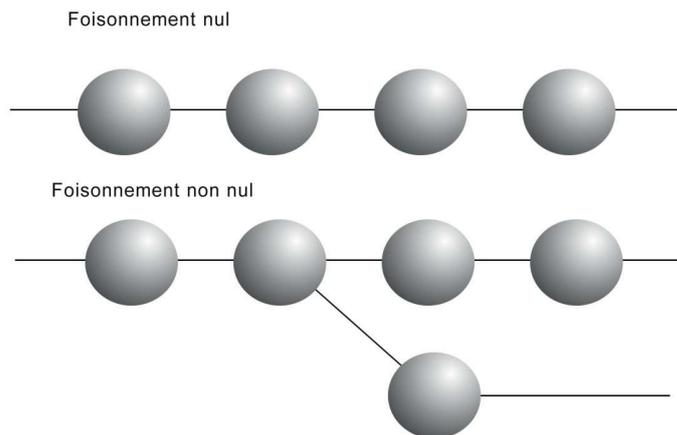
If the abundance is not zero, as soon as the number of interdependencies is high, not only the power of the network stamming from A but also its complexity become infinite: the network of elements and interdependencies stamming from A exceeds any possibility of cut because at the nth divergence the neighbourhood (the interface) of the Knowledge contains $(1+\varepsilon)^n$ elements.
To "cut" the Knowledge issued from A from the rest of Reality it would then take a cut of infinite dimension because: $\forall N>1$, when $n \rightarrow +\infty$, $(1+\varepsilon)^n / n^N \rightarrow \infty$.
The E entropy of the network grows as the logarithm of the number of its branches.
$E \rightarrow +\infty$
Should we think that Reality would be unsplitable in parts, not cuttable?
In fact, no, a principle of aggregation tends to reduce the complexity of the Knowledge.

The loop:
In the simple case of zero abundance, if the chain A $\leftrightarrow$ B $\leftrightarrow$ C $\leftrightarrow$ D $\leftrightarrow$ ... closes on A in such a way that A $\leftrightarrow$ B $\leftrightarrow$ C $\leftrightarrow$ D $\leftrightarrow$ ..... $\leftrightarrow$ A , this chain forms a loop.
In the general case of a non-zero abundance, the network of interdependence links closes globally on itself (in a woolball could be said).
In absolute terms, the loop would be totally cut off from Reality, constituting a part in itself, independent of Reality, a self-created element.

In the general case we will say that the generalized loop of Interdependencies is a statistically singular configuration, with a minimum neighbourhood, a number of links with Reality lower than the N mentioned above, i.e. constituting a part of Reality by a cut to N dimensions or, using the definitions of Poincaré, representable in a space with N+1 dimensions.

Let us now assume that the probability of loops in a Knowledge increases and tends towards 1 when complexity increases.
In a Knowledge stamming from A, a non-zero abundance leads to complexity and therefore necessarily to the existence of loops, constituting "new elements", presenting a minimum neighbourhood.
This aggregation of Knowledge applies ad libitum, as long as the complexity is not "exhausted", i.e. until the abundance tends to zero, without ever being able to reach it since the complexity then exhausts, the probability of loops tends to diseaper.
This asymptot with a zero abundance, with a single branch would correspond to a zero entropy.
This principle results in an asymptotic balance between the expansion and aggregation of Knowledge derived from A, such as the abundance tends aymptotically towards zero.
As it absorbs its logical neighbourhood, the Knowledge issued from A is aggregated into elements. It has possible cut surfaces of finite dimension.
At the aymptote ($\varepsilon=0$) the aggregation is the Individuation of Knowledge.
Such as A $\leftrightarrow$A$\leftrightarrow$A$\leftrightarrow$A
It should be noted that this aymptotic balance is inherently necessary (because $\varepsilon\rightarrow0$ is the necessary asymptote) although infinetely contingent (because ε must remain > 0, providing indefinitely possibilities of divergences) .
It does not require any prior law or ad-hoc constant.
The principle described above is a sufficient cause.
We will name this principle the Logos

Note that the viewPoint A, is not the true origin of Knowledge for it is itself a loop, a compound part, its components being themselves compound and so on. The decomposition of A can be repeated infinitely.
-A Knowledge is unfounded, unfounded, without a primary element.

It follows that, in our heuristic model, the notion of element can be abandoned, replaced by a singular (cuttable) configuration of Interdependencies that plays the role of "part" in our model.
If elements A and B are unfounded, the A$\leftrightarrow$B link loses its foundation at the same time. It must be replaced with the Interdependence between "The Multiplicity of A" and the "Multiplicity of B."
- The Interdependence link is unfounded.

Switching to probabilities:
We can then use Kolmogorov's philosophy of probabilities and generalize it.
The reality in this case would consist of a set of events that have occured (events are themselves interdependent and unfounded sets of events that have occured) which the subject would gradually become aware of.
The logical link A$\leftrightarrow$B can be replaced by a probabilistic link $Pr(A|B) \neq 0$ and $Pr(B|A) \neq 0$
The complex reality of this link runs through the unfounded realities of A and B.
The subject's knowledge of A's constitution makes it likely that B's constitution will be experienced (keeping in mind that A and B are states of knowledge of the subject).
For the subject, the unfounded complexity of A is ultimately replaced by $Pr(B|A)$.
This is in fact the result of a succession of judgments that each time replace an aspect of complexity with a probability.

By generalizing it can be said, in quantum terms, that the unfounded reality of A presents itself to B as a state vector representable in a state space (of finite dimension N+1)

NB: The state space depends on the overall structure of the subject's Knowledge. We will not develop this point here.

The N-dimensional cut that delimits Element A (for B) is the place of an Act, a judgment by which the unfounded complexity of A collapses into a countable set of probabilities Pr (Bj|Ai), $1<i<N$. This Act, this projection, carries an additional dimension "orthogonal" to the cut, which completes the representation space according to B (size N+1).

This is what the figure below is trying to show.
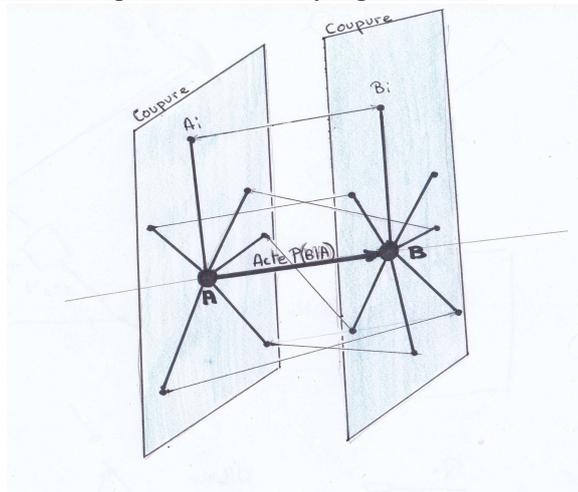
The Act by which the complexity of A is replaced by a state vector can be characterized as a judgment, in the sense that A being unfounded the state vector cannot be calculated exactly. However, this judgment is not psychological, it is a necessary result of the reality of A.

A simple example of such a judgment would be: "If I am at the casino in front of a roulette game with a sum of money (1), then I entered it with money (2) and I will end up without money (3)". Only the proposal (1) being established by its statement, the proposals (2) and (3) are necessary truths, although unprovable, they are judgments.

It should also be noted that Pr (B|A) is not a bet, neither on the possibility of B knowing A nor on A as a possible cause of B.

Since all events have occurred, probabilities result from Actual interdependencies that themselves result from deeper and more complex Actual interdependencies, etc.

Ignorance by the subject of these interdependencies does not affect their reality.

Everything that makes B is real long before it makes sense, long before it exists for the subject.

The present moment

Common sense distinguishes two sorts of facts of knowledge:

The experience of a fact of the physical world which the subject would become aware of through sensations.

The thought experience by which Facts of Knowledge come to appear and make sense for consciousness.

For common sense, the facts of the physical world (classical physics) occur according to the time of the physical world, regardless of the moment when the consciousness of the subject becomes aware of it.

The Facts of Knowledge are, however, logical facts and are not subject to the same time:

-a theorem that has not yet been demonstrated is already true,

-the result of a calculation that we have not yet made is already in the operation laid,

-a memory that is not present in mind is already a reality,

-to which time are subjected the facts of our dreams ?

Knowledge brings to the consciousness the Facts of Knowledge according to its own tempo. Some want to consider the facts of thought as electrochemical phenomena and consequently report the tempo of Facts of Knowledge to the tempo of the facts of the world.

This is illusion: There is nothing to link the representation to a material state of the subject, because the material state is itself a representation.

It is easy to show that the present moment of the world as Alice's thought gives it meaning, cannot in any way be included in a present physical reality of Alice's thought, associated with a present state of Alice's brain.

It would be futile to reject this evidence on the pretext that we do not know how thought works. We already know that it is impossible to make sense in the present world of the present state of a few billion physical elements.

When I represent a "world without me or before me," I nevertheless remain the sine qua non condition and the focal point of this representation of the "world without me or before me".

If there is a past and a future represented, representation does not actually have a past and a future, the reality of representation is not in time.

A present moment of knowledge is not the present state of something physical.

The present moment of knowledge, even if it is limited to its conscious part, is not "something", nor is it "the state of something."

The meaning of a Fact of Knowledge is not "the present state of something."

Yet common sense too often overlooks this evidence:

==Exemple :== If Alice becomes aware of a physical fact F at the time T_a by the Fact of Knowledge F_a and Bob at the time $T_b > T_a$ by the Fact F_b, common sense will simply say that F occurred in a time $T_0 < T_a < T_b$ and that propagation time to Alice $(T_a - T_0)$ was shorter than propagation time to Bob $(T_b - T_0)$. No one will care about the impact of the F_a experiences of Alice and F_b experience of Bob on their own time.

Yet if F_a (resp. F_b) was the only 'chronological" experience of Alice (resp. Bob), i.e. the only mean for them to adjust their own time to a "time of the world" then the instant of F as lived by Alice and Bob would be the common instant of their chronologies with $T_a = T_b = T_0$.

Why then do Alice and Bob share an "universal time" in which $T_a < T_b$?

An explanation for this paradox is provided by M.Bitbol (ref MQIP p112 113) who, referring to Goodman and Wittgenstein writes: "... *a probabilistic estimate at first glance offers great resistance to its possible experimental rebuttal. It would even be fair to say that it is irrefutable*

law by the only finished experience.... If the probabilistic assessment is based on solid reasons, if the renunciation of these reasons leads with it the fall of a pan of too broad and too well validated knowledge, the finding of a frequency that deviates from the projected value will not be enough to refute the latter. Many more experiments will have to be done, many more discrepancies will have to arise before the possibility of replacing the projection system from which probabilities derive is simply considered. »

It is understandable from this quotation that the integration of the "chronological" experiences of Alice and Bob in their respective times is a statistical process and that the apparent rigidity of the "time frame" common to Alice and Bob results indeed of the extraordinary amount of common experiences that synchronize their individual times and influence the perpectives according to which the Fa and Fb experiences will get Meaning

The unique experience of F is not enough to change Alice's and Bob's perspectives and impose Ta=Tb

On the opposite, it is the inequality of Ta and Tb that imposes Fb to be a different event than Fa.

This example also highlights that the moment Ta of the Fa Fact of Sensation experienced by Alice is not fixed by the present moment T of fact F in the world, but by the way Fa is merged with all the other Facts of Alice's Knowledge to finally lead to the semantic (and necessarily present) unity of the knowing subject.

<div align="center">
Annexe III
Carlo Rovelli (ref FTCR)
The thermal time hypothesis.
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extrait de l'essai de Carlo Rovelli :
*In nature, there is no preferred physical time variable t. There are no equilibrium states ρ0
preferred a priori. Rather, all variables are equivalent; we can find the system in an arbitrary state
ρ; if the system is in a state ρ, then a preferred variable is singled out by the state of the system.
This variable is what we call time.*
*In other words, it is the statistical state that determines which variable is physical time, and not any
a priori hypothetical "flow" that drives the system to a preferred statistical state. When we say that
a certain variable is "the time", we are not making a statement concerning the fundamental
mechanical structure of reality. Rather, we are making a statement about the statistical distribution
we use to describe the macroscopic properties of the system that we describe macroscopically. The
"thermal time hypothesis" is the idea that what we call "time" is the thermal time of the statistical
state in which the world happens to be, when described in terms of the macroscopic parameters we
have chosen.*
...
Time is, that is to say, the expression of our ignorance of the full microstate.

One should note that this text from Carlo Rovelli doesn't tell us about the world as a system since
nothing can be said about the world,but it tells us about the representation of the world by a subject.
This remark is enough to lead us to the concept of time as per Ontology of Knowledges.
Then the end quote becomes :
*The "OK time hypothesis" is the idea that what we call "time" is the thermal time of the
interdependant system which builds up the representation of the world by an individuated subject.*
...
Time is, that is to say, the axis of our existence as individuated knowledge.

One could eventually add :
*The time of a subject is an asymptotic line, in the interdependant system that 'Reality' is, on which
'entropy tends towards zero'*

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Références :

Ref MQIP   *Mécanique Quantique, une introduction philosophique*
              Michel Bitbol
              Ed. Champs Flammarion 1999
Ref FTCR   *"Forget time"* Essay written for the FQXi contest on the Nature of Time
              Carlo Rovelli
              https://arxiv.org/pdf/0903.3832.pdf

Other publications by the author :
Ref OK: **Introduction to the Ontology of Knowledge**
              Jean-Louis Boucon.
              Article published on Philpapers
Ref PLOC: **The philosophy of language and the Ontology of Knowledge**
              Jean-Louis Boucon.
              Article published on Philpapers
Ref LAEG   **The Ontology of Knowledge, logic, arithmetics, set theory and geometry**
              Jean-Louis Boucon
              Article published onPhilpapers
Ref BQOC   **Beyond QBism with the Ontology of Knowledge**
              Jean-Louis Boucon
              Article published on Philpapers
Ref MOND   **The Ontology of Knowledge and the form of the world**
              Jean-Louis Boucon,
              Article published on Academia.edu
Ref FOUND   Th*e concept of Foundation and the Ontology of Knowledge*
              Jean-Louis Boucon,
              Article published on Philpapers
Ref SOLI   **The Ontology of Knowledge is it a solipsism ?**
              Jean-Louis Boucon
              Article published on Philpapers
Ref UPF :   **L'Univers n'a pas la forme**
              Jean-Louis Boucon
              Ed. Mon petit éditeur 2013