

Ontology of Knowledge and the form of the world

Jean-Louis Boucon

In this article, we will try to illustrate how, according to the Ontology of Knowledge (OK), reality appears to the subject in the form of objects « in becoming » in a four-dimensional space whose time of the subject (his becoming) would be a privileged dimension.

For the OK, reality is formless and it is the subject that gives it shape. Every knowing subject, is a representation of the world, one among infinity of infinities of solutions to the Logos, a transcendent principle by which the complexity of logical interdependence, the amorphous "substance" of reality, is metastably and necessarily aggregated into singularities bounded by cuts, through which meaning appears to the subject.

As an introduction, a first chapter will lead us from pure coincidence to the space of possibles and appearance of the form.

The process will then include four steps:

- with Husserl: from proper and improper to multiplicities
- with Poincaré: from isomorphism to morphogenesis,
from understanding to the subject's perspective
the fusion of Acting, Giving-Sense and Becoming
- with Russell and Poincaré: Quantity, divisibility, continuity, cut
- with Hahn and Gonsseth:
the idoneity of four-dimensional space-time
the subject as one of the possible meanings of reality

The aim is not to reconstruct a two-century history of the notion of space-time, nor to "show false" the analysis of these authors. We only want to use their concepts to illustrate the OK, both by evoking similarities and differences. It may therefore be that certain aspects of the thought of the philosophers mentioned are not presented or presented in a questionable way. We assume that.

NB: Rather than proposing one more analysis of the authors in question, we will quote (sometimes by large excerpts) modern articles that seem clear and adapted to the subject.

Of course, we will give credit to the authors.

Compared to issue 20200505, an introduction was added

Compared to issue 20200313, this issue has appendix III

Introduction : « From pure Coincidence to the space of possibilities and appearance of the form ».

If with two dice Alice rolls a double six she will think it is a "pure coincidence"

Let us first specify that, just as there is no truth in itself, apart from the experience that one can have of it, there is no probability in itself, beyond its measure by an agent, ie according to the meaning that the agent gives it.

Giving meaning to an experience implies for the agent an extraordinary bundle of interdependencies with reality: if, for example, in Alice's mind six points made no difference from one point: the experience would not make sense for her, if the history of Alice's world meant that she was not in the presence of the dice: the experience would not have meaning for her. There would be no coincidence.

Alice's double six and its probability don't make sense in the world per se, but in Alice's world. The conditions of possibility of Alice's experience are not fulfilled in the world per se but in Alice's world. These conditions of possibility are fulfilled at the cost of other more or less probable coincidences, the effectiveness of which only takes on meaning through the experience or experiences that Alice makes of them.

The coincidence of the two sixes of Alice's throw is therefore far from pure, it is in fact prepared, ie made possible by all the singular coincidences which contribute to the representation by Alice of

her world and of herself.

A hypothetical pure coincidence would be one that no other coincidence would have made possible. The probability of $1/36^{\text{th}}$ of a double six is actually extraordinarily high compared to pure coincidence. A coincidence that nothing prepares, a pure coincidence, borders on the impossible. It can even be argued that it is impossible to experience pure coincidence.

An actual impossible, an actual pure coincidence is therefore meaningless, a nonsense.

If the double six can exist for Alice, it is precisely because this coincidence is not pure: In the logical structure which binds Alice to everything which, as closely and as far as one wishes, participates in her representation of the world (what the OdC calls her Knowledge *), there is a set of attractors, of singularities which make the experience of a throw appear to Alice in a finite, countable space of 6 possibilities.

* The definition given by the OdC to Knowledge is different from that common sense gives to it : Knowledge according to the OdC is everything to what and by which formless reality takes on meaning in a subject. It is not contained either in the material envelope or in the mind of the subject. It is an abundant logical path that is not subject to time or space. It is relative to the subject which is its focal point. The Existence of the subject is the ultimate meaning, the highest order mode, of this path of logical interdependencies which link him to reality (Schopenhauer would say: *causal activity*). The material world, the body and the mind of the subject are only categories of the meaning that Knowledge takes in the subject. Knowledge transcends (logically precedes) the subject.

This exponentially proliferating path is structured in singularities according to order modes. This structure of singularities imposes the meaning that Alice gives to her Knowledge. One of the singularities appears to Alice as the necessity for the throw to have a unique result. This unique result is a necessary attractor and the path that links Alice to this attractor is itself structured into 6 individuated contingent paths.

These singularities make possible not the issue of the throw but the experience by Alice of the issue. Without singularities, the logical path from Alice's "I" into reality would be lost in an exponential proliferation of equally probable paths, each of which would have a probability of being traveled on in the order of $1/e^{\infty}$. Without singularities, Alice's Knowledge would be nonsense.

A very simple example illustrates this: A flash of light produced by a 1mW power LED for 0.1 second produces approx. 10^{-4} J. or 10^{14} photons. We can say that the perception of a single photon by Bob is of negligible probability. It is therefore necessary that the proliferation of interdependencies which link his conscious perception to the (supposed) reality of the flash presents the singularities which will individuate this flow of 10^{14} photons and make its perception "possible", ie of significant probability.

These singularities "affect" the logical structure of Alice's Knowledge as a whole and not simply what common sense would designate as "the launch event".

Their "logical truth" is neither linked to time nor to the materiality of the "launch event".

The perception of the LED flash has the "sense of sight" for a condition of possibility. This one is an extraordinary complex of interdependencies which goes back; over millions of years to the evolution of living things; over years to the learning of vision by Bob; over days to Bob's perception metabolism; over seconds to Bob attention focusing on the LED; over 0.1 second to the process of integrating the effects of photons flux; over milliseconds to the logical combinations that give it meaning in Bob's present world. All these interdependencies are, for their part, a condition of perception and their singularities are made present by the perception of the light flash. To claim that "sense of sight" is already present and certain as such, independently of perception, arises from circular reasoning because it is by perceiving that we create the present and the certainty of perception.

It is from all this complex of interdependencies and by its singularities that the meaning of the LED flash emerges for Bob among all its representations.

Experience and its conditions of possibility are only one reality *a priori*, only meaning distinguishes

them *a posteriori*. The logical conditions which determine these singularities are *stricto sensu* the conditions of possibility of an experience by Alice. Because of these singularities, a result of her throw makes sense as a necessity for Alice in a space with 6 possible values, each of probability $1/6$.

If now Alice throws a ball instead of a dice. For the same reasons, a result will necessarily make sense to her in a two-dimensional (x, y) space with continuous values. These are no longer 6 contingent paths that lead to the necessity of the result but a two-dimensional space with continuous values. The probability of a given result $\{x, y\}$ may seem infinitely small to us, it is nevertheless infinitely greater than the impossibility. We can define a density of probability of $1/4\pi$ by dividing the certainty ($P = 1$) of a result by 4π steradians.

If now Alice spins a disk, a result will necessarily make sense to her in the form of an angular position in a continuous-valued one-dimensional space where the density of probability would be $1/2\pi$.

The fact that these examples bring into play events of the physical world could make us doubt the purely logical character of the conditions of possibility, but these logico-material examples could be replaced by purely logical, immaterial "rules": We could for example construct a similar reasoning by having Alice and Bob play "rock-well-leaf-chisel".

In these examples, the space of possibilities is logically included in an *a priori* necessity, the total of the probabilities cannot exceed the certainty implied by this necessity. Thus, in the example of the disc, although the outcomes are in infinite number, the sum of their probabilities is *a priori* limited to 1. This results in an actual relation between the probability "lived" by Alice * and the share of this issue in the space of possibilities (* not by the sensitivity, the understanding or the spirit of Alice but in Alice as a logical subject).

So, if Alice draws a sector on the disk and spins it a few thousand times, the probability that the index points to the inside of the sector is also the measure (in Lebesgue's sense) of its angle. An actual probability is the meaning of a measure. Alice's actual experience (ie her Knowledge according to the OdC) is taking form.

An evidence then appears to us: When a contingent fact participates (for a subject) in a necessity, the effective probability of its occurrence is a measure, the measure of its importance in the sense of Whitehead (ref OdC) relative to a Whole.

The space of the possible of a necessity is, in itself, provided with a measure.

Note that the measure is only valid for the Facts which contribute to this necessity. Measurement is only valid "within" necessity. Considered from "the outside", this necessity will appear as a contingent fact contributing in turn to a necessity of a higher degree provided with its own measure.

Necessity results, not from an intrinsic nature of the contingent facts themselves, but from the conditions of their possibility. These general conditions, whose singularities make the existence of Facts possible for the subject, constitute, beyond the horizon of meaning, an interdependence between the Facts themselves. Although the Facts appear disjoint in their extensional parts (in their logical relations as the subject represents them), their intensional parts (beyond the speakable) have common elements. This common intentional part, not subject to form, time and space, is the real cement of a necessity which logically transcends instantiated Facts.

At the highest level, the Knowledge of the subject is logically contained in the necessity of his Individuation. The forms, the meaning that his Knowledge takes for the subject are in truth the labels associated with actual probabilities in a structure of necessities and contingencies, in the subject.

The actual probability of a Fact of Knowledge in the subject is its form.

In the generic description of the world by common sense, in the synthesis of reality from primary facts, from atomic logical elements, the meaning of the world is still today an aporia.

On the contrary, we see that a description breaking down the subject's necessity for Individuation into contingent modalities carries with it its own meaning, without the need to refer to other principles, to a hypothetical form in itself or to the mysteries of the Spirit.

The necessity of his Individuation is, for the subject, the first principle of meaning.

Corollary:

The contingent forms that the world takes for the subject are relative to the necessity of his Existence.

The concept of "Conditions of possibility" therefore takes on a particular meaning: the conditions of possibility should no longer be considered as "external" to the event. They are Alice's perspective on her Knowledge through which the result comes to Exist for Alice, they create for Alice the sense of the event in the sense of the world.

In the same Act, the conditions of possibility of an experience make Exist a Fact and its space of possibilities.

These conditions of possibility are by definition part of Alice's reality. The reality of Alice is all the logical interdependencies that are linked to her, it is her Knowledge in the sense of the OdC, not only the speakable, present part but everything that is logically linked to the "I" of Alice including the unspeakable and timeless part, beyond the horizon of meaning.

NB: Knowledge of Alice is not "all of reality" but only the subset of reality interdependent on her "I". Alice's world is not The World but only the meaning of her Knowledge. Only what is interdependent on Alice can be a condition of her experience, of her representation.

To the Knowledge of Alice, for example, it is necessary to include the infinite bundle of interdependencies which will finally make the dice, its material, its form and its meaning appear for Alice. The dice that Alice throws is not an object of universal reality but an object of Alice's world. This dice is not in a universal space-time but in the space-time which associates the facts of the world of Alice.

There is not, on the one hand experience and on the other, conditions of possibility as a "place" and "precondition" of experience, but only one logical path: Knowledge of the subject which, through its singularities, makes Exist both a logical Fact with measurable probability and the space of its possibilities.

An attractor as a singularity can be described as the necessity which logically subsumes a set of contingencies. It is also the space which merges the spaces of probability of the contingencies which construct it. We can say that the necessity (... of the result of a throw) is the label (the signifier) of the class of contingencies which construct it {1,2,3,4,5,6} (the signified, the substance) and the space which contains them (the mode of order of the signified, the form). The substance and the form.

For the subject, his own Existence, the persistent experience of his "I", is necessity: it is the necessity of his Individuation, the transcendent principle of his own Existence. This necessity subsumes all the contingencies which participate in it, all the Knowledge of the subject. The need for the "I" clearly delimits the space of possibilities for the subject. "I" is the label (the signifier) of the class of contingent Facts which contribute to fulfill the necessity of my Existence for myself (the signified) but also of the way in which they are organized (space). In this class, Facts of the world appear to me insofar as they contribute in a not insignificant way to the necessity of my Individuation.

"I am, I exist" logically implies the world and the space of possibilities of my representation. There are therefore not the Facts of the world, intelligible to the subject in a prior space-time, but only the Knowledge of the subject whose structural singularities make Exist, that is to say, make possible Facts in spaces of possibility. The facts of the world in the Universe.

The conditions of possibility which impose the 6 attractors of the dice roll, i.e. determine the outcomes of the experience and the space of possibilities, do not appear as such in Alice's representation of the launch-event. Alice represents a roll in progress, as if the probability of 1/6 were an individuated, speakable attribute of each issue. The extraordinary constraint which applies to the representation of Alice and transforms the meaningless pure coincidence into a necessity to which only 6 speakable contingent paths contribute; This constraint which we call: conditions of

possibility, does not appear to Alice as part of her experience. Yet we have seen that it is the substantial and formal cause of it.

Unlike the throw as an event that seems to take place in Alice's time, the conditions of possibility of her experience are not located in her time. Alice does not know when the dice was designed or made, she does not know when living beings agreed and when she herself understood that six dots represented something different than one dot etc ...

One could conceive of a variant of the experiment where Alice chooses 2 dice at random from among a billion dice already thrown there on a table. The probability of choosing a double six would be unchanged because the conditions of possibility of the experiment would be essentially unchanged. According to this modality, however, the relation between conditions of possibility and time of experiment would disappear.

When the outcomes of a series of experiments E are distributed over R according to a normal distribution law, the space of values of the outcomes is continuous. The probability of an outcome with exactly a given x value is "infinitely small", yet no value x can be said impossible. This probability (of the order of $1/\infty$) is incomparable to that of an impossibility (which would be of the order of $1/e^\infty$). A probability density function can be defined.

A normal distribution is justified by the assumption that "experiences" have "many and independent" causes. These causes are supposed *a priori* to be possible (of non-negligible probability in spaces of possibility with finite dimensions). It is indeed these *a priori* conditions of possibility, with no relation to the time and place of the E experiments, which allow the outcomes of E to exist according to a law of probability always positive in a one-dimensional probability space. We see here again that the conditions of possibility impose *a priori* the logical space of possibilities of the E series. The experiments of the E series are interdependent in their intensional realities for the very reason that they can exist for the subject.

The question then arises of the possibility of meaning, of the actual Existence of infinite outcomes or infinitely close outcomes.

Finally, let us note that for Alice to become aware of the issue of an experiment, the representation of her Knowledge shall extend and include the conditions of necessity of a result. These conditions of necessity determine the space in which the result is represented. One of the issues passes from the status of "contingent" to the status of "Existing", that is to say necessary and present. The others are then nonsense because as soon as one of the contingent issue is revealed as Existing, ie its probability = 1, the Existence of the others is nonsense

1-From proper and improper to multiplicity:

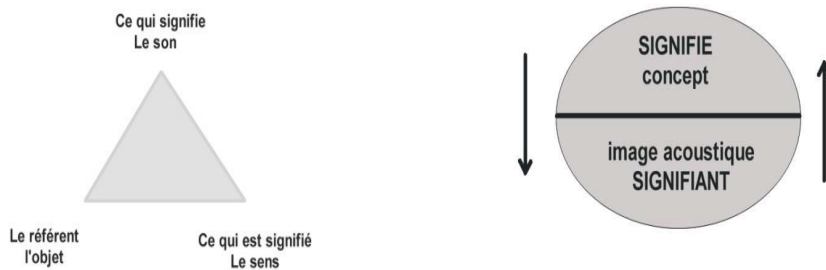
Husserl's journey towards the theory of multiplicities must be paralleled by his path to phenomenology.

The influence of the mathematicians Kronecker and Weierstrass cannot be isolated from that of the philosopher Brentano, the question of the essence of numbers cannot be isolated from that of objective representations.

Before following Husserl's way to multiplicities, we need to clarify a point of vocabulary concerning the concepts of intentionality and intensionality. Indeed, in his dual journey as a philosopher and mathematician, Husserl was confronted with these two different notions:

- For Brentano, philosopher of thought, who was Husserl's master, the essence common to all psychic phenomena is intentionality:

"What characterizes any psychic phenomenon is what the Scholastics of the Middle Ages called intentional (or even mental) inexistence and what we might call ourselves (...) the relationship to a content, the direction towards an object (...). Every psychic phenomenon contains something in itself as an object, but each one contains it in its own way. In representation, it is something that is represented, in judgment, it is something that is admitted or rejected, in hatred something that is hated, in desire something that is desired and so on" [Bisart RCI p.2, Brentano PES p. 124-125; 101-102].*



* In-existence here does not have the privative meaning of non-existence, but the locative sense of existence-in...

It is the critique of this Brentanian notion of intentionality that will lead Husserl to the concept of "objective representation" according to which the object of thought has an ideal reality and needs neither a subject nor its mental activity to exist.

-Husserl, to deal with the essence of numbers, must appeal to the logic of his time. In logic, the term intensional is defined as opposed to the extensional nature of a logical proposition.

Thus, it is possible to state the proposition 'witches exist' and then to use the logical object 'witch' extensionally without prejudging its intensional basis.

In the expressions 'The Tiger* signed the armistice' and 'Clemenceau signed the armistice', the logical objects 'Tiger*' and 'Clemenceau' are equivalent in their extensional function only with obvious conditions on their intensionability. **Tiger was the nickname of Georges Clémenceau head of France during WWI.*

Finally, the intermediate result of an algebraic calculation (i.e. $X=3$) can be further used extensionally as such in a system of equations. It can then be said that the extensional proposition ' $X=3$ ' has for intensionability all the algebraic calculation that led to this result.

It turns out that the philosophical term of intentionality is much more frequently attached to Husserl's exegesis than that of intensionality, a more technical term and generally reserved for logical (and linguistic) domains.

However, in the following lines, we will focus on establishing the parallel between the theory of multiplicities and the Ontology of Knowledge. We will certainly talk about metaphysics and knowledge, but it will nevertheless be the logical concept of intensionality that we will appeal most often, without relation to psychological intentionality.

Just remember which one is with a « t » and which one is with an « s »

General introduction:

I would like to highlight this proposition from Brentano:

"This intentional in-existence belongs exclusively to psychic phenomena. There is no physical phenomenon like this. We can therefore define psychic phenomena by saying that it is the phenomena that intentionally contain an object in them" [Ref: Bisart RCI p.2]

Interpreted in the first degree, this proposition states very plainly what should seem obvious to us:

Except for a consciousness, there is no object. Physical phenomena have no intentionality, no object and therefore no objects. The existence of the object is, exclusively, a "psychic" phenomenon.

Isn't that essentially what Schopenhauer said 60 years earlier? *"The world is my representation. The subject is the substratum of the world, the invariable condition, always implied of any phenomenon, of any object; because everything that exists exists only for the subject."* [Ref MRV]

From this proposition we also deduce that the physical world does not exist without subject, in other words that in any existence there is the subject, including in the existence of the solar system a billion years ago. It is an illusion to believe that the subject can be excluded from the models proposed by science, including mathematics. The expression ' $1+1=2$ ' implies and thus expresses the existence of the subject.

Of course, the question remains: "What is this object of thought?", to which we must seek an answer, but how much time will have been wasted, how many useless contortions, even today, to

refer the object of thought to a form-object of the physical world, to a logical fact, to something that would be "in reality" and universally One. But that is not.

The question of intentionality in simple beings (we will later talk about jellyfish) or collective (ants) shows how relative this notion of "psychic phenomenon" is.

This does not mean that we should deduce either anti-realism or idealism. Nothing excludes that there is a reality outside consciousness or that consciousness is of the same nature as that reality.

The *adequatio rei and intellectus*, the question of the truth of the predicative judgments, must of course take into account that "outside of a consciousness there is no object". We will only be able to deal with this issue in a later chapter, when the nature of the representations is clarified.

From proper and improper to multiplicity:

Excerpts from: Les « essences » des Recherches Logiques

by Claudio Majolino [Ref Majolino ERL] (translated into english by the author)

Brentano, in the courses entitled *Elemental Logic and its necessary reform*, ... argues that the being is said in two ways: there is the being "in the literal sense", namely the substance, and the being "in the improper sense" - namely the being of all the other categories that "are also called beings relating to one and a single nature, relative to the unique being of the ousia." [Brentano, ASE, 101.]

Anything that is not substance is related to substance, as an accident. And since there is a strict isomorphism between the structure of predication and the structure of being, the different categories are not only the different ways in which something is predicated from the raw substance, they are also different "modes" of existence. What "is" exists either as a substance or in relation to the substance. There are therefore as many meanings of being as there are modes of being in relation to the raw substance.

It is the couple of "proper" and "improper", which ... distinguishes the two fundamental categories: the essential and the non-essential.

Metaphysics being defined by Brentano as the science of the proper meaning of being, which must be separated from its "improper" meanings, coincides with the "science of reality as real"

Husserl will have the opportunity to hear Brentano present a new psychological application of this sharing, originally ontological, of proper and improper.

Brentano then introduced the distinction between "proper representations" and "improper representations," apparently moving from the realm of modes of existence to that of modes of representation.

So what is to be understood by the term "proper representation"?

The *Psychology* of 1874 had taught us that the function of the act of representation is to make something present to the consciousness as an immanent object. However, it should not be believed that all content is actually represented.

In the course of 1884-85, Brentano explains that we represent something in a proper way when this thing is present in itself to consciousness as an immanent object. On the other hand, we represent something improperly when we do not represent this thing by itself, but in an "analog" way: namely, in a relative way, through a substitute, an ersatz, one or more secondary representations, through his affections or relationships. What is not grasped in itself, in its presence, is experienced in a simply analog way as what is related to its own representations.

"We represent to ourselves in an improper way what we do not have corresponding representations for. In this category, we cannot form concepts such as "infinite," "unlimited," "eternal," etc., in a proper way. We can only achieve them through analog formations, by looking at a space whose limits we cannot grasp or by multiplying a periodic event such as the alternation of day and night. But things are not much different in the case where we name objects whose singular characters are only grasped without us being able to represent them as such, because of their complication.

One cannot have a proper representation of a million or a billion; we use these names without understanding them to the end. [ref Brentano, LRU]

OK's note: Note that this is true of any predicate associated with an object. For example, we

represent colour or hardness only in an improper way, without being able to reach what they are properly.

Brentano characterizes the distinction of proper and improper applied to representations from a double point of view. [..]. The "proper" is a representative domain marked on the one hand by the solidarity between language and experience, and, on the other, by the presence to the consciousness of the thing in itself, of its intentional in-existence ... on the other hand, the "improper" is the domain where we represent something only through language, and only through its relative being (represented), in relation to other things that are "represented" properly.

The new inflection here introduced is therefore due to this strange closeness established between the mere linguistic character and the relative character of the representation.

We will see later-on that these "solidarity between language and experience and the presence to the consciousness of the thing in itself" are misleading because language is also the cause of the in-existence of things in the consciousness. Language is not a simple tool for consciousness to express itself.

Excerpts from: Objectivité et subjectivité dans la critique husserlienne du relativisme
Denis Seron (FNRS, Université de Liège) [Ref: Seron OSCHR](translated into english by the author)

Objects of internal perception are truly and in themselves; for example our thinking, our joy, our pain are in themselves. That is why we are mistaken when we oppose, as is often the case, the phenomena with what is in itself. [Brentano, DP p. 131].

From Brentano's perspective, the metaphysical objectivity of mental phenomena is in this sense opposed to the intentional or simply phenomenal existence of physical phenomena. Psychic phenomena are endowed with both a real existence, in itself, and an intentional existence. The first comes to them as long as they are the "secondary" objects of internal perception, the second as long as they are the "primary" objects of representations of other types, for example memories or acts of imagination. [Ref:Brentano, PES, 129-130].

This mutual independence of objective-subjective dualities in the epistemological and ontological sense may well be, despite appearances, the main lesson to be learned from the criticism of relativism in the general context of the Researches. The idea, basically, is that the ontologically subjective nature of a domain of objects does not in any way compromise the epistemologically objective character of the corresponding propositions and theories: a theory of the ego and its experiences can be true, that is, true in itself, just as the ego and its experiences can be in this sense endowed with an existence in itself, even though they are phenomena of internal experience and, in this sense "ontological", subjective... It is plausible that this way of seeing determines in depth the conception of logic defended in the Researches....

OK's note.... Husserl focuses his attention on the mode of existence of the (logical) improper being rather than on the proper, intensional being. That's what will lead him to the concept of multiplicity. It should be noted that Brentano's conception, distinguishing the domains of the proper and the improper, does not escape the pitfalls of a discourse on the "proper" expressed in the philosopher's language, i.e. from the domain of "improper". A discourse about the "proper" presents itself to us as universal, whereas conscious language is inherently relative to the subject. For example, the "metaphysical existence of a mental phenomenon" whose truth is relative to the one who speaks it, was it intercommunicable through language, does not imply the universal "etance" of this phenomenon in a hypothetical reality.

From metaphysics to the philosophy of mathematics:

Excerpts from: Les « essences » des Recherches Logiques

by Claudio Majolino

[Ref: Majolino ERL]

At the same time, Husserl dealt with problems of the Philosophy of Arithmetic:

Arithmetic has several types of numbers, sometimes difficult to store under a unitary concept (whether the concept of numbering, quantity, etc.) and yet they must be explained in a unitary way; For this, the general arithmetic must first be returned to the arithmetic of numerations, based on the simple concept of "number"; any other concept must be either derived or reduced to the latter, in a word "based" on it. To do this, a theoretical explanation of the concept of numeracy is needed, so that one can first establish its founding character and, secondly, deduce or derive all the other concepts of general arithmetic from it.

Husserl first believes that he can think of numbers as metaphysics thinks it is and that the solution to the problem of the homonymy of numbers is in the distinction and articulation between a "proper representation" of numbers and an "improper or Symbolic representation".

"It is in Brentano that I must have deeply understood the extreme importance of improper representation throughout our psychic life"

Husserl first introduces a "proper" concept of number, namely that which one derives from the reflection on the psychic act of the collective bond. The number is the result of the act of collecting and counting indeterminate units. Such a concept is said to be "proper" insofar as, through the act of counting underlying it, it is derived from the representation of a multiplicity present in itself. To grasp a multiplicity in itself means, which is very important, to grasp it as a present in the face of a reflexive (second degree) act oriented towards the act of collective bonding, which connects several indeterminate objects in the unity of a countable quantity. The synthetic activity of such an act is therefore the concrete phenomenon from which to obtain the abstractum indicated by the concept of number

Subsequently, Husserl addresses the concepts of improper or symbolic numbers, namely other concepts - the concepts of numbers that are not based on collective bonding, but which, however, are supposed to presuppose and always refer to proper numbers. Symbolic concepts therefore express multiplicities that cannot be grasped by counting. Multiplicities that are well understood in themselves but not present "strictly speaking" and which ultimately replace the latter when their own representation is denied to us (as in the case of very high numbers or paradoxical numbers).

Husserl soon realizes that he has misled himself by following the Brentanian theory: One cannot think of the homonymy of numbers as metaphysics thinks the homonymy of being. The distinction between the concepts of proper and improper or symbolic numbers does not allow him to unify arithmetic from the concept of number.

"What is called arithmetic is a fundamentally equivocal science. In reality, 1, and all the fundamental signs of arithmetic have only multiple meanings, which correspond to the different areas of possible application of the same algorithm. [Husserliana, XXI, 63-64.]

The unity of the arithmetic is not to be sought in the relationship to the unity of a concept, it is based solely on the unity of an algorithm: namely on a unit of structure.

Husserl detaches himself from the conceptual distinction between the proper (or the original, the fundamental) and the improper (or the relative, the derivative, the secondary).

"To think of multiplicity, there is no need to cling to the original."

OK's note: Note the two aspects of Husserl's approach:

- 1) the meaning of the concept is detached from any reference to the "original" object and
- 2) the meaning is, on the contrary, founded by the structure of its relations with the other concepts of the domain concerned.

This approach can be compared to that of Husserl's contemporary F. de Saussure for the linguistic sign [Ref: PLOC]:

The Stoicists proposed a trinity-object in {reference, meaning, sound} (fig1). But how could the object opposite be considered referent if we could not know anything about its form, its essence, its substance, if not through sensations?

De Saussure decided, as far as linguistics were concerned at least, to exclude the reference from his model. The sign is no longer something that applies to something else, it no longer unites a thing and a name but a concept and an acoustic image (fig 2)

fig 1 the stoïcist trinity :

The referent : the object

What means: the sound

What is meant: the meaning

fig 2: de Saussure's sign

What means: the acoustic image

What is meant: the concept

For Husserl, an algorithm given - i.e. a general deductive domain characterized by a finite sequence of objects* and specific operations - any particular conceptual domain (numbers, ordinal numbers, etc.) that admits the formal laws of this algorithm is, in the same way, an arithmetisable domain.

OK's note: *... of improperly defined objects, with no proper nature, like De Saussure's signifiers.

This change of course has two main consequences:

(a) At the top of the fundamental concepts of arithmetic, the concept of number is replaced by that of "multiplicity", a concept whose importance goes beyond the narrow framework of arithmetic itself.

The concept of multiplicity is defined by Husserl in ref Husserl E&J.- 87c-d

A multiplicity is defined as a set of objects of any kind that can transform into each other, crossed by the same relationships, morphological or syntactic. This is the case with the different concepts of number, against which certain laws specific to the arithmetic algorithm are still valid. The most general concept of arithmetic is thus that of "formal number" - a number being therefore any object "defined by the form of its relations" ref (Articles on Logic, trad. English, p. 551)

OK's note The multiplicity according to Husserl is more defined by the relationships that order the objects than by the objects themselves. This will allow Poincaré to develop a formal representation of space, detached from any empirical data related to sensitive experiments, from a alleged spatial perception *a priori* and therefore from *a priori* intuitions of geometry.

(b) The primacy of the concept of multiplicity erases any difference between the proper and the improper, between the original and the derivative, between what is given in person and what is given through a subrogé. What is a priority is not the derivation of concepts from each other, but the sharing of the variable laws of a given multiplicity.

OK's note: The OK stresses that the proper being does not appear as a void in the improper representation.

The relational domain contains neither and does not represent anything other than the proper domain.

The ontological is not a "hole" or "ignorance" lived as such in relational representation.

The expression 'this molecule' leaves no void in my representation as long as the logical cut that "delineates" it says everything that can be experienced in the language of my multiplicity. We'll see the details later.

Improper representation does not represent anything other than proper representation, but represents in another context: The 'hydrogen molecule' as an improper representation, which characterizes the object by a set of possible experiments, represents nothing other than the bond of the two 'hydrogen atoms', which represent nothing other than the bond of the <proton> and the <electron> and so on. For the OK, this "so on" indicates that the improper meaning keeps fading indefinitely through proper representation, it means a non-foundation even more than an infinite. There is eventually no proper representation, no first meaning but only a limit to the need for the subject to make "things"

exist in his universe.

This limit is in fact a horizon bearing a non-psychoic judgment, an act that replaces the 'proper being' (which is not) with the relative being, i.e. defined according to its relationship to the other objects of representation by the subject. This horizon is therefore not a universal truth but it is relative to the subject.

The usual meaning of the word Horizon is misleading here, as it bears the idea of a continuous edge, line or surface and of a "beyond" horizon that would belong to the same space as "below". This would be an error : what is beyond the horizon does not belong to the same space as what is below. In this sense, the allegory of Plato's cave is equally misleading. Every Fact of Knowledge, every being, every relationship is a horizon. The meaning of our representations has no edges or holes.

What appears on the horizon of the Fact of Knowledge is enough, as a principle, to fill the meaning of our representation. The multiplicity appears to the subject, as a matter of principle, complete, coherent and unlimited.

The endless regression of the giving of the (proper) object should not be seen as a problem but as a solution: The substance, of the being as of the relationship, vanishes and is replaced by a simple singularity.

Back to ontology:

Husserl having deduced the epistemological imperative that the homonymy in arithmetic should not be thought of in the same way as in metaphysics, prolongs his reflection by the imperative that one thinks of the metaphysical homonymy according to the terms learned by the arithmetic homonymy. The most general concept of an arithmetisable field, namely that of multiplicity or formal number, is not a concept that designates the unity of a kind: the being, the unity of the being is to be thought of on the model of the unity of a formal multiplicity (articulated according to different degrees of complexity and different transformation laws, and not logical subsumption laws)

The Husserlian vision requires separating:

- The phenomenological domain of meaning, that of "semantic categories" expressed by forms like, one, some, much, little, is, not, which, and, or..

- The phenomenological field of ontology, that of "pure or formal objective categories" expressed in words such as "object, state of things, unity, plurality, number, relationship, connection, etc."

It is noted that the form "to be (as per "is")" belongs to the domain of meaning. It is part, like other syncategorems, of a "formed and articulated" meaning complex. The "is" is a "category of meaning," as is the "and" and the "or."

OK's note: For the OK everything that has form or is articulated, belongs to the relational, semantic and never to the domain of the ontological, the pure objectual. The object is only a relational singularity.

OK goes beyond Husserl's position wrt the form "to be" and distinguish three different "modes of being":

"to be real" which could be thought as the ontological concept but has no object. There is no-thing of what one could say "this is real"

"to be Actual" could be equivalent to "to be possible but not existing" given a state of knowledge.

"to exist" means "to have meaning for a subject" the closest meaning to the Husserl's : "to be"

The transition from the ontological to the relational is, for the OK of a different nature than for Husserl: the ontological domain is that of an unspeakable complexity, the relational domain is that of the dicible, of what can be described in the form of relationships between objects, definables in a finite-dimensional universe.

The dicible, however, does not mean anything other than the ontological, it is only its simplification in the form of probabilities.

What is beyond the horizon of meaning (the domain of the ontological) becomes dicible only by available relationships (which can be built) below the horizon (the domain of semantics). To represent, an Act must replace the complex with the describable, by a law of probability.

The boundary between the two domains is the horizon of the meaning of knowledge. This horizon is in a way located where the need for intentionality of the knowing subject is exhausted. The "I" of the conscious subject is never outside the situation, we wrote it already, it is at the focal point of the relational. The Viewpoint is located in the domain of the dicible.

"Alike the being, the other categorial forms in the statements link components of the terms, or the terms themselves, to form the unity of the proposition. The 'one' and the 'the', the 'and' and the 'or', the 'if' and the 'then', the 'all' and the 'none', the 'something' and the 'nothing', the forms of quantity and numerical determinations, etc. - all these are important propositional elements, but we would look for in vain in their objective correlate (assuming we can even attribute objective correlate to them) in the sphere of real objects, which means, outright, the sphere of objects of a possible sensitive perception. Ref [sixth research - 43.]

Husserl chooses to approach the being always in its predication form, as a "relational being" - always within a grammatically articulated meaningful multiplicity. It is not so much the being that must be intuited as the multiplicity that must find an intuitive filling:

"This is how, in the usual language, sets, indeterminate multiplicities, totalities, numbers, disjunct terms, predicate (being-just), states of things, become "objects." [sixth research - 45.]

It is important to stress: it is a categorically structured multiplicity that one is supposed to see in the categorial intuition, not an isolated or abstract category.

The filling of structured categorial intuition occurs in concentric circles, in a synthetic way:

"We will be able to characterize sensitive or real objects as objects of the lower degree of a possible intuition (simple perceptual act), categorial or ideal objects as objects of higher degrees (articulated perceptual act) [...] Sensitive objects are there in the perception, in a single layer of act; they are not subjected to the need to be formed in multiple layers, in acts of a higher degree, which constitute their objects by means of other objects already constituted for themselves in other acts. »

The insertion in the categorial context of each element of the lower circle, as soon as it is seized as a foundation link, gives it a certain place and role, the role of a member of a relationship, especially of a subject-member or object-member; and these are differences that manifest themselves phenomenologically. [sixth search - 49.]

Non-foundation

Husserl proposes a synthetic structuring, in more and more general theoretical layers; the categories of a given level being considered as the "object-members" of a higher-level set (of a meta-category), these object-members being united and defined by their inter-relationships within ever more abstract multiplicities, i.e. more detached from the sensitive experience.

The above Husserl's statement "Sensitive objects ..are not subjected to the need to be formed in multiple layers..." contains implicitly the notion of horizon of meaning (a limit beyond what the object is considered as One), explicitly related to a need, i.e. not universal and necessary but relative and sufficient.

Despite this, Husserl does not seem to arise the idea of prolonging it by a downward decomposition, i.e. the idea that the "sensitive objects" of the lowest level could themselves be multiplicities, sets of elements created, united and structured by their formal relationships, by an algorithm.

Such a de-composition being, by definition, without possible end, it inevitably opens the epistemological Pandora box of the non-foundation of objects and all meanings.

Non-foundation from which the following proposition can be inferred:

- There is only extensional meaning

Not only does non-foundation deprive the mathematician of the primary element for his theoretical constructions, but it also deprives him of the possibility of effective proof, as the mere existential

statement "there is A" becomes unprovable.

Is this not precisely the situation facing contemporary physics?

An "unfounded" multiplicity theory would have precisely allowed Husserl to replace the prime element with the object-member in its role as an elemental brick.

On the other hand, the lack of absolute provability of propositions as elementary (and as intuitive) as $A=A$ does not allow the recursive construction of logic, arithmetic, geometry or the theory of sets as they were thought in Husserl's days.

The contagion of the concept of non-foundation, from the epistemological domain to the ontological domain, is inevitable: without foundation, being as a substantive is doomed:

- There is no being

The being can manifest itself only in a syncategorematic form that cannot and should not be made nominally independent. If it appears in multiplicity, it is because it is a syncategorem. In this sense, the exact term for categorial intuition would rather be that of "syncategorematic intuition." For if the 'ist' (the 'is'), the 'bin' (the 'am'), the 'sind' (the 'are') are likely to appear within a multiplicity, this is never the case of the 'sein' (of the 'to be') [sixth search -50.].

OK's note : We see how Husserl effectively frees himself from the question of the substantive being to only keep the being as a "link" or "syncategorematic form".

The collective statement "A and B" is as fundamental and mysterious as the existential statement "A is." It is even more important, insofar as it reveals the syncategorematic nature of the latter. In both cases, these are forms of multiplicity, with the same status and dignity [sixth research - 51.].

OK's note: With this sentence Husserl indirectly addresses the question that could be formulated as follows: "If in all ARiB relations, only the definition of the Ri signs establishes the A,B... as members-objects of multiplicity and if the A,B... are logically unfounded, how would the Ri be founded? how would they be rigorously definable?"

The non-foundation of being, which appears implicitly in these texts, leads with it the non-foundation of logical links and therefore calls into question the construction of multiplicities, not in its principle but in its modalities.

What Husserl refers to by the terms: relationships, laws, algorithms, is in turn only an improper representation because there are no more "object-laws" than there is "object-things".

We will return to this point in the paragraph on the continuous.

Isn't the definition of the laws of multiplicity, of its constituent algorithm, as subjective as that of beings?

Presence of the subject:

To answer this question, the OK proposes to reverse the direction of intelligibility:

According to the OK, the Husserlian structuring into increasingly general theoretical layers aims toward the "I" of the subject. The "I" of the subject is the asymptote, the virtual focal point of the creation of meaning.

Any representation is subsumed in the assertion of the existence of the subject.

The assertion of the subject's existence is contained in the probabilistic certainty of the "I" knowing "I": $\Pr(\ll I \gg | \ll I \gg) = 1$ which is the asymptote of any representation; not as the product of the subject's understanding but as his very existence.

The structure of a multiplicity is nothing but an instantiation of this principle:

- the statement "A is" expresses that "A Exists for "I"" or $\Pr(\ll I \gg | A) > 0$

- the statement "A and B" in addition to the "A is": $\Pr(\ll I \gg | A) > 0$ and "B is": $\Pr(\ll I \gg | B) > 0$ expresses the interdependence of A and B within the same representation of the subject, which is expressed by:

$\Pr(\ll I \gg | \{A \text{ union } B\}) < \Pr(\ll I \gg | A) + \Pr(\ll I \gg | B)$

-the $A=A$ relationship is the limit case of a $\Pr(A|A) = 1 - \varepsilon$ with $\varepsilon \rightarrow 0$, adding to the existence of A: $\Pr(\ll I \gg | A) > 0$

These three propositions reveal the notions of Existence, Perspective and Relativity to the subject.

The "I" as the focal point of the synthesis of categories:

C. Majolino's proposition: "*The filling of structured categorial intuition occurs in concentric circles, in a synthetic way*" offers the opportunity to raise an epistemological ambiguity:

For common sense (for us) the "simple perceptual act" is unquestionably, relative to the subject. On the other hand, as higher-level categorial intuitions are synthesized, categories and their interdependencies seem more and more universal (let's mention the pure intuition of kantism or the Platonic Idea) for finally oust the subject.

So much so that the sense of the individual object of our representations appears to us as at the unique (almost ensemblist) intersection of categories whose predicative value and relation to other categories seem transcendent to us.

This illusion is based on the persistent effectiveness of these predicative values throughout our knowledge.

Let's illustrate this by the example of a building :

I am well aware that each of my points of view on a particular building is relative and local, that the perspective is built thanks to the light rays that reach me.

If, on the other hand, I draw a blueprint of the building from these relative points of view, I am convinced that this plan is the concept of the absolute shape of the building.

I have convinced myself that this plan transcends the local, relative and constructed aspect of my experiences to give me access to the knowledge of a universal, absolute, given reality.

The only truth of this plan, however, is its effectiveness in predicting future experiments, which will be just as local, relative and constructed as the previous ones.

Another more philosophical example would be the existence of objects: we have only local, relative and constructed experiences. Yet we gladly conceive of existence as universal, absolute, given.

This is precisely what C. Majolino's quotation formally contradicts: "*categorial intuition occurs by synthesis.*" The categories do not transcend the perceptive acts, they synthesize them. The operational field of this synthesis is, as a principle, limited to the totality of the knowledge of humanity, which is immeasurable to reality. There is therefore no way to claim the transcendence, the universality of our categories.

The concept is a class, a category and even if one amounts to the syncategorematic meta-level, at the level of the laws that unite the categories, the subject remains present.

The general form, constructed by accumulation of experiences, necessarily relative, of individuated forms has no reason to lose its intrinsically relative and local character.

The extent of any experience is immeasurable to the possible. The (relative) experiences constructed from all the local points of view do not allow for an absolute and universal concept.

It only creates meaning, that is, an operator to establish, from known experiences, conjecture scans about possible experiments. These conjectures are relative, even if they are certain.

The relevance of conjecture actually requires only a certain form of continuity between points of view, a continuity that can come from the process of developing and disseminating points of view without any other condition on reality.

The relevance of conjectures only reveals the consistency of Logos.

Even if the concept of space guarantees us the accuracy of astronomical, even cosmogonic forecasts, the reality of the distance that separates us from planets and stars has no credit advantage. "Distance" remains the name of a conjecture.

If with Schopenhauer we state that "the world is my representation" which implies that "The world is the meaning of my Knowledge", we conclude that the focal point of categorial synthesis, as a principle subsumed by the knowing subject, can only be the "I" of the subject.

Absentism

The nature (meaning) of the mathematical object is defined by the relationships that regulate its

properties within the multiplicity. Two multiplicities will be indistinguishable, without prejudging an intensional ontological nature of the objects that make them up, from the moment when each object (improper) A of one would have its equivalent A' in the other. By "equivalent" we must then understand that A will have opposite B,C ... the same formal relationships that A' will have with regard to B',C'...

Objects are only what they appear in a multiplicity.

Reversing the direction of intelligibility, reveals a form of circularity of the Husserlian discourse of which we will see, with Poincaré, the epistemological consequences: The structure of laws that define a multiplicity, actually fixes the laws of meaning, the syntax and vocabulary of a descriptive language that only makes sense in the strict field of multiplicity thus defined.

It follows that it is illegitimate to describe the world "in general" by means of the formal concepts of any multiplicity. The question is not only about the fact that syntaxes and vocabularies used would not be legitimate but very fundamentally about the possibility of a language compatible with the complexity of reality, based on structures specific to the multiplicity that we live, where complexity has collapsed.

The domain of meaning, the one in which our consciousness exists and in which our representation of the world is defined, allows us to give meaning to the domain of ontology only at the cost of an Act which itself, by definition, escapes all meaning.

In other words, the subject can only give meaning to the world within the (conceptual) limit of the multiplicity of which he is the center, in the language of this multiplicity.

In general, mathematical theories place the subject "overhanging", as "absent".. Even when they take into account certain psychological aspects, the philosophers of mathematics such as Husserl, Cantor, Hilbert, Russel, Poincaré etc... take a "clinical" or external point of view and allow themselves to describe the thought of the subject (other than themselves) in the language of their own conscious thought, as if the thought of the subject was something or the state of something; they then describe a succession of sensitive phenomenon, intelligible phenomenon, understanding etc.

The philosopher's (extensional) time is certainly adjusted to the subject's extensional time because the exchanges between knowing subjects adjust the time of their extensional multiplicities, but it is inapplicable to his intensional time.

There is no time for intensionality. The intensional reality of the subject is not "present."

The subject of which the philosopher speaks and on which his time reigns is an object for the philosopher.

This, expressed in other words, is what Maine de Biran pointed out.

In this sense, Kant's effort to describe the *a priori* conditions of any sensitive experience remains invalidated by the very fact that he has only the language of the (his) conscience.

This **absentism** implicitly conceives the world as a given and its intelligibility as a "topological convergence" from reality to consciousness, in the form of

- 1) sensitive phenomena and understanding, which over short time interpret the experience and
- 2) evolution and languages that, over long time, create the conditions for interpretation.

Representation would be "the result" of a process.

The "topological convergence" of intelligibility implies the idea of causality, of a reality imposing its facts on the conscience and finally of a time of the world. The "absentist" bias therefore introduces a "time of the world" among the objects of science even though science does not seem explicitly concerned with the time of the world (laws are generally invariant in a change of origin of time).

Absentism presents us the Facts of Knowledge as facts of the world, a state of Knowledge as a state of things, a straight line as a thing.

Because of absentism we see science using the concept of state (present) as a physical fact independent of the subject, while there are only states of knowledge, while the cuts in the reality are Facts of knowledge.

Until the advent of quantum physics, the absence of the knowing subject made it possible to

simplify the mathematics necessary for science, for example by accrediting the idea of isomorphic re-presentation of reality or that of Unity as a sensitive phenomenon or that of a state of things. It seems clear to the OK that these mathematical theories, whose knowing subject would be absent or projected to infinity, require more complete theories "in the presence" of the subject. The article [Ref LAEG] on this topic can be read.

To delve deeper into what has just been written, let's quote Alain Badiou:

"The question is nothing less than that of the suture-to-the-being of a theory of the presentation, itself axiomatically presented.

The existential clue to be found is the one by which the legislative system of Ideas, which ensures that nothing comes to impede the multiple, proposes itself as a registered deployment of being-as-a-being.

But in order not to fall back into a non-ontological situation, it is required that this index do not propose anything special, and therefore that it is neither one, which is not, nor a multiple compound, which is nothing but a result of the account, an effect of the structure.

Since the being is not, what demeans its existence cannot in turn be "being"

The striking solution to this problem is this: hold the thread that nothing is delivered by the law of Ideas, but let this 'nothing' come to be by the assumption of a pure own name. Or, to prove as existing, by the surplus choice of a name, only the unrepresentable, from what the Ideas will then make proceed any admissible form of presentation.

The name, what can be said extensionally of the unrepresentable, the form that arises in the context of multiplicity, should not be considered as "something else" than the unrepresentable.

In this sense, the name of the being is the name of "nothing"

Since, within the framework of the set theory, what is presented is multiple of multiples, i.e. the form of the presentation itself, the unrepresentable can only come to the language as what is "multiple" of nothing."

Let us immediately note this point: the difference of two multiples, as regulated by the axiom of extensionality, is marked only by the multiples that belong to the multiples that are differentiated. A multiple of nothing has therefore no conceivable distinguishing mark. The unrepresentable is unextendable and therefore in-different. The result is that the inscription of this in-different will necessarily be negative, since no possibility, no multiple, can indicate that it is from him that the existence is affirmed. [Ref: Badiou p.80.]

Alain Badiou, wishing to adhere his ontology to the set theory, wants to make the empty set the primary element of the unrepresentable: "what no existence can be said to belong to" or "a "multiple" that is exempt from the primitive Idea of the multiple"

Two errors already present in the set theory are the basis of this misdirection:

1) Because of the absence of the subject, particularly obvious in the cantor theory, Badiou is led to build the meaning up from the "extensional name of nothing" (i.e. the empty set). For the OK a contrario, the existence of the knowing subject, the "I" which is the virtual totality of "everything that means to me", is the initial meaning, the initial cartesian truth out of which any meaning emerges.

2) The "a priori" character of the notion of belonging that is clearly apparent in an expression such as "multiples that belong to multiples". Whereas belonging, like any predicate, is an extensional concept, which is only worth below the horizon of meaning and has, by definition, no meaning beyond that horizon.

This remark underlines the difference between the Husserlian multiplicity that refers to an extensional structure of law, and the Cantorian multiplicity that intensionally characterizes the constitution of the being presented as One.

"By "multiplicity" or "set" I generally refer to any multitude that could be conceived in a unitary way, i.e. any collection of specific elements that can be brought together by a law in one whole and I think I define here something akin to the Platonic Eidos." [Ref Cantor p.165]

In an attempt to redefine the Cantorian multiplicity within the Husserlian understanding, we could write this: "The (extensional) meaning of the element (multiplicity) "presented one" makes possible (see certain) the experience, by the subject, of new cuts by which that multiplicity would be extensionally presented as "several elements"".

By this definition on the one hand, the knowing subject is present but maintained "outside" the Cantorian multiplicity and on the other hand, the transition from the mere possibility to the existence of this Cantorian predicate of multiplicity will require a new cut, an Act that will reveal it as multiple from the perspective of the subject.

In summary:

- The non-foundation tells us not to expect primary beings out-there, not even a primary element of meaning but on the opposite, we shall see the "point of view" i.e. the subject, as the focal point of meaning.

- The "I" of the subject is not the "ultimate being", but rather the asymptote of the process of expansion/individuation of meaning.

Because the nexus of meaning is the subject and not "primary elements" and structures out-there, what our representations and all science describe are the logical laws of meaning and not the physical laws of the world.

The forms of the world are not the result of its intelligibility but of the necessary process of individuation of the knowing subject.

2- From isomorphism to morphogenesis and perspective:

Excerpts from: *La théorie de l'espace de Poincaré*.

Philippe Nabonnand.

[Ref Nabonnand]

The categories of sensitive space as a product of understanding

For Poincaré the axioms of geometry are conventions. Truth in geometry makes no sense. One can only ask about the convenience of geometries.

Poincaré may well be right, but his remark does not advance us much because we shall then ask : what is a convention? Making a convention a pure product of the understanding of men does not advance us any further, for we cannot exempt ourselves from an answer "in reality" to the question: what is the understanding of men "in reality", what is a convention "in reality"?

We will then have to look in the logical laws of the mind for the conditions for the possibility of a convention, why two minds produce patterns that seem inter-exchangeable to them, i.e. integrating without contradiction into the field of their exchanges.

"The notion of space cannot be an integral part of any of our sensations taken in isolation. It is only when we observe the order in which these sensations follow one another that this notion can arise. However, if it is absurd to assume that we can imagine sensations different from our normal sensations, we can on the contrary with some effort imagine a succession of sensations, similar individually to our normal sensations, but succeeding in an abnormal order. We can imagine that these sensations follow other laws and for example that they are ordered, not in accordance with the structure of the Euclidian group, but in accordance with the structure of another group. Beings who would experience our normal sensations in an abnormal order, would create a geometry different from our own. [Poincaré 1901, 127-128]

In this quote H. Poincaré does not dwell on the exact nature of the sensations of space. For H. Poincaré the sensations do not have the spatial character *a priori* but, in the spirit of Husserl's multiplicities, it is the way we order them that creates space and this or that geometry.

The psycho-physiological genesis of space: space has no external reality, but it is also not the product of a form of our sensitivity.

Poincaré defends the idea that a primary notion of space linked to our tactile experience of sensitive

or real objects, as objects of the lower degree of a possible intuition (simple perceptual act) precedes the genesis and study of the group of movements, categorical objects or ideals as objects of higher degrees (articulated perceptual act). Space is therefore the result of an idealization and a mathematization of our sensitive experiences.

"The so-called formal properties are those that are common to all isomorphic groups. If I say, for example, that a particular transaction repeated three times is equivalent to a particular repeated four times, I have stated a formal property, entirely independent of quality. Such formal properties are likely to be studied mathematically. They must therefore be spelled out in the form of rigorous propositions. On the other hand, the experiences in question can never be the true basis of these propositions. We have in us, in our power, a number of group models and experience only helps us to discover which of these models deviates the least from reality. [Poincaré 1898, 13]

The properties of the movement group and therefore the laws of geometry...

"...are not imposed on us by nature, but are imposed by us on nature. But if we impose them on nature, it is because it allows us to do so. If it offered too much resistance, we would look in our arsenal for another form that would be more acceptable to it. [Poincaré 1898, 12]
*I wondered what is the true character of geometric truths [...] I also sought to analyze the **psychological** origin of the notion of space. [Poincaré 1901, 127]*
*Should this category (sensitive space) be viewed as a "form of our sensitivity"? No, if we mean that our sensations, considered individually, could not exist without it. It only becomes necessary for us to compare our feelings, to reason about our feelings. It is therefore rather **a form of our understanding**. [Poincaré 1898, 6]*

In Poincaré's idea, the notion of space emerges from the way the subject's understanding "structures" sensations or internal changes that in themselves are not spatial.

This genesis of geometry according to Poincaré, described in general terms, would be compatible with the vision of the OK. However, we will criticize it in two respects:

As soon as Poincaré leaves the pure field of mathematics, an explanation using "understanding" is no longer legitimate. The "understanding" operates below the horizon of meaning, within the multiplicity of the subject, where Facts and Laws, where Giving-Sense and Acting have already emerged from his perspective. The reality of the emergence of sensations is beyond this horizon, inaccessible to the understanding of the subject.

The second criticism stems from the first. The time of the world being a representation by the understanding, the term "succeeding" must therefore be replaced by "structuring", neutral in terms of time.

The philosopher's language cannot properly describe the subject's Understanding

Surprisingly, H Poincaré considers a "space capacity", based on tactile sensitivity and/or capacity to move, which feeds the understanding with a specific subset of sensations. Although not spatial *a priori* these sensations allow the subject's understanding to "make a distinction between a movement and a change of state" and to develop a "sensitive space", i.e. the semantic categories of space structured in a multiplicity. Sensitive space is further proceeded by reason to produce a geometrical space (a space variety)

The distinction could be justified by saying that space capacities are produced over long time by evolution, culture and learning (Hardware - Operating System) while understanding (software) produces spatial representations on the short time.

For OK the distinction between "space capacity" and "understanding", between "the conditions of possibility" of a sensation (resp. an experience) and the sensation (resp. the experience) itself is largely arbitrary.

This distinction does not stand a careful examination: Considering for example the sense of vision: it is not possible to separate "what is seen" from "the capacity to see" from the "intentionality within seeing".

We have here an illustration of the bias we called previously “topological convergence” of intelligibility which imposes a causal relation between an object to be represented and a subject who represents. This causal relation is an error in this context : The causal relation is a category of conscient thought that does not properly describe what is beyond consciousness.

Even if, following Darwin's theory, we consider our “space capacity” as an abounding series of causalities, we then have to consider Schopenhauer's warning that the sensation, although being the “*last change*”, “*has no superiority over the others* (those which led to our “space capacity”) *to establish .. the causal union between the objects*”

“... we forget that although the law of causation is an innate condition and which only makes possible the perception of the outside world, we do not have the right to apply this principle, derived from the proper disposition of our faculty of knowledge, to what is outside and independent of it, as if it were the absolute and eternal order of the world and of all that exists.” ref: QRPR §24

Poincaré's hypothesis that sensitive space is "a form of our understanding" requires a considerable expansion of the notions of understanding and sensitive space.

Jellyfish, for example, are predators: they see, swim and orient themselves. They have a purpose, in our eyes spatialized, and yet they have no brain and who will say that they "reason" to "ordain their sensations"? Analyzing jellyfish as simple biochemical "machines" also seems to be a dead end, at least in the current state of science: we must admit that the jellyfish has what Schopenhauer called a "Will" and that we do not know how to say what is the Will of a Machine.

In addition to a sensitive "space", the jellyfish-predator, having a purpose, necessarily has a sensitive "future". Not that it can be said that, in the "spirit" of the jellyfish, intensionally, appear the categories of space-time individuated as such. In fact our categories do not apply to the intensionality of jellyfish.

We can say, however, that this jellyfish, being extensionally described in the multiplicity that is our representation of the world, for which the categories of space-time are (for us) defined, this jellyfish being appears to us as if it would possess space-time categories.

In the hypothesis of Poincaré, taken in the first degree, there is a form of anachronism: The understanding of man would be a condition to the sensitive space. One way or another, a sensitive space-time was present in jellyfishes millions of years ago. We must consider that "our categories" of sensitive space-time, or say "the categories and relationships that define for us the variety of "space-time", emerged at the same time as our understanding emerged.

This leads us to the hypothesis that subject's understanding is not above representation, it is not “the tool that represents” but a category of representation, a multiplicity of which the space-time variety would be a substructure.

Here is an example that illustrates the already made remark about multiplicities: there is no universal language (vocabulary and syntax). A language applies only within the multiplicity that defines it. Objects, laws, words and syntax co-emerge from- and co-found - a single multiplicity whose the epicenter is the subject.

Impossible isomorphism

The study of the geometry and properties of space is reduced to that of the structure and properties of the movement group. Poincaré describes a group's study as the study of its formal properties and will explain that two isomorphic groups, i.e. having the same formal properties, have the same order and can operate on spaces of different dimensions. Thus, the movement group operates on the sensitive space which is of very large size and its study is difficult. Fortunately, the problem is simplified

"by replacing the group given to us, with its form and material, with another isomorphic group whose material is simpler" [Poincaré 1898, 36]

Poincaré defines the notion of isomorphism of two groups by the identity of their formal properties:

"Sometimes two groups contain operations that are entirely different in nature, and yet

these operations combine under the same laws. We then say that both groups are isomorphic. [Poincaré 1898, 22]

The idea of H. Poincaré is in essence: It can be considered that if A and B are elements of a variety with dimension N linked by an $A \leftrightarrow B$ relationship, if I replace A and B with a representation A' and B' of a variety with dimension $M < N$ and I can find a group of relationships that retains the formal properties of $A \leftrightarrow B$ so that I cannot tell the difference between these $A \leftrightarrow B$ relationships and $A' \leftrightarrow B'$, I have a variety (a space) isomorphic of the first i.e. for me indistinguishable.

That is, but in the case of the representation of the world, I do not have access to the initial variety (reality), my only criterion will be the coherence of $A' \leftrightarrow B'$ relations in my so called "image" space. It is therefore not given to the mind to judge any isomorphism between what causes our sensations and the concepts we derive from it. We have no access beyond the horizon of our sensations. Before they appear as such, sensations have already been "shaped", reduced in complexity, and we know nothing about the formal properties of what is beyond. In fact, the complexity of reality and its formal properties are unknowable to us (because they are unspeakable).

The reduction of complexity is not a facility for and by the understanding, it is the prerequisite, indispensable to all meaning, it is the Act creative of forms.

The only criterion for validating sensations "below" is the coherence of the representations we make of them and their evolutions as we experience them.

"A mathematical being exists as long as its definition does not imply contradiction, either in itself or with previously accepted propositions. [Poincaré 1902 p 64]"

Poincaré evokes the groups of movements in which displacement would be an idealization of the feeling of displacement. The bias of absentism is evident here: the sensation of displacement has, in essence, the subject as a focal point and above all it is impossible to find a basis for it or to limit its logical extension within what one would try in vain to define as the spirit of the subject. There is therefore no evidence of the properties of associativity, the existence of a neutral element or a symmetrical element, other than, as Poincaré himself points out, by the absence of contrary experience in the subject's limited and relative experience. How then could one apply a recursive reasoning based on these properties to the sensations of displacement?

"A being who could not move would be unable to make that distinction [between displacement and change of state]. Such a being, therefore, could never create geometry,-- even if its sensations were variable and even if the objects around it were mobile. [Poincaré 1898, 9] »

Without disputing its substance, this short text offers a perfect example of the "biased perspective" of the scientist describing the thought of a being, other than himself, in the language of his own conscious thought, what formally gives a certain circularity to Poincaré's reasoning:

Indeed, the terms "to move," "displacement" or "mobile" already imply the space in which one moves; i.e. a certain geometry. No being can "move" without having "invented" the geometry in which it moves (as simple and conventional as it is).

Poincaré's proposition only makes sense in his multiplicity (which we assume similar to our own), the one in which the being is the object of his study, but not in the multiplicity of which the being in question would be the subject. However, it is in the latter that the being-subject is supposed to create a geometry.

The absence of apprehension of "our" space by the being-subject Poincaré refers to does not constitute a "void" in its multiplicity. Its universe is not "blind" to something we would know. There is no hiatus in its multiplicity.

Formally, Poincaré makes of the movement the necessary cause (the prerequisite) for the apprehension of space, which constitutes an inconsistency since in his own words there are no spatial sensations at first, no sensation of movement at first, no movement at first.

In Poincaré's text it is not the "movement" that the being is lacking but the "ability to move". It could well be carried by all kinds of movements without "moving".

"Moving," even considered in the language of our multiplicity, implies Power and Will, which involve the Meaning.

"Moving" cannot be distinguished from "Giving-Sense" to movement.

The only "movements" that can give the subject an apprehension of space are facts of his Knowledge and not facts of the world. His Universe is not

Note that this lack of apprehension of "our" space by the subject-being to which Poincaré refers does not create an absence in his multiplicity. His representation is not "blind" to something that we know. There is no more hiatus in his multiplicity than in ours. His representation is no more no less isomorphic to reality than ours.

This remark highlights the epistemological problem associated with the notion of isomorphism applied outside the mathematical context. It would seem that, in Poincaré's thought, although space as such is not a reality, there is "in reality" something specific, of what formal space is an isomorphic representation and of what geometry would be an idealization.

Thus, without contradicting Poincaré on the fact that space and its geometry (as well as time?) are artificial constructions; the very idea of isomorphism between the two sides of the horizon of meaning is unjustified, even according to Poincaré's definition.

The idea of an isomorphism between reality and representation is unfounded; there is no evidence to suggest that reality "has form", there is no basis for claiming that there is an "external formal object" to the creation of meaning, nor even that there are laws of "reality" that would give shape to "reality", even if they are relative.

This is detailed in appendix III "laws of the world or laws of thought"

The process of representation is not necessarily an isomorphic relationship from reality to its representation, even if one considers the broader meaning that Poincaré gives to isomorphism.

With Brentano we have shown that "the object has no objects".

With Pandit Shantideva we say that "Forms are vacant, there is no other vacuity than forms or forms other than vacuity."

Reality in itself is amorphous, free of forms.

With Schopenhauer let's add that the subject and the object are one and the same representation.

For the OK the representation is not isomorphy but morphogenesis, and the law that governs this morphogenesis is Logos, a transcendent logical principle.

Finally, we will recall that this morphogenesis is well ahead of understanding or consciousness or any psychology and of course ahead of matter or space.

It should also be remembered that it is well ahead of the idea of time.

Our apprehension of space does not, therefore, found *de jure* the reality of an isomorphic equivalent.

Logos, the principle of morphogenesis:

For the OK, it's about geometric shapes as for the meaning of words:

Here an excerpt from the article "The Philosophy of Language and the Ontology of Knowledge" [ref PLOC]

Ferdinand de Saussure stated [Ref: Vernant 2010]:

"that there can be no thought without language" and that "abstraction made of its expression by words, our thought is only an amorphous and indistinct mass... taken in itself the thought is like a nebula where nothing is necessarily delineated..."

By this statement, F. de Saussure refused any prevalence of thought on language. It also showed that there can be no thought without language.

In his view, the word was not merely an arbitrary label attached to a concept, but was at least part of the structuring of thought into interdependent entities.

From this premise arises the importance, for thought, of language, words and signs whose nature we need to specify.

For OK, it goes with geometrical forms as with the meaning of words : Just as "*there can be no thought without language*" for the OK, "*there can be no thought without forms*".

Just as De Saussure refused any reference of the sign (acoustic sensation-concept) to a reality, we

must refuse any reference of the form (formal sensation- concept) to a reality.

Although it is true that their idealization by geometry is a product of understanding, geometric shapes (i.e. the meaning of things in space) are not a product of understanding.

Let's illustrate this with the example of physical cristallisation:

Each representation is a metastable collapse of complexity. Representation crystallizes the Meaning from germs whose appearance, within this amorphous complexity, is necessary in its principle although its instances are contingent just like the germs of physical crystallization. These germs are Facts of Knowledge and it is from these germs and according to the laws of the Logos that the Meaning of "representations" develops and structures.

Who could say that crystallization occurs according to an established plan, or that it is isomorphic of an established plan?

The substance from which crystals emerge is amorphous, yet from the first germ, from the first singularity, a blueprint of future developments is self-drawing, regulated by the mathematical laws of crystallization. As the crystals take shape, the probabilities of possibles differentiate and very quickly, these same laws of probability, instanciated to a set of germs, impose almost deterministically, at macroscopic scale, the growth of the crystals. The progression creates the plan of progression by iterative instanciation of an immaterial, non-physical principle.

This example of cristallisation implies a substance and describes the forms of cristals in an already ordained space.

In the ontological case, we have seen that reality is not a substance, it is not subjected to space nor to time. A Knowledge can have no other meaning that the "law of probability on developments it makes possible ". It will then be said that the Meaning defines the change and that change let the Meaning exist.

While making forms to Exist, the perspective creates the conditions for the existence of new forms. Every word, every form contributes to- and in the same time results of- the expansion of representation.

Individuation is the essential rule that drives the emergence of new words and forms.

Just as physical cristallisation, thanks to a specific order, reduces the excessive stress in the amorphous substance, the form reduces the excessive complexity in the formless reality.

The Meaning-change interaction applies to Poincaré's analysis: space (the Meaning) leads the Movement (the expansion of the Meaning) and the Movement makes the space (the Meaning) Exist. Space and Movement co-emerge from the perspective of the subject.

From space to state:

It would be shown, in the same terms, that the change of State, no more than the movement, can exist without a perspective that gives Meaning to a State.

There is no "in reality" present state of things because outside the Meaning there is "in reality" neither present nor things whose condition can be described.

For a state to Exist and then a "change of state" could happen, there must be a cut in the real that is a Fact of Knowledge, a fact of representation.

There are no states of things but only states of Knowledge.

There is no change of state without a perspective, i.e. a subject, which gives Meaning to the state.

Note: We made this remark regarding the Riemannian interpretation of the second principle of thermodynamics, showing that it is in fact the knowing subject who, introducing by a cut * (by experience) the representation of a state in a isolated system and thus the notion of a change of state, introduces that of increased entropy and ultimately that of an irreversible time.

The second principle of thermodynamics therefore refers to a fact of knowledge and not to a fact of the world.

*the experience is a new cut in the intensionnality of a reality through which this reality will be dicible, descriptible in the language of the multiplicity of the agent.

Acting, Giving-Sense, Becoming.

Morphogenesis, the absence of *a priori* forms and time impose to redefine such notions as the action, the change, the becoming, the possible, the necessary, the will, the power.

To illustrate this let's take again this Poincaré's idea that "the motion" gives meaning to space.

As thoroughly and deeply we look into ourself, the more we find that the Motion and the Action in general cannot be distinguished from Meaning.

One cannot define a precise limit between the Act and the Meaning, between the body and the spirit.

The mecanistic description according to which the spirit tells the body to act and the latter reports on the change to the spirit via individuated sensations is quite simplistic and approximative.

Who can tell where stops the command and begins the act, where stops the act and begin the sensations ? The example of a mere smile or a word would convince of the total fusion of Act and Meaning.

When I reach my hand to an object, my act is indistinctly a physical and a meaning change, indistinctly will and power.

To paraphrase Galileo: "without the meaning of movement, movement is like nothing"

We also know that there is no meaning without the "giving of meaning". The meaning of a Fact only Exists if the subject gives it meaning, i.e. if he integrates the Fact into his own Individuation. We had shown that change make the meaning to Exist, we specify here that changes are bound by the becoming of the subject : only changes in my representation what contributes to my becoming and since the world is my representation : only changes in the world what contributes to my becoming.

These few words express an impassable limit to science.

We intuitively know that acting is becoming and that thinking is also becoming. But it is not the world vis à vis that changes or makes sense.

Distinction between Action, Giving-sense and Becoming is only formal.

There is no difference in nature between the action, the representation and the becoming. These are categories of representation.

To answer specifically to Poincaré: to move and to represent space have one and the same nature.

The question "of what space is the meaning ? " is useless because space is only meaning.

Meaning, for a subject, is the law of probability on the possible (i.e. Actual) ways towards what shall necessarily come to Exist: that is to say "himself".

The Meaning is not the helpless expectation of an unveiling, because its expansion is made necessary by its own nature and the Individuation of a subject is Actual, always already true.

Note that the meaning so defined is not given by the understanding to "something" or to "the state of something", the meaning is the law of probability.

At the highest degree of abstraction the Meaning-of-oneself is this: "*the probability, the possibility, the will, the conviction, the absolute Desire, the Power and eventually the necessity to recognize oneself as oneself again* "

I am not "the one who thinks all this", I am "this"

When I believe "to change the world" or simply "to change position in the world" or more simply "to see the world change", "I" only act the expansion and the Individuation of my representation.

Meaning changes but "in reality" nothing changes because reality in In-act, not subjected to time.

- The Knowledge contains In-act the Power that animates the expansion of its Meaning and the Will that directs it.

- The object of the Will comes to Exist through the Act of Expansion of the Meaning.

The Meaning of a Knowledge is expressed through acts that com-prehend.

There is nothing new here: Is our thought not the expression of our thought, is life not the expression of life, does not a logical theory require a broader theory to express its truth...?

The relationship from a state of knowledge to the state of knowledge that expresses it is irreversible by nature and not by accident. It is not the complexity of the interdependence between one state of Knowledge and another that makes improbable any turning back, but the logical principle that a truth can only be expressed (Exist) by its expansion towards a larger truth that com-prehend it.

-The attribution of Meaning appears to Knowledge as an irreversible flow.

The result is an order relationship with a 'semantic content' and a 'container', between 'what is understood' and 'what understands'.

-The attribution of Meaning gives an order to Knowledge.

The meaning of the action contains time and space.

An action is an agent, a patient, a probability (was it equal to 1), space and time.

But this enumeration is not enough for the subject to describe the action, he also needs an intentionnalAct* that identifies the agent as such, the patient as such and the relationship as such. Is it not then this Act of identification that, by distinguishing the 3 elements agent-relation-patient creates in representation, both a spatial and temporal separation?

Note that an action can only be represented by the subject in an instant and a location of his time and his space.

In the very concept of action is anchored the time and space of the action.

Can't we say then that time and space are not in the essence of the action but in the essence of its representation as such?

The specific example of the emission-absorption of a photon from A to B comes also to mind: Shall the time and space of the exchange be considered as essential to the action or to its representation ?

* The distinction between {the action as a form} and {the representative Act} is important here.

The perspective of the subject ordains the multiplicity.

Moreover, since all sensations are, in essence, subsumed in the Existence of the subject, nothing allows us to think that the space variety, in our minds, is formed by synthesis, according to laws of association of unitary sensations. It is far more likely that conscious space, things and laws, co-emerge from a process of structured separation of the amorphous All of our Knowledge.

Not only there is no evidence that, beyond the horizon, formal relationships between facts can serve as a reference to our concepts of space and time, but the very concepts of facts or states-of-fact themselves do not prevail.

Let us give an example here: what do we know about the mode of individuation of sensations?

Feelings are not individuated sensations in principle, by nature. Before we can "reason about our sensations", we need a process of separation of sensations, of individuation that precedes sensations and understanding.

On this point Maine de Biran points out that the sequence: "sensitive phenomenon"- "intelligible phenomenon"- "understanding" results from a systemic and erroneous view of our apprehension of the world, when in reality the sensations emerge from our global ability to know as a whole. (see Appendix II)

A.N. Whitehead, philosopher and mathematician, was co-author with B. Russel in 1910-1913 of Principia mathematica, a founding work of modern logic and arithmetic.

In 1938 Whitehead confirmed and clarified Maine de Biran's opinion, in more contemporary terms, in two lectures [ref:Whitehead]:

One deals with the notion of **importance**

Whitehead first states that "*fact and its importance are inseparable*" and that "*these two associated notions underlie the full extent of our experience.*" ... there is no isolated fact. Interdependence is in

the essence of all things”

For Whitehead, the importance of a Fact is not a mere (if unconscious) judgment of the subject, applied as an attribute to the Fact existing by itself. Importance is a joint condition for the appearance of the Fact in the perception of the subject, in his Existence.

A Fact exists or does not exist for the subject based on a judgment of importance.

The other lecture deals with the notion of **perspective**.

For Whitehead, the judgment of importance is that aspect of our world feeling by which a

"perspective of the world of things felt" imposes itself on the subject.

"The two notions of importance and perspective are closely intertwined"

The importance of fact lies not in fact but in the global relational structures that determine the modes of judgment of importance and form a perspective.

We recognize with Whitehead, under the term “perspective”, the notion of “multiplicity” dear to Husserl, except that the knowing subject is explicitly designated by Whitehead as the epicenter of the perspective.

One might consider that importance qualifies the individuated fact while the perspective describes the pattern of a structure in the Knowledge of the Subject. This simplistic vision should not make us forget that if importance is a relationship of more or less, it is so based on a relational judgment emerging simultaneously from perspective and that perspective is literally from a point of view: that of the subject. Appendix I, "The Fact and Its Importance," can be read concerning the Views of Whitehead.

If the interdependence of the Facts of Sensations and the perspective that commands them does not appear to us on ordinary scales, it is because a sensation is a tiny sample of the All that determines the subject. Its impact on the subject's perspective does not appear because it is generally negligible. The new sensation seems to emerge without paradox in a space beforehand and absolutely ordained. The perspective seems to be given as such at first sight.

Moreover, there would be an error of principle in thinking of our apprehension of the sensitive phenomenon as a form of signal processing in a time and space, whatever its definition. If, as H. Poincaré argues, time and space are a construction by understanding, they cannot be considered existing in a process that precedes their construction. If there was to be a sensitive phenomenon, this should be considered outside of any spatial-temporal repository.

The OK frees us from this apparent paradox: It is through Logos, a logical and probabilistic principle, transcendent, prior to any form of understanding, psychology or evolution that the unspeakable reality structures and represents itself. The Fact of Knowledge as it presents itself to the consciousness of the subject, results from the collapse of complexity, from an interdependent reality, complex, unspeakable, not subject to form (especially neither to space nor to time), until a Horizon of the Meaning, virtual cut between the intensional and the extensional, on which the Fact appears to the subject with a dicible meaning in the language of his multiplicity, language composed of beings and spatial-temporal laws. This collapse of the complexity has for an asymptote the Individuation of the subject (who is representation), his becoming-One. It is the singularities of this collapse and the structure of their fusion that define the perspective of the subject.

3- Quantity, divisibility, cut, continuum:

Quantity, order relation:

In “On the Relations of Numbers and Quantity”, Russell argues that quantity is not a property of a certain quality, but a "category of comparison."

The question raised by Russell would be: Is the quality (of having quantity) generated by comparison or can the comparison develop only if a common quality is shared by all the terms compared?

This question directly impacts the concept of multiplicities defined by Husserl: indeed, beyond the

notion of quantity (which in itself is considerable!) it can be extended to all the relationships that structure the multiplicities, associate the objects that occupy multiplicities and "create Meaning." Depending on whether these relations are based on "qualities shared by all terms" or are "generated by comparison" we will have to think of multiplicity as "a unique assemblage of universal laws" or as "a set with endogenous conditions of existence, creating by separation its own forms and structures"

To use common words, is a multiplicity a unique syntactic extension from a universal intentional semantics (assuming that there is universal semantics) or is it the endogenous creation at the same time of a semantics and syntax?

The first of these alternatives leaves us in search of a first meaning to combine and the second in search of a substance to separate.

The distinction between these two options, however, is crucial from a practical point of view, since the first allows us to imagine a potentially dicible universal as it stands, while the second imposes as a single Act the emergence of Meaning and language and the extension of its horizon of validity. The first option validates the mathematical assumptions about infinity, the second invalidates them. The first option validates a flat geometry, open, indifferent to itself, the second assumes a geometry generated by itself, centered on itself, closed on itself.

According to OK the logical object "quantity" has existence for the knowing subject only as extensional magnitude, association of attributes dicible by means of the vocabulary and the syntax that regulate the representation/multiplicity.

For the subject, to evoke the existence *per se* of a quantity (and of any object) is therefore nonsense. This is true concerning the space and time of our representations.

However, this does not mean that there is no actual interdependence between intensional reality and extensional Meaning, but only that intensional reality is not describable with the attributes of extensional representation.

"Two intensive quantities of the same kind are, with regard to the conceptual properties that can be attributed to each in isolation, completely identical; the difference in quantity is therefore a difference in a property which appears not to exist before comparison. [...] This would seem to reduce the intensive quantity to a two-term relationship, and yet, by saying that one term is larger than another, we categorically state — as we admitted at the beginning of our analysis — that each has a separately a quantity." [Ref: Russell 1897c, 77-78:]

Russel's error must now seem obvious to us: What proves to Russel that the quantity exists before the subject observes it, i.e. gives it an extensional Meaning? For the OK talking about intensional (intensive according to Russel's word) quantity is nonsense because quantity only makes sense extensionally through an Act, by means of a cut.

How the certainty of the "I" imposes quantity.

In Whitehead's words, let us say that the notion of perspective is inseparable from that of the importance of the Facts. (see Appendix I)

The importance of fact A from the perspective of the subject is a quantitative notion, its "quantity" can in its general principle take the form of a conditional probability $\Pr(\langle I \rangle | A)$.

The perspective, i.e. the patterns of the multiplicity according to which the subject gives Meaning to the world, separates the All (of the subject) into Ordered Facts according to their relative importance.



Fig 1a

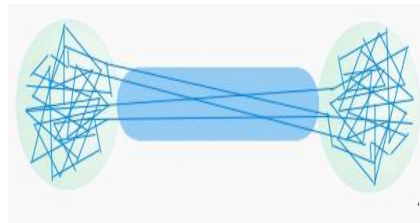


fig 1b

In the interdependence relationship $A \langle AB \rangle B$ (fig 1a), elements A and B are "in reality" of a bottomless complexity. The same is necessarily true of the $\langle AB \rangle$ link which is only the extensional appearance of the intensional reality of the interdependencies between the "reality of A" and the "reality of B" (fig 1b). In this sense A, B and the $\langle AB \rangle$ link which binds them are not of different natures. Interdependence $A \langle AB \rangle B$ does not have the nature of an accident between Facts A and B. $\langle AB \rangle$ is also a Fact.

In ensemblist terms, the $\langle AB \rangle$ cut-link could be referred to as the intersection of sets A and B in their "Realities". So much so that one can identify a Fact as the intersection of classes of Facts, meta-Facts, as we had defined the meaning of Socrates by the intersection of classes of "ugly," "old," etc.

The distinction between the elements and their relationship (not in principle but instantiated on $A \langle AB \rangle B$) is not given in principle, it finds its justification in the consistency and coherence of the representation provided to the subject by the global perspective of his knowledge, his world.

A, B and their relationship $\langle AB \rangle$ can be represented in a space of dimension $N+1$ rather than in a more complex structure that would cut-down these three elements, because this dimension $N+1$ is appropriate for a coherent representation.

The global perspective regulates how the importance of A: $\Pr(\langle I \rangle | A)$ and B: $\Pr(\langle I \rangle | B)$ emerge from the importance of a set $A \cup B$: $\Pr(\langle I \rangle | A \cup B)$ which ultimately emerges from $\Pr(\langle I \rangle | \text{All})$. The perspective allows the A, B, C to emerge in an order of importance.

The perspective does not put in order the Facts of a Knowledge, existing in principle, according to an attribute of importance attached in principle to each Fact. Quite the opposite. The perspective let the Facts emerge out of the All of Knowledge, by separation according to "surfaces of lesser complexity" or "surfaces of simpler interdependence", "of lesser resistance to the Meaning" that are cuts.

All the Facts of Knowledge emerge from the Existence of the "I" whose certainty can be noted: $\Pr(\langle I \rangle | \langle I \rangle)$ that cannot exceed 1

As a result of this constraint, all Facts of Knowledge are interdependent, which can be noted: $\Pr(\langle I \rangle | A \cup B) < \Pr(\langle I \rangle | A) + \Pr(\langle I \rangle | B)$

From which one could derive an approximation in the space of representation saying:

$\Pr(\langle I \rangle | A) + \Pr(\langle I \rangle | B) - \Pr(\langle I \rangle | A \cup B) = \text{interdependence } A \langle AB \rangle B$

Or again: $\Pr(\langle I \rangle | A) + \Pr(\langle I \rangle | B) - \text{interdépendance } A \langle AB \rangle B = \Pr(\langle I \rangle | A \cup B)$

whose merger necessarily results in $\Pr(\langle I \rangle | \text{All}) \leq 1$

Such formulas in an ontological essay have something ludicrous, but whatever, what they show is indeed worth some ridicule:

Through these formulas we see that the rules that order the world are the rules of Individuation of the subject as representation. The principle of Individuation is sufficient to make exist forms, modes of order in an interdependent reality.

The principle of Individuation applied to the complexity of the subject as knowledge imposes quantitative rules on the union of Facts of Knowledge, which cannot in total exceed the certainty, the probability equal to one, of the existence of the subject.

We see thus that the perspective is not psychological and is not produced by understanding, it is a mathematical fact.

Let us keep in mind, however, that the perspective that commands this interdependence in a certain space is not an universal absolute or an *a priori*. Of course the Logos transcends individuals,

moments and places, each subject is an individuated instantiation of this principle on the sample that is his Knowledge, immeasurable to reality.

If one ignores that the perspective is relative to the subject, or if one projects the point of view of the subject to the infinite of the chain of interdependencies, or in other words if one neglects the necessary convergence of interdependence links into an Individuation of the subject, then one finds probabilistic equality.

$$P(A) - P(B) = P(A \cup B)$$

Which appears to us at the universal foundation of mathematics of the countable.

The effect of quantity on perspective

At this point a question arises that would be addressed to A. Einstein as well as to H. Poincaré: If Facts (quantities) and perspective co-emerge in the same global process, if the possible inconsistency created by a Fact (a quantity) is absorbed statistically by the process that builds our perspective, can we postulate that above a "certain quantity", above a certain importance of a Fact, our perspective is affected in a significant way and that the geometric space built in reference to this perspective is altered?

Isn't the co-emergence of Facts and perspective the very reason for general relativity?

Divisibility:

Russell adheres to an "additive" conception of the extensive quantity, according to which each quantity determined is an aggregate (Russell known as "totality") of smaller extensive quantities. Thus: "The extensive quantity is always likely to be divided into extensive quantities, which are in turn divisible. This leads to infinite divisibility" (Russell 1897c, p. 75).

According to OK, the meaning of the mathematical object "quantity" is defined in the domain of extensional meaning, it is the area in which one can compare and associate quantities.

The extensional relationships between elements of the group have the formal properties that result from experiences that can be achieved without paradox by the subject below his horizon of meaning.

From the intensional part of the "quantity" object, beyond the horizon of meaning, the subject knows nothing at first sight.

To say that a quantity (object) is (infinitely) divisible, implicitly means that the extensional relationship that applies to that object also applies to its intensional sense, beyond its horizon or more precisely that it is possible to repel (infinitely) this horizon without altering the formal perspective of the subject.

We can therefore address Russell the same remark as to Poincaré: it is not just because a physical continuous gives me a "quantitative" (resp. ordonnable) sensation in a space endowed with a quantity (resp. an order), that the inside of the cut logically delineating it can also be described with the same terms.

The language that defines extensionally the element within a multiplicity does not apply to describe it intensionally. We, subjects of multiplicity, know nothing to say about the intensionality of an element. In particular, the fact that an element is formally divisible does not allow to say that it is made up of an addition of elements.

The intensional reality of any element must be considered as unformal. Cutting the informal requires an Act. There is a Judgment (probabilistic) that expresses in extensional terms what can be expected from the new cut. A judgment that makes sense. This judgment can only be made from the perspective defined extensionally, on the side of the horizon where the subject's point of view logically "is" located.

It should be noted that there is nothing psychological in either this Act or judgment (see ref OK).

A quantity appears to us divisible in the sense of Russell when the alteration of our perspective due to a new cut is negligible. The possible inconsistency created by the cutting of quantity is absorbed by the statistical process that builds our perspective. The apparent invariance of perspective lies in the finite nature of the possible experiments. The new knowledge created by the division of quantity

is tiny compared to the global knowledge that defines our perspective and defines us as a knowing subject.

To say that quantity is infinitely divisible is therefore only an approximation that until the beginning of the twentieth century had caused no paradox, a founding axiom of analysis that could be compared to Euclide's axioms for geometry.

However, for the OK, the perspective of the subject that arises from the mode of fusion of all the Existing is in any case constrained by the unsurpassable limit that is the certainty of the Existence of the subject (Ref: LAEG). It follows that the division of a quantity into two quantities can only be done at the cost of a global (infinitesimal) questioning of the perspective and therefore of the Universe of the knowing subject. A reasoning on divisibility is therefore not recursive.

The continuous:

Russell [...] invokes an argument proposed by Poincaré in "The Mathematical Continuum" published in the Journal of Metaphysics and Moral in 1893 p.16:

If the quantity were sensitive in nature, two quantities that generate indistinguishable sensations should be equal. However, the smallest discernible differences between sensations are finite, so that no reason can explain, if the quantity is sensitive, the creation of the continuous.

There is, however, a reason for continuous.

Suppose three sensations A, B, C such as A is indistinguishable from B, B indistinguishable from C, but not A from C. So we necessarily have, based on a purely sensitive basis: $A = B$, $B = C$, $A \neq C$. To avoid contradiction, we must assume that B is not equal to A and C; we have abandoned, with this hypothesis, the thesis of the purely sensitive nature of quantity.

[...] The idea of continuous quantity, of orderly series proceeding by infinitesimal graduation, is thus a product of thought. Quantities can be given by the senses, but they become quantity only by an act of the mind (1897c, p. 79).

No continuous quantitative variation is given in the experiment — meaning that magnitude conceived as an "orderly series proceeding by infinitesimal graduation" is a concept, not a sensitive intuition. The quantity must therefore be considered as a conceptual form.

The collective statement "A and B" is as fundamental and mysterious as the existential statement "A is".

To give Meaning to the notion of physical continuity the OK shows that the N-dimensional relationship $A_i \leftrightarrow A_{i+1}$ is only the N-dimensional probabilistic image of the complex relationship between the reality of A_i and the reality of A_{i+1} : $\{A_i\} \leftrightarrow \{A_{i+1}\}$.

Since $\{A_i\}$ and $\{A_{i+1}\}$ are unfounded and complex, what is represented within the multiplicity of the subject as the interdependence of finite dimension : $A_i \leftrightarrow A_{i+1}$ is, in fact, itself unfounded and complex. The link $A_i \leftrightarrow A_{i+1}$ has the same nature of Fact of Knowledge as the A_i and A_{i+1} elements. Like these Facts, it can only be cut by a new Act, by creating a new Meaning.

The <Continuity> of the link has the same predicative value as the <Unity> of the elements.

The cut

In "la science et l' hypothèse" H. Poincaré illustrates the number of dimensions of a geometry:

"Let's call element a set of sensations..."

A system of elements will form a continuous if one can move from any of them to another also by a series of consecutive elements chained so that each of them cannot be discerned from the previous one.

Let's consider a continuous C and remove some elements that for a moment we will look like no longer belonging to the continuous. All of the items removed is called a cut.

It may be possible that, thanks to this cut, C is subdivided into two separate continuous, with all the remaining elements forming no more a single continuous.

Then there will be two elements A and B on C, which will have to be looked at as two

separate continuous and will be recognized because it will be impossible to find a chain of consecutive elements of C starting from A, going up to B and each element being indistinguishable from the previous...

On the contrary, it may be that the established cut is insufficient to subdivide the continuous C. To classify physical continuous, we will look specifically at what cuts are needed to subdivide them.

If we can subdivide a continuous C by a cut that is reduced to a finite number of elements, all discernible from each other (and therefore not forming a continuous or several continuous), we will say that C is a continuous to one dimension.

If, on the contrary, C can only be subdivided by cuts that are themselves continuous, we will say that C has several dimensions. If cuts that are continuous to one dimension are enough, we will say that C has two dimensions, if cuts that are two-dimensional continuous are enough we will say that C has three dimensions and so on...

Thus lies the notion of the multidimensional physical continuity thanks to this very simple fact that two sets of sensations are distinguishable or indistinguishable.

[Ref: Poincaré 1902]

The OK makes use of the concept of cut. This term is used in a rather similar sense if it is restricted to the language of an extensional geometry, the one with which we represent the world, that of the space-time variety. The differences between the OK's design and that of H. Poincaré are however fundamental. These differences form a whole and will need to be addressed globally.

1- Complexity rather than continuity.

In an attempted language concerning an unfounded reality, the notion of continuity makes no sense. The term complexity would probably be better suited. Complexity cannot be ordained into any N-dimensional space, no matter how large N. The complexity of reality goes beyond the concept of continuity, which must be reserved for the multiplicity for which it is defined. Only a notion of continuous with infinite dimension could approach the notion of complexity.

2- The cuts are the result of necessary singularities.

The non-foundation of reality transcends the concepts of finitude or infinity. In article ref: OK. it is postulated that complexity necessarily presents singularities, loops of interdependence, purely logical (which could be compared to the turbulences of chaotic flows). These singularities have in them the law of their own unity. No sensitivity, no understanding, no space is necessary before hand for their unity to be true. This unit can then be associated with a less complex set of interdependence relationships. This set of relationships is called cut where logical Transaction takes place. ref. OK This principle of aggregation/reduction of complexity is metastable and will only tend to exhaustion when complexity tends to disappear, which corresponds, in our multiplicity, to a single-dimensional continuous.

3- Space is born by aggregation/separation of the complex.

The dimensions of the geometric space variety result from this reduction of complexity towards an asymptote and not from an additive synthesis from sensations that are *One a priori*.

4- The principle of aggregation/separation is statistical and logical, it transcends understanding.

This principle is Logos. The Logos transcends sensitivity and understanding of which it is the essence. Before being the product of the subject's sensitivity or understanding, the N-dimensional structure of our variety results from the Logos.

Note: statistical and logical are combined if one expresses the relationship of logical interdependence $A \leftrightarrow B$ by the statistical relationship: $\Pr(A|B) > 0$ et $\Pr(B|A) > 0$

5- The subject is an asymptote of the Logos.

The application of the principle of Logos to reality presents an infinite number of possible solutions, all of which are Actual, all are logically true. Every knowing subject is one of those solutions. The "I" of the subject is the one-dimensional asymptote of this solution, the focal point of the reduction of complexity and just as well the logical origin of the separation, the final cut that presents to the subject his present moment as a promise of his future. The structure of this convergence is the

perspective of the subject, the law of its multiplicity which also sets the form of his space-time.

6- Only the extensional dimension is defined by the cut.

The subject is by definition "external" to any cuts in his representation. He is by definition "what comprehends"

But it is the perspective of the subject that determines the properties of space-time in which he represents the world. The perspective therefore sets only the extensional "dimensions" of the cuts, and this relatively to the subject.

The intensional part of the object does not necessarily meet the rules of the "extensional" perspective.

7- The cut and the perspective (including space-time) are interdependent.

This point has already been detailed. The overall perspective of the subject results from the ways in which the Meaning is separated according to the cuts that appear to his representation.

8- The cut is semantic and not "physical"

As H. Poincaré presents them, the cuts are geometric even before the possibility of geometry is justified. In the words of Poincaré, the cut is the point that cuts the line, the line that cuts the surface etc... the cut is already "another thing" than the continuous sensations it "subdivides"

The concept of cut considered by the OK is based on a semantic and non-spatial structure. The cut in the sense of the OK is not a "thing" but a "form"

The logical facts do not fit according to the rules of our physical world.

The result of a calculation is nothing more than the calculation. In the OK sense, however, the result of a calculation is a cut in the calculation. It is a mode of order (or degree of order) that represents the calculation (or part of the calculation) as One (even if the calculation is an infinite sequence of operations, even if the result is a probability, even if it is an N-uplet).

If the proposition 'the French are 75% dissatisfied' is a break in the sense of the OK, it does not mean anything other than the opinion of each of the French, it does not even mean anything other than the unspeakable infinity of reasons why each of them is dissatisfied or not.

The extensional meaning that the subject must give to this proposition is "among the 67 million possible experiences in the form of an answer to the question "are you dissatisfied?", 50.25 million responses would be "yes". (Perhaps these answers are already all recorded in a large computer in California)

9- The cut is not exclusive:

Just as one could say that Socrates is the unique intersection of the classes of ugly, old, wise, humanist etc... it can be said that an individual logical Fact is the unique intersection of classes of logical Facts. But none of these classes "belongs" exclusively to the resulting Fact, for the simple reason that these classes only make sense by the syncategorematic rules of multiplicity according to which the world of the subject makes sense.

The class of ugly men to which Socrates belongs only makes sense for the subject. It's an extensional truth. Let's say that this class is "made possible" within the multiplicity of the knowing subject.

In particular, if it is possible for a subject to spatially delineate a Fact defined extensionally by a cut, there is no reason to say that the intensional part of the Fact "belongs" to the same domain of space-time.

4- The idoneity of four-dimensional space:

The idoneity.

Excerpts from :Pragmatic Epistemic Justification and F. Gonseth's Idoneism François Bonsack, Neuchâtel

Gonseth defended a philosophy of knowledge that he called idoneism (from Latin idoneus : appropriate, suitable, sufficient). The French word **idone** can be translated in English by adequate and the quality **idoneité** by fitness or adequacy. It is near to what van Fraassen calls empirical

adequacy.

Here the definition that Gonseth gives of it : “*Adequacy is the quality of the statements which, in a given situation, fit the circumstances, conditions, demands and means of investigation of the situation best.*”

For Gonseth, all knowledge is summary, approximate, schematic, revisable, open to future modifications.

Knowledge is not true, it is only adequate.

What are the differences between adequacy and truth ?

1. Adequacy leaves some distance between reality and the model we build of it. The model is only a framework, it retains only the relevant elements for the problem as posed. This distance allows a critical attitude : it prevents us from taking our approaches for reality itself, or to believe that our models exhaust reality[....]
2. [...] “Truth is one, adequacy is pluralistic”. Depending on the objective pursued or the required precision, the distance we have mentioned allows several different models to fit the same reality. During the inquiry, it may happen that a model that appeared until now perfectly adequate appears insufficient in other circumstances. What Gonseth calls a horizon of reality must make room for a deeper horizon.
3. [...] Contrary to a false belief, that can remain unverified, inadequacy involves validation by experience: an inadequate model can lead to unefficient actions.

Without disputing these lines by François Bonsack in the circumstances of this article we will take the terms closest to the Gonseth's words as they are in french. We will therefore use 'idoneous' for 'idoine' and 'idoneity' for 'idonéité' (Thanks to M. Sage for these words)

If Gonseth used these rare french words rather than “adéquat” and “adéquation” and if he went to so much trouble defining their contents, it is precisely to emphasize the specificity of the concepts and these specificity are what we will call here.

According to Gonseth's definition, being idoneous for a model is not a mere qualifier. A model 'is' not idoneous. A model gets only idoneous through its use: by the absence of inconsistencies in the acts that result from it. Reading F. Bonsack “.it prevents us from taking our approaches for reality itself.” makes it easy to understand that the proposition <this model is idoneous> would have something paradoxical.

Idoneity is not universal. The model judges its own idoneity from within.

The essence of idoneity is much more a principle of exchange between the 'model that directs the act' and 'the effect of the act that corrects the model'. The idoneity does not so much describe the model than the *de facto* interdependence between the Meaning and the Act. Returning to Poincaré: our spatial sensations are idoneous by the very fact that our gestures go to their goal and it doesn't matter after all whether they are spatial. The Act makes the model idoneous as much as an idoneous model makes the Act efficient.

The idoneism according to Gonseth, as a philosophy of knowledge is addressed to understanding, to reason.

In the following lines we will endeavour to show why, for the OK, the principle of idoneity precedes understanding in the sense that, long before consciousness can grasp it, it is the co-emergence of Facts and perspective that ensures, by principle, the idoneity of our Representations.

Excerpts from: De la non certitude en mathématiques - La philosophie idoine de Ferdinand Gonseth
Université Paris I Panthéon–Sorbonne 2014-2015 UFR de Philosophie
Marc Sage sous la direction de Monsieur Marco Parza

« ... by yielding to metaphysical intent, we depart from the conditions of real knowledge.
There is no reason to believe that objective discipline can ever be based on a prior and first doctrine, in the metaphysical sense of these words. Gonseth 1949
"Our thought cannot grasp any reality of any kind; it cannot inform us of any facts of the

world; it only touches on the way we talk about him and can only make changes to what we say. There is no way to bring forth through thought, behind the sensitive world that observation makes us perceive, a "world of the true being". Any metaphysics is impossible. Impossible, not because such a problem would go beyond human thought, but because it lacks meaning" [Hahn1935] p. 35

"A doctrine is not self-justifying a priori . It reveals being idoneous in its implications and consequences. Ibid '18

"Idoneous, because this feeling guarantees me that the judgments in question do not generally fall false. And that is, in essence, the practical meaning of the objectivity of a judgment.

Now this power to become, this ability to be constantly projected beyond and forward its present meaning, is integrated into the idea of objectivity. It becomes one of the essential elements; it is part of its "significant substance."

Let us agree with Gonsseth and Hahn to abandon the hypothetical adequacy of the signifier to a signified, in any case unprovable. Let us agree with them that the "significant substance" of our representations is their idoneity.

We will then have to differentiate two domains of validity for the word "idoneity":

A domain that could be described as extensional and which would be, for example, the judgment I can make on the right representation that jellyfishes have of their environment.

Idoneity in that understanding would be, in a way, an advantage, acquired during evolution and which would ensure the survival of the species.

Although perfectly acceptable in principle, this understanding of the term does not answer our question since, like all the theory of evolution, it relates *a priori* to a world of beings, with physical laws governed by time.

The other domain of validity, the one we are interested in, relates to the idoneity of my representation for myself. In this case, the idoneity is an internal property to the Meaning of the Knowledge, to the representation. It would be inconsistent, if one adopts the point of view of Hahn and Gonsseth to give the idoneity an external, universal meaning.

This idoneity here is a law of probability that makes "in reality" depend the future Meaning of my knowledge of its present Meaning. "The Meaning of my present knowledge is a law of probability on the future meaning of my Knowledge."

The idoneity of representations is a Fact of knowledge.

The same is necessarily true of the words "present" and "future" in the above propositions. It would be equally inconsistent to refer the change, succession, present and future of our representations to any succession of the facts of the world, to a 'time of the world'.

Time is a fact of representation.

It is with this understanding of the idoneity that the following questions arise:

Why are our representations idoneous?

What law of continuity justifies the effectiveness of bets on possible Meanings from the revealed Meaning?

How do past invariants impose themselves on future events?

So why should what is idoneous today be so tomorrow?

Idoneity, Individuation and Existence are the essence of the subject.

For the OK, the idoneity is not the result of an adjustment of perspective to any reality.

Individuation is not a formal property of the Becoming.

The Individuation, the idoneity of Meaning, the Existence of the subject refer to the same necessary consequence of the postulate that "the probability of loops in a Knowledge increases and tends towards one when complexity increases." see "Introduction to Ontology of Knowledge" (ref OK p.9)

From this postulate the article deduces the metastable collapse of complexity, an aggregation of

singularities that is only exhausted when the abounding of the Meaning tends asymptotically towards zero, i.e. towards a one-dimensional interdependence, towards a future such as $A \leftrightarrow A \leftrightarrow A \leftrightarrow A \dots$

Let us understand that the term 'collapse' is semantic: the complexity of the logical interdependencies that make "Me" up collapses into the certainty of "my Existence", based on the Meaning of my existence. Expressed by the relationship: "the probability of "I" knowing "I" is equal to one" (or almost!).

The formal simplicity of the "I" does not designate anything-else-than-, nor even an-alteration-of- the amorphous complexity of the interdependencies that make up its Meaning.

The solution of a problem does not designate anything other than the problem! The formal solution is already actual in the complexity of the problem. The problem in its bottomless complexity is always actual in the formal simplicity of the solution.

This tension towards a "Becoming-One" is Individuation of Knowledge because the focal point of this aggregation is the "I" of the knowing subject; his Existence, the "becoming-myself" of the "I" then writing $"I" \leftrightarrow "I" \leftrightarrow "I" \leftrightarrow "I" \dots$

The subject is Individuation of knowledge and Individuation is the very principle by which the meaning of Knowledge is rendered, for the subject itself and with certainty, coherent and complete: idoneous.

The ultimate meaning of knowledge is: "I will be"

"to be or not to be" is not a question since its statement implies being.

It should be noted that aggregation to an asymptote is inherently necessary. It does not require any law or ad-hoc constant. The postulate described above is its sufficient cause. This principle is Logos.

Thus described, the Individuation is none other than the probability equal to one that, knowing "I", "I" will still exist, which precisely defines the meaning of the Existence of the knowing subject.

The "significant substance" of my Existence is that my present Existence implies my future Existence with a probability infinitely close to 1.

My Existence, not as an object of the world, but as a representation, in the very words of Schopenhauer.

Add to this that there are an infinite number of possible (and therefore Actual) solutions to the collapse of complexity. We are one among the infinity of infinities of logical paths of which, each step in its lived form, makes progressively possible, then probable, and then certain the lived forms of the following steps.

For the OK, the idoneity, the Kantians "in mundo non-datur ..." are part of the essence of the subject: the perspective of a subject is for itself and in essence, coherent, consistent, complete, idoneous.

The future is Actual (already possible):

This idea according to the OK requires us to admit *a minima* that our future experiences already have a certain mode of reality (which the OK notes Actuality) at the moment when a state of the present takes Meaning for us.

We have models for this:

In a chess game, for example, players' future moves are already made impossible or possible, more or less likely by the present positions of the pieces on the chessboard.

But we must add to this mode of reality of the future that it is interdependent of the reality that we have experience in the present moment. Interdependent in the meaning of the OK

Let us understand, we are talking here about possible future experiences of "our Knowledge" and not about possible future forms of reality. Our Knowledge does not change anything in reality but it makes possible or probable the Facts of its expansion.

The subject is one of the possible Meanings of reality:

"In its essence, mathematics is only a set of views and schematic processes of our mind, a

conscious replica of the unconscious activity that creates within us an image of the world and a set of norms according to which we act and react. Not a building anchored somewhere with absolute solidity, but aerial construction, which holds as if by miracle: the boldest and most unlikely adventure of the spirit. [Gonseth 1926] '56

The OK suggests a possible reversal of Gonseth's statement: Mathematics would not be the conscious replica of the unconscious activity that creates in us an image of the world but on the contrary the laws that regulate human thought would be mathematical. Not some physical principle that can be modeled with mathematics but genuine mathematics.

If our intuitions (mathematics in their form) of the world are idoneous, it is because they are themselves the eigen-values of mathematical functions that create the meaning of the world. We are not beings who give meaning to the world, we are one of the possible meanings of the world.

And it is on the contrary, the extraordinary robustness and invariance of the transcendent laws of probabilities, applied to necessarily large numbers of interdependencies (because reality is unfounded) that makes us believe that invariances in the Meaning of our knowledge, result from the consistency and universality of the physical laws of the world.

Mathematics transcends us because it creates us, our substance is logical interdependence and the form of our spirit results from the principle of Individuation, a principle that we can state by laws of probability.

How could the number 2 question the universality of the $1+1$ addition? How could a sextuple six consider its unlikelyhood ?

To the question: "Can a living being who has a relationship to his environment only through chemical reactions have an intuition of space?"

you would probably answer "No, impossible since chemical reactions have no "forms"!"

So let's ask ourselves: "Don't we have ourselves as our only relationship to our environment, electro-chemical reactions?"

Is it not because we give *a priori** our body a geometric shape that we interpret these electrochemical signals *a posteriori* as extensions or relative positions?

Isn't the "space sensation" the product of circular reasoning?

* *a priori* and *a posteriori* are only logical, detached from any time reference.

idoneity of the four-dimensional space-time:

A reality can be represented through cuts of dimension N as long as everything that is located beyond the representation horizon, can be replaced by qualities and laws (interdependence relationships) that can be expressed in the subject's $N+1$ dimensional space, whose point of view is by definition "below" the cuts (i.e. in the extensional domain), with no practical possibility of contradictions.

It can then be said that the $N+1$ dimensional space is idoneous (and not isomorphic of reality), as much as is necessary for the coherence of the representation, i.e. of the subject.

It is our nature that the space-time of our representations, in which our Facts of Knowledge interact, has the necessary complexity for their coherence, for our coherence.

The dimension of the cuts that define our horizon of knowledge is not the result of intellectual or sensitive activity but the fact of a logical and probabilistic principle.

The solution in which the cuts are 3-dimensional (i.e. our space-time) is the simplest of solutions (with integer dimension) in which all the interdependencies of Fact of Knowledge to Fact of Knowledge (cut to cut) can be represented as a one-dimensional relationship, a fourth dimension. The three-dimensional universe is the simplest of representations in which all things can appear to Exist.

If I can "identify" a Fact of Knowledge to an element bounded by a three-dimensional cut, then I can represent all the interdependencies between all Facts by a 1-dimensional link.

At the ordinary scales and in the current state of our experience, additional dimensions would bring nothing more in terms of representation.

Euclidian geometry:

*"But how do I know that the two internal changes . . . should be considered identical?
Simply because they caused the same muscle sensations; and for this I do not need to know
in advance geometry and to represent my body's movements in geometric space. [Poincaré
1898, 9]"*

This last quote from Poincaré highlights the close association of the Meaning and the Act in the genesis of space: for the subject, action is movement only because it implies the probability of sensations which, in his global perspective, will appear as spatial.

When Poincaré refers to the compensation relationship between Acting and Giving-Sense, it does not need to be accurate. Compensation simply maintains the coherence of the subject's representation (i.e., the probability of inconsistency is close to zero in the subject's domain of experience (the space of his internal changes)).

However, the OK states that "all the Facts of Knowledge emerge from the Existence of the "I" whose probability $\Pr(\langle I \rangle | \langle I \rangle)$ cannot exceed one"

Because of this constraint the space of the "internal changes" of the subject cannot be infinite, except if one only considers changes of no importance, which is nonsense. Internal changes are therefore necessarily interdependent, each of them affects the overall perspective of the subject. The compensation between Acting and Giving-Sense cannot therefore be extended to infinity by recursiveness.

This constraint is incompatible with an infinitely extended Euclidian geometry.

Can we then assume that our intuition of a Euclidian geometry is that which, based on the immeasurable ratio between a Fact (of Knowledge) and Knowledge as a whole, considers as negligible the influence of a specific Fact on the global perspective, even though it is the interdependence of Facts that builds up the global perspective.

Would mathematical Euclidian geometry be the idealization of that?

Can't we say then that geometry is locally Euclidian?

To support this let's read Mr. 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 refutation. It would even be fair to say that its law is irrefutable by finished experience.... If the probabilistic assessment is based on solid reasons, if the renunciation to these reasons leads with it the fall of a pan too broad and too well validated of 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. »

Conclusion

The deterministic or probabilistic laws of our representations and our science do not link what "is" to what "will be" but what "I know" to what "I will know".

Consistency is not a predicate on the physical laws of the world but on the logical laws of Meaning.

If you cannot convince yourself of that.

If you want to believe that the Softmatter of the Meaning cannot be more consistant than the

Hardmatter of the physical world. Think again ...

...and try to answer these questions:

- Why do my dreams show me things and people in a space-time ? Is that not because Meaning is consistent on its own ?

- Why would it be less unlikely for the physical world to evolve from the big bang to individuated knowing persons than for the amorphous interdependence to assemble (logically) individuated representations of the world ?

appendix I

The fact and its importance

A.N. Whitehead (Wh), philosopher and mathematician, is with B. Russell co-author, in 1910-1913 of "Principia mathematica", a founding work of modern logic and arithmetic.

In 1938 Wh gave 9 lectures presenting his metaphysics, whose texts have been grouped into a collection entitled « Modes of Thought » (ref WMdP)

In the following lines, we will start from the notions of "Importance of the Fact", theme of the first of these lectures and "Perspective", theme of the Fourth, which we will reinterpret according to the terms of the OK and then try to go beyond them to draw conclusions applicable to arithmetic and geometry.

Let's start by solving two vocabulary details:

(1) The term matter-of-fact: We will rather use the term "Fact" as defined by the OK, as it may be involved in the terms "Fact of Knowledge" or "Fact of Sensation"

(2) The terms "being connected" or "connectedness". We will prefer "Interdependence" which is well defined by the OK.

Development

Wh first states that "*There are two contrasted ideas which seem inevitably to underlie all width of experience, one of them is the notion of importance...The other is the notion of matter-of-fact*". We will see that in this quote, the expression "*all width of experience*" is not incidental.

For Wh, the importance of a Fact is not a mere judgment (would it be unconscious) of the subject, applied as an attribute to the Fact existing by itself. Importance is a condition associated with the appearance of the Fact in the perception of the subject, its Existence as the OK defines the term.

"... characteristic modes of thought as we first recall ourselves to civilised experience are "this is important", "that is difficult", "this is lovely" etc."

For Wh, here is no surprise that one can qualify as "important" a Fact even though it is only vaguely characterized by the terms "this" or "that", for importance is not a mere qualifier of the Fact.

Not that importance is a prerequisite for the Existence of the Fact.

As the OK shows, since the Fact has no substance, it is the association of meta-Facts, of judgments of belonging to classes of Facts. Thus, judgments such as unity, importance ... co-exist in the Fact, like all the meta-Facts that constitute it. Importance co-Exist in the Fact.

As an illustration, a movement rapidly converging towards our axis of vision triggers in us a physical state of alertness, even before it has been individuated as a Fact of perception and acknowledged as "a danger" by our spirit.

Having shown co-existence in the Facts of the importance judgment, Wh then exposes the nature of importance, beyond its usual psychological meaning.

For Wh: "*the notion of a mere Fact is the triumph of the abstractive power of the intellect*" "*A single fact in isolation is the primary myth required for finite thought, that is to say, a thought unable to embrace totality* (3)"

(3) This term of totality would have deserved more precision. We propose " ... *the totality of its Knowledge* " or " ... *a thought/subject unable to give meaning to the totality of his thought/object* ". Knowledge and thought/object designate here the same notion.

Wh: "*This mythological character arises because there is no such fact. Connectedness is of the essence of all things* "

We will move from Interdependence inside the Fact to come to the Interdependence between the Facts of Knowledge and its role in the constitution of a perspective that will make possible a judgment on their respective importance.

For Wh, the judgment of importance is that aspect of our feelings of the world by which a "*perspective of the world of things felt*" imposes itself on the subject. It is according to this perspective that our consciousness neglects such unimportant Facts and gives Existence to such important facts.

"*The two notions of importance and perspective are closely intertwined.*"

The importance of the fact lies not "in" the fact but in the global relational structures that determine the modes of judgment of importance and is called perspective.

One could consider that importance qualifies the individuated Fact while the perspective describes the scheme of a structure in the Knowledge of the subject. This simplistic vision should not make us forget that on the one hand the importance is a relationship of "more or less", relative in essence, order relationship between Facts, necessary to an orderly structure; and that, on the other hand, the perspective is in the proper sense according to a point of view: that of the subject.

At this point, the reader of Wh's lectures feels the same discomfort as when reading Kant or Schopenhauer. As long as the terms: importance, perspective, judgment keep a psychological connotation, nothing is clear.

The OK proposes to the reader, by explaining this notion of "point of view of the perspective", to deepen the intuition of Wh to highlight by which objective process the Facts of our Knowledge seem to emerge in a space ordered by the importance and more generally by order relationships.

For this, let us quote a somewhat obscure passage from Wh: "*We may well ask whether the doctrine of perspective is not an endeavour to reduce the concept of importance to mere matter-of-fact devoid of intrinsic interest.... It is true to say that perspective is the dead abstraction of mere fact from the living importance of things felt. The concrete truth is the variation of the interest, the abstraction is the universe in perspective, the consequent science is the scheme of physical laws which, with unexpressed presuppositions, expresses the patterns of perspective as observed by the average of human beings*".

According to Wh, perspective results from systematization, in the form of laws, of invariances of structure (patterns) in the importance of Facts of Knowledge, as felt by the subject.

For the OK, Wh's analysis lacks the following premise: "*The subject is individuation of his Knowledge*"

Let us recall some principles enunciated in ref. OK: The Logos tends to aggregate the Knowledge of the subject into individuated singularities that are the Facts of Knowledge which, themselves, being interdependent, will be aggregated in turn and so on into a global process of individuation that converges to an asymptote : the "I", the knowing subject, the Point of view. The meaning of each Fact is expressed by a law of probability on the Facts to appear.

From a global view we can say that the agglomeration of the Facts of a Knowledge, by its convergence, gives Existence to the subject. It is the individuation of the subject.

G. Simondon has clearly stated (ref ILFI, IPC): The subject is not the result of individuation, it is the principle, the Act of individuation. Individuation does not end with the appearance of the subject. The convergence is perpetuated indefinitely towards the always repulsed focal point that is the "I". Thus, the flow of appearance of the Facts and their agglomeration "towards" the "I" is endless.

This convergent agglomeration is not regular.

The contributions to the individuation of the "I" are not equal.

The conditional probability of Existence of the subject, knowing the Existence of a Fact is not the same for all Facts.

Existence of certain Facts is objectively more important than others for the Existence of the subject.

The importance is therefore not a psychological or physiological phenomenon but a distribution of objective probabilities in a system of interdependencies.

It is the probability of Existence of the subject knowing the Existence of the Fact.

According to the same principle by which the Facts are individuated, singularities in the importance of the Facts appear and subsist. They individuate in meta-facts of importance.

The dynamics individuate and persist, as the convection in the atmosphere is individuated in cyclones and anticyclones.

Importance is not an exclusive attribute of the Fact, according to an absolute scale, but a characteristic that judges the Fact as one of the Facts, from a perspective of which we now know that the point of view is the "I".

Now, by virtue of the Cogito, the Existence of the subject is certain for the subject, in essence.

It follows that the sum of the importance, integrated over the whole extent of his Knowledge is equal to one for the thought/subject.

Importance is only one of the modes of Existence, one of the formal elements that coexist in the Fact and carry the meaning.

Importance is only one way of qualifying the remarkable singularities resulting from the Logos.

It is here that the remarkable consequence emerges.

In a reality according to the OK, which would not be ruled by physical laws a priori but by the laws of Knowledge, by the principle of the Logos:

The world of the subject is not the juxtaposition of Facts disjoint, with an absolute Existence, possibly ordered according to a priori scales.

The meaning of the world is not a possibly infinite addition of independently existing, or loosely interdependent, meanings of Fact.

Since the Meaning of a Logical Fact is the assertion of the Existence of the subject, the world is a set of Facts whose cumulative Existence results in the certainty of the Existence of the subject.

For the representation of the subject, the world is distributed according to a distribution of probabilities of Existence whose integral on the totality of the extension of his Knowledge is 100%.

This distribution is not equal, it is even metastable according to the principle of individuation.

There are singularities.

From the global interdependence between the singularities, the Logos' laws define, according to a perspective centered on the subject, the rules and the parameters that order the representation of the world.

Thus, the limitations to the extent of the world as it appears to us, our inability to qualify the infinite to large and small scales, result neither from insufficient means of observation, nor from an intrinsic limit to the world, but from the fact that the Existence of the world is included in the Existence of the subject, the totality of which can not exceed a mere certainty.

This principle can be expressed very concretely: In order for the subject to be able to make A and B exist in the same representation, the In-act of A and that of B can not be disjoint, then the Senses of A and B, expressed in terms of conditional probability of "I" do not add up completely.

Such a conclusion is not without consequences on the validity conditions of arithmetic and geometry.

Arithmetic: If we consider the number (integer) as the Fact of arithmetic, then only pure numbers, numbers which would be nothing for the subject, numbers with a zero Existence can constitute an

infinite according to the classical principle of recurrence. Of such numbers nothing could be said. In particular their importance would be nil ($1/\infty$) and therefore uniform, as moreover it would be impossible to attach to them the sense of the logical operations which define them, these numbers could not be ordered.

An arithmetic of numbers with non-zero existence should respect the above stated constraint: that the integral sum of the existences of numbers, extended to the whole field of this arithmetic, is limited to 1.

Let us say that if the conditions necessary for that each number n can be represented by the subject, occupy a fraction F_n of its existence, the series will be limited by $\sum F_n \ll 1$

One can probably conceive several classes of solutions respecting this constraint, that they limit the extension of the domain or the density of probability of Existence. I even suppose that they have already been elaborated for the solution of relativistic and quantum problems.

Geometry: If we consider the point as Fact of geometry, then only points with zero Existence can populate a continuous and/or infinite space. This space could not be ordered.

The constraints that would impose to points with non-zero existence, to "physical" points, would be of the same types as for the numbers of arithmetic.

I will not venture on this terrain.

It can be argued, however, that the solutions to this constraint:

- Will be centered on the subject
- The Facts will necessarily be without substance, unfounded. In other words, in these facts, there will be judgments of structure, singularity, and importance. They will possibly be defined only by intersections of classes.
- The Facts will be interdependent so that:

$$\sum_i P(\text{subject} \mid \text{Fact}_i) \ll P(\text{subject}) = 1$$

In conclusion :

It is remarkable that this Mode of Thoughts was written (in 1938) by the co-author of Principia mathematica (written with B Russell in 1910-1913).

In purely ontological terms, it will be noted that it is not the "totality" or "cardinality" of a world being which is limited in reality, but the Existence of the world which is limited to the Existence of the subject by the laws of the Logos .

Only the representation of a world is limited by an horizon.

Any question of form related to what is beyond this horizon is useless.

Should we deduce a new cosmology?

This text has brought us an objective answer to two questions concerning the OK:

- How, among the infinity of infinities of actual orders, a particular order is brought to Exist for the subject ?
- What is the principle of the relations of "more or less" that will order and qualify the individuated Facts?

In philosophical terms, this throws light on Kant's "*in mundo non datur hiatus*" in his "Critique" ref CRP:

A hole in the representation of the world would be for the subject a quantum of uncertainty about his own existence. But such uncertainty is impossible under the Cogito.

appendix II
From Maine de Biran to the geometry of Poincaré

Abstract:

The Fact of sensation is detached from the faculty of feeling and not from a fact opposite.

Development:

Common sense is that the sensation comes from a fact opposite and enters the mind in the form of a sensible phenomenon, transformed by the understanding into an intelligible phenomenon recognized by reason as a fact-of-sensation. The fact-of-sensation, once revealed to reason, is combined with others to ultimately synthesize a representation of the world.

For Maine de Biran (Ref NoK and DAI), this vision is erroneous, it is to apply to the thought/object the modes of reasoning which describe material or logical systems elaborated by the consciousness (the thought/subject) and whose relevance is not established to describe the thought/object.

It is only after having generally affected the mind, in a diffuse form, that the sensible phenomenon emerges as a fact-of-sensation.

The sensation is present (although informal), as an affection of the thought/object and it is the global faculty of knowing which gives it form.

But the combination of sensation with other sensations and concepts does not happen at the level of the revealed sensation, it affects, still informal or at least diffuse, the thought/object.

Reflex acts demonstrate this.

Sensations do not combine as revealed sensations, but spread as informal affection in thought/object from which they emerge and combine.

Only then formal concepts can reveal themselves in the form of Facts of Conscience.

Sensations are not combined by reason as logical propositions would be, but sensations merge in their diffuse form as chaos and only then can new formal concepts emerge from this chaos.

In fact, we can say that there is between the informal and formal levels a diffuse front where the classes of Facts of the thought/subject are the germs of crystallization of the affections of the thought/object.

In other words, the faculty of combining sensations does not stand at the level of the subject's understanding but at the level of the mind/object.

We are both subjects and objects of our sensations, at the same time spectator of sensation/object and actor/subject of sensation.

This diffuse front obliges us to abolish the difference of nature between the logical/mental/intangible and the physiological (or whatever physical nature) of thought.

Knowledge operates by detachment and not by synthesis.

Contrary to what common sense says, the (formal) facts of the world are not associated with knowledge in the form of sensations revealed as such to the understanding, but on the contrary, they are detached from the global faculty of knowing.

The fact can not be seen without the filigree presence of the knowing subject.

This fact can only appear to the "knowing me".

Without a subject there can be no objects.

At the moment when the fact of sensation is revealed, it is already part of the whole of knowledge of the subject.

To the idea that reason synthesizes the universe of knowledge by disposing, at each moment, one-to-one, the facts of sensation, revealed for themselves, we must then oppose that it is the global faculty of knowing who lets emerge out of it, the fact, as part of a whole conceived and organized globally in the self-object.

Not that we must choose between one or other of the hypotheses, but rather understand how they cooperate to increase and formalize the meaning of Knowledge.

We see then that the fact of sensation in its form and also its position in the universe of our representation is just as much and certainly more determined by knowledge and its laws than by the possible a priori form of an external cause of the sensation or its position relative to other objects.

Space according to Poincaré :

The concept of space to which this conclusion leads us is close to that of Poincaré: a universe whose form is created as a whole by the mind/object and appears to the mind/subject. An universe where nothing has "by itself" a position.

According to Poincaré (Ref S&H, THP), space has no external reality, nor is it the product of a kind of a specific sensitivity. The properties of space derive from our motor and tactile experiences.

However, sensations have no geometric and spatial character. Spatiality appears to us from associations and orderings of sensations.

Poincaré supposes an innate capacity, a category of the understanding which he names "sensible space" or "representative space" whose function is to classify sensations and to allow the qualitative comparison of sensations of the same kind.

NB: The way sensations are ordained by the faculty of knowing is illustrated in appendix V from the ideas of Whitehead.

The axioms of geometry are conventions, the question of truth in geometry does not make sense, Euclidean geometry is the one that corresponds best to our experience and in particular to the sensations associated with the movement of natural solid bodies.

For Poincaré, the genesis of space is physio-psychological and cultural.

It is at this point that the OK diverges from Poincaré.

It is surprising that the father of dynamic systems theory was content with this typically Darwinian explanation, implying a psychological component under the mysterious label of a "category of the understanding" that he leaves unexplained, as did before Kant and Schopenhauer (ref CRP, QRPR, MVR).

How, could a "category of understanding" identify and compare "sensations of the same kind" ?

This is a typical example of the epistemological error of describing the thought/object with the terms of the thought/subject.

Poincaré, who had seen the constructive character of probabilistic laws and chaos, did not ask the question "what are the laws of the understanding?" from the point of view of logic and very large numbers. It must be said that at the time the field was occupied by the rise of the physiological and psychological sciences of thought.

It is also surprising that Poincaré did not note the circular aspect of a Darwinian explanation underpinned by the notion of a priori time and by an a priori materialistic view of the world.

These remarks made, it remains nonetheless that according to the conception of Poincaré, in a space created by the understanding from various "sensations" and having in themselves no spatial character, the objects of the world do not have "by themselves" position and therefore no speed, acceleration, inertia, mass etc ...

These properties of the object emerge from the global Knowledge of the subject and it is this essential link of the individuated object with the whole of the represented universe, which gives meaning to the ideas of mass, inertia, gravitation, relativity.

For example: The inertia of an object is a mode of its relation to my perspective of the universe: "*If I move an object in my representation of the universe, the whole representation is affected*" "*To move an object, I shall change all my representation* »

Appendix III

Laws of the world or laws of thought

Abstract:

Experience does not validate the reality of the laws and forms of a vis-à-vis world.
These cannot be distinguished from thought.
They have no object.

Development:

In his 2nd metaphysical meditation, Descartes formulates the Cogito:

« .. *This proposition: I am, I exist, is necessarily true, whenever I pronounce it, or when I conceive it in my mind.* ».

What can be generalized by:

« .. The proposition: I am, I exist, is necessarily true, whenever I pronounce, or when I conceive any proposal in my mind. »

Thus the proposition "A" or "A is true" implies (and proves) first and foremost the existence of the subject who conceives it.

The "A" proposal is therefore incomplete since the knowing subject who speaks the proposal is formally absent from it, while its existence is attested for itself by this statement.

To make the subject formally present you need a proposal such as "I know that A" or "I understand A" or "I believe that A".

The question then is: In my representation of the world, if "I know that A" can it be that "non-A" ? Is it possible that A is represented by my mind as a thing of the world without an equivalent "in reality" in the world?

Knowing how difficult it is to prove without the possibility of access to the real world, from our sensations alone, the equivalence of "I know that A" with an "A" vis-à-vis, the scientific method has devised a principle of pragmatic verification that can be summarised as follows:

If the conjectures produced from my representation of the world are verified by experience, then my representation is equivalent to the world.

In other words: if any relationship in representation: " $I \text{ know that } A \Rightarrow I \text{ know that } B$ " has its equivalent $A \rightarrow B$ in the world, we can say that the representation is isomorphic of the world.

The principle of verification can be schematicized by comparing the results of conjecture and experience in two parallel ways:

1a:(representation) A - Sensation of A - $I \text{ know that } A$ (conjecture) - $I \text{ know that } B$

1b:(experience) $A \rightarrow B$ - (experience) - Sensation of B - $I \text{ know that } B$

"Legend: " \rightarrow laws of the world \Rightarrow laws of thought

A Facts of the World A Facts of Thought

According to this principle, *knowing A*, we compare the relationship in representation: $I \text{ know that } A \Rightarrow I \text{ know that } B$ to the experience that we can make of the relationship $A \rightarrow B$ that occurs in the world vis-à-vis. If, by the way of experience, *knowing A* we also get $I \text{ know that } B$, we can say that the relationship $I \text{ know that } A \Rightarrow I \text{ know that } B$ is equivalent to $A \rightarrow B$

According to this definition, isomorphism assumes nothing about the "proper" or "intensional" reality of the facts of world A and B , nor the facts of knowledge " $I \text{ know that } A$ " or " $I \text{ know that } B$ " or even relationships \rightarrow in the world or \Rightarrow in thought.

In Husserl's words, this principle defines an isomorphism of the world and its representation as multiplicities, limited to the extensional part of the two.

" A, B, \dots " are adopted by the subject in his world represented as equivalent to " A, B, \dots " in a vis-à-vis world.

There is nothing very extraordinary about this form of pragmatic realism.

However, for the validation of equivalence to be effective, \mathbb{B} must be a necessary condition for *Sensation of \mathcal{B}* , which may be noted:

$$\Pr(\text{sensation of } \mathcal{B} |_{\text{non-}\mathbb{B}}) = 0 \text{ strictly}$$

Again without prejudging the intensional realities of \mathbb{B} or the *sensation of \mathcal{B}* .

The problem is that... when it concerns the world vis-à-vis, the distinction between extensional and intensional realities arises exclusively from the intentionality (with a t) of the knowing subject(s). In the world vis-à-vis, the distinction between the all and its parts is nothing without the subject. There is no object without the subject, nor is there any action between objects.

Without subjects, no laws of action between objects.

Without a knowing subject the earth does not attract the moon for without intentionality there is neither earth nor moon. The one-dimensional vector attached to the moon's center of gravity results from our intentionality, as do the billions of billions of single-dimensional vectors attached to each of the moon's atoms and directed towards each of the earth's atoms.

Without the intentionality of the subject what associates the earth and the moon, although real, is nothing that exists.

The process we call "experience of \mathbb{B} " therefore does not have the simplicity of fig.1b.

The fact of knowledge "*sensation of \mathcal{B}* " does not directly imply the (supposed) fact of the world " \mathbb{B} ". The transition we call experience is not a one-dimensional vector linking an individualized fact of the world (\mathbb{B}) to an individual fact of knowledge (*sensation of \mathcal{B}*).

In their realities \mathbb{B} and *sensation of \mathcal{B}* are unspeakable complexities and the transition that is supposed to connect them is therefore also an unspeakable complexity.

Physicists and neurobiologists have long attested to this.

This transition is not governed by a deterministic law that would allow us to assert that $\Pr(\text{sensation of } \mathcal{B} |_{\text{non-}\mathbb{B}}) = 0$, it is in fact an abundance of billions of interdependences of a probabilistic nature in which already appear by themselves quantities of singularities that are facts of thought.

Sensation of \mathcal{B} appears in its individuated and intelligible form to the subject only by emerging from his knowledge through a simplifying, individuating Transaction that marks the boundary between the intensional and the extensional, the unconscious and the conscious. This Transaction is already knowledge and *conjecture of \mathcal{B}* issued from the *knowledge of \mathcal{A}* plays a major role in it, if only by directing the intentionality of the subject towards the object of knowledge \mathcal{B} . In many other ways it helps to define the perspective of the subject that will shape *Sensation of \mathcal{B}* .

From this, the philosophers of knowledge have long attested.

conjecture of \mathcal{B} lies in the knowledge of the subject not only in its dicible form: "*I know I conjecture \mathcal{B}* " but also in its intensionality, the form of which is unknowable, including by the subject.

In the intensionality of thought *sensation of \mathcal{B}* cannot be discerned from *conjecture of \mathcal{B}* or even from any other intelligible form.

1a (conjecture) -		<i>sensation of \mathcal{B}</i>	
	Intensional Thought		Understanding
1b (experience) -		<i>all intelligible sensations</i>	
	Informal	Formal	Formal

The emergence of sensations out of the relational chaos of intensional thought is a probabilistic logical phenomenon.

In the hypothesis of the above diagram, the possibility of the emergence of the formal (intelligible) *sensation of \mathcal{B}* out of intensional thought associates with the supposed experience of \mathbb{B} (according to way 1b), the *conjecture of \mathcal{B}* (according to way 1a) and all the other logical facts that constitute intensional thought.

It should be noted that we are forbidden to associate intensional thought with a state of the world vis-à-vis (for example, a state of the brain, a place or a moment of the world) because both are "outside" the jurisdiction of isomorphism.

Let us simply say that from this intensional thought emerges for the subject all representations, of the world and of itself. This simple remark must make us feel and humbly contemplate the unimaginable complexity of the intensionality of thought.

Note that the distinction made here between conjecture of B , experience of B and intensional thought is only a heuristic facility.

One could then write the relationship in a probabilistic form:

$$\Pr(\text{sensation of } \mathcal{B}) = \Pr(\text{sensation of } \mathcal{B} | \text{experience of } B) + \Pr(\text{sensation of } \mathcal{B} | \text{conjecture of } \mathcal{B}) + \Pr(\text{sensation of } \mathcal{B} | \text{intensional thought})$$

Paraphrasing Schopenhauer, the fact that experience of B seems to our conscience as the "last change" does not actually give it any superiority over others (... facts that make up the thought) to establish the *sensation of* \mathcal{B} .

We are very far from the original pattern which presented the *sensation of* \mathcal{B} as a direct consequence of B , determined in the world, transmitted to the understanding, already existing and individuated as such, a necessary condition for the fact of knowledge "*I know that* \mathcal{B} ".

It is clear from this that, precisely because intensional thought is informal, we cannot say that $\Pr(\text{sensation of } \mathcal{B} |_{\text{non-}B}) = 0$.

The intensional thought including *conjecture of* \mathcal{B} , derived from the *representation of* \mathcal{A} , makes possible the *sensation of* \mathcal{B} and thus the *representation of* \mathcal{B} by the subject, even if " B " is not true.

The representation of the world through thought has its own persistence.

The probability of "*I know that* \mathcal{B} " if "*I know that* \mathcal{A} " is not zero.

From this, our dreams have since long attested.

From that : *representation of* \mathcal{A} , makes possible *representation of* \mathcal{A}

This possibility is sufficient for the endogenous emergence of "*I know that* \mathcal{A} , \mathcal{B} , etc." no longer as Facts of thought equivalent to facts of the world but as attractors in the relational chaos that is intensional thought.

Yet the laws of intensional thought are those of relational chaos, while the laws of the world as we describe them at the macroscopic level are the result of causalities.

The attractors of relational chaos are infinitely more persistent than the results of an infinite sequence of causalities.

The contrary chances that might alter the course of the development of my thought are infinitely less likely considering its extent than are the contrary chances that could alter, in the (supposed) real world, the course of $A \rightarrow B$

The realization of (*I know that* \mathcal{B}) from (*I know that* \mathcal{A}) depends infinitely little on a hypothetical realization of B from A .

To think that "*I know that* \mathcal{B} " can be invalidated by " $\text{non-}B$ " is to confuse the thought/subject in which this possibility exists and the thought/object or intensional thought in which this possibility is infinitely low.

The scientific method does not validate the isomorphism between the world and its representation, nor even the need for a form of the world.

Memories, for example, are evidence of the persistence of meaning in thought without the experience of the object.

Dreams are evidence of the ability of intensional thought to create a persistent sensation without the experience of the object.

It follows that:

Experience cannot be used to validate representation.

The complexity of intensional thought as relational chaos is sufficient to allow the continuity of representation.

The laws of thought are sufficient to provide a continuous, persistent, predictable representation.

The laws of the world cannot be distinguished from the laws by which representation emerges from intensional thought.

The laws of a physical world opposite are not necessary.

The forms of the world resulting from these laws cannot be distinguished from the laws of thought.

They have no object.

It should be remembered that intensional thought should not be described as a "thing" or a "phenomenon" in the usual sense of the terms.

On the one hand, since dicible Facts, space and time emerge from intensional thought, its "substance" cannot be adequately described by these concepts.

On the other hand, since the One is representation, i.e. also emerges from intensional thought, it is necessarily unfounded: without primary element or Fact.

PS: We will say, however, without demonstrating it here, that representations of the world by several knowing subjects can be rendered isomorphic, which also renders obsolete a validation by shared experiences.

All this will allow (I hope) the reader to deepen the meaning of these few aphorisms due to L. Wittgenstein (ref: "On certainty" Gallimard.):

105 Any verification of what is admitted as true, any confirmation or reversal are already taking place within a system. And certainly this system is not a more or less arbitrary or dubious starting point for our arguments; on the contrary, it belongs to the essence of what we call an argument. The system is not so much the starting point of arguments as their vital environment

110... as if there was not a time when the quest for the foundation comes to an end. But at this term, it is not unfounded presupposition, it is the unfounded way of proceeding.

140. We do not learn the practice of empirical judgment by learning rules; we are taught judgments and their connection to other judgments. It is a totality of judgments that are made plausible to us.

142 ; These are not isolated axioms that seem obvious to me, but a system in which consequences and premises give each other support.

225 What I stand firmly at is not a proposal but a nest of proposals.

The system of all the things we hold true (true things or true system)

232 Each of these facts taken in isolation, we can question it, but all of them we cannot question.

... That we don't question all of them is simply the way we judge, and therefore we act

205 If the truth is what is founded, then the foundation is not true, nor is it false.

The author:

Jean-Louis **Boucon**

E-mail : boucon.jean-louis@neuf.fr

Blog : <http://jlboucon-philo.over-blog.com/>

Références :

- Ref : Majolino ERL *Les « essences » des Recherches Logiques*
Claudio Majolino
Revue de métaphysique et de morale_2006/1 (n° 49), pages 89 à 112
- Ref : Brentano ASE *Aristote, les significations de l'être*
Franz Brentano, Trad pascal David Paris, Ed. Vrin
- Ref : Brentano LRU *Die Lehre vom richtigen Urteil*
Franz Brentano, Hambourg
- Ref : Bisart RCI *Résumé du cours sur l'intentionnalité (1ère partie)*
Robert Brisart 2014 (www.academia.edu)
- Ref : Seron OSCHR *Objectivité et subjectivité dans la critique husserlienne du relativisme*
Denis Seron (FNRS, Université de Liège)
In : M. Gyemant (éd.), coll. « Problèmes & controverses », Paris, Vrin, 2015.
- Ref : de Biran : *Œuvres choisies*
Aubier éd. Montaigne 1942
- Ref : Brentano DP *Deskriptive Psychologie,*
Franz Brentano, (R. Chisholm & W. Baumgartner) Meiner, 1982,
- Ref : Brentano PES *Psychologie vom empirischen Standpunkt,*
Franz Brentano, (Leipzig, Duncker & Humblot) Meiner, 1973,
- Ref : Husserliana *Husserliana*
(publié par IHE philosophiques de Louvain)
- Ref : Husserl E&J *Expérience et Jugement.*
Compilation posthume par Ludwig Landgrebe éd. PUF Epiméthée
- Ref : Husserl Log *Articles sur la logique,*
Compilation posthume éd. PUF Epiméthée
- Ref : Husserl 6R *Éléments d'une élucidation phénoménologique de la connaissance. Rech. VI*
E. Husserl PUF Epiméthée
- Ref : Badiou *L'être et l'événement*
Alain Badiou, Ed : Seuil 1988
- Ref : Cantor *Grundlagen einer allgemeine Mannigfaltigkeitslehre*
Leipzig 1883
- Ref : Nabonnand *La théorie de l'espace de Poincaré.*
Philippe Nabonnand. Recherches sur la philosophie et le langage, Paris: Vrin, 2010
HAL Id: hal-01082336 <https://hal.archives-ouvertes.fr/hal-01082336>
- Ref : Poincaré 1901 *Analyse des travaux scientifiques de Poincaré faite par lui-même,*
Uppsala : Almqvist & Wiksells Boktryckeria, 1913 ; *Acta mathematica*, 38 (1921)
- Ref : Poincaré 1898 *On the Foundations of Geometry,*
The Monist, (1898), 1-43 ; trad. fr. L. Rougier
- Ref : Poincaré 2002 *L'opportunisme scientifique,*
Laurent Rollet (éd. Birkhäuser, Basel), 2002
- Ref : Poincaré 1902 : *La science et l'hypothèse,*
Paris : Flammarion, 1902 ; cité d'après la réédition de 1968.
- Ref : Vernant 2010 *Introduction à la philosophie contemporaine du langage*
Pr Denis Vernant. A. Colin 2010

- Ref : Russell 1897c, *On the Relations of Numbers and Quantity* »
B Russel, Mind , n. s. 6, p. 326341, in Papers 2, p. 70-82.
- Ref Sage *De la non certitude en mathématiques La philosophie idoine de Ferdinand Gonseth*
Marc Sage Sous la direction de Monsieur Marco Parza
Université Paris I Panthéon–Sorbonne 2014-2015 UFR de Philosophie
- Ref : Gonseth 1949
- Ref : Hahn1935 *Logiques, mathématiques et connaissance de la réalité*,
Hans hahn, éd. Hermann (1935)
- Ref : Gonseth1926 *Les fondements des mathématiques*,
1926, éd Albert Blanchard (1974)
- Ref MQIP *Mécanique Quantique, une introduction philosophique*
Michel Bitbol , Ed. Champs Flammarion 1999
- Ref : Whitehead *Modes of thoughts* lectures 1-importance & 4-perspectives
A.N. Whitehead pub. MacMilan New york 1938
- Ref ILFI : *L'individuation à la lumière des notions de forme et d'information*
Gilbert Simondon Réédition. Millon 2005
- Ref CRP : *Critique de la raison pure*
Emmanuel Kant Ed G Flammarion 2001
- Ref MVR: *Le monde comme volonté et comme représentation*
Arthur Schopenhauer, trad. Auguste Burdeau, librairie Félix Alcan Paris
Numérisé par Guy Heff www.schopenhauer.fr
- Ref QRPR: *De la quadruple racine du principe de raison suffisante*
Arthur Schopenhauer, trad. J.A. Cantacuzène
Numérisé par Guy Heff www.schopenhauer.fr
- Ref Wittgenstein: *De la certitude*
Ludwig Wittgenstein [Ed. Gallimard](http://www.gallimard.fr)

Other publications by the author :

- Ref OK: *Introduction to the Ontology of Knowledge*
Jean-Louis Boucon.
Article paru sur philpeople.org
- Ref PLOC: *The philosophy of language and the Ontology of Knowledge*
Jean-Louis Boucon.
Article paru sur Independentphilpeople.org
- Ref LAEG *The Ontology of Knowledge, logic, arithmetics, set theory and geometry*
Jean-Louis Boucon
Article paru sur Independentphilpeople.org
- Ref BQOC *Beyond QBism with the Ontology of Knowledge*
Jean-Louis Boucon
Article paru sur Independentphilpeople.org
- Ref CNT *A natural concept of time*
Jean-Louis Boucon,
Article paru sur philpeople.org
- Ref FOUND *The concept of Foundation and the Ontology of Knowledge*
Jean-Louis Boucon, Article paru sur philpeople.org
- Ref SOLI *The Ontology of Knowledge is it a solipsism ?*
Jean-Louis Boucon
Article paru sur philpeople.org
- Ref UPF : *L'Univers n'a pas la forme*
Jean-Louis Boucon
Ed. Mon petit éditeur 2013