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What is the "phenomenon" in science and philosophy?

From the physiological point of view, the senses are the organs of perception.

1- Introduction to the question posed by the notion of phenomenon.

2- The phenomenon in Science.

3- The phenomenon in Philosophy.

Introduction of the question posed by the notion of phenomenon.

The term phenomenon means that the observer can see or perceive that something remarkable is happening an identifiable, possibly reproducible, measurable reaction without necessarily distinguishing what the material in question is from or how it can produce such a reaction.

Phenomenon and reality, phenomenon and rationality, phenomenon and material object, phenomenon and noumenon, knowledge or not of the thing in itself, physical or chemical phenomenon, material or psychological phenomenon, phenomenon and observer, material or spiritual phenomenon, deterministic or contingent phenomenon, predictive or probabilistic phenomenon, the notion of phenomenon raises many questions both scientific and philosophical.

There is a phenomenon when we notice that facts are repeated when we are in the same initial conditions.

Science is therefore a study of phenomena.

It seeks to determine precisely under what conditions they occur and for what reasons.

These facts are considered remarkable and require observation on the one hand and interpretation of the other.

The scientific or philosophical ideal would be that one can always tell what happened when a phenomenon occurred but it is not always the case.

Some people even say that this question is insoluble or badly posed, as science is not able, according to them, to go beyond the phenomenon to reach a deeper reality, or these authors consider that this reality beyond beyond observation does not exist.

The most idealistic believing that it is the spirit (human or supra-human) that creates the world he observes.

The idea of distinguishing the phenomenon (what is observed) from the object itself (considered as a reality deeper than the interaction expressed in the observed experience), to introduce the role of the observer in the observation is an idea that has had a long journey.

The notion of phenomenon does not only concern areas such as physics, chemistry or biology.

There are psychological phenomena, social, societal, or the field of information, communication, etc ..

In the social, historical, economic and political fields, there is also a tendency to present the facts either in a chosified way or in a purely idealistic way.

In the first case, concepts are presented as pure and simple material reality.

In the other, they are presented as free creations.

The dialectical character of the objective and the subjective, the being and the appearing, the being and the becoming, the chance and the necessity, the object and the environment, the matter and the shape, content and structure, actuality and potential, disappears as well.

The phenomenon reflects a reality and not just an opinion but the observed phenomenon is not the whole reality.

In all these areas, as in physics, we find the same difficulties in conceiving the observed interaction, actual-potential, the same difficulty in conceiving also the dialectic of chance and necessity, that of probabilistic laws in relation to actions that remain individual, or the dialectics order-

disorder, chance-laws, etc.

In the main, we have to be-appear, or matter-phenomenon, a dialectical pair which bases a large part of our difficulties (real as philosophical) of perception and understanding of the material world.

But the recognition of its existence is not only a limit, it is a fundamental discovery of the actual mode of operation.

As for example, the opposition between positivists and mechanists, between the Copenhagen school and realistic physicists, or between physicalists and phenomenologists, we seek to break this pair of dialectical, opposing but interdependent and inseparable opposites.. is not to unravel the enigma but, on the contrary, to darken it.

None of the developments of the sciences nor of philosophy has illuminated a dialectical contradiction nor by eliminating one of the terms, nor by submitting it to the other, nor by studying separately one of the two.

The phenomenon in Science.

The term phenomenon aims to pose a problem: is there a difference between what can be observed directly and reality.

To speak of phenomenon is to take a cautious distance from what one seems to see and to avoid taking appearances for reality.

But that goes far beyond: it is to distinguish an irreducible couple: to be / appear and seek to study the interaction between these two entities.

It is the appearance (observation) that manifests existence but the reality of being (matter) is not reduced to its perceptible manifestations, to appear (phenomenon)

It is not only the observer (the man or the measuring device) who needs the phenomenon to perceive the outside world.

An individual matter, itself, perceives another matter only through interaction.

Now, physics has shown that matter is always separated by vacuum.

It is the transformation of emptiness by the presence of matter that allows it to interact with the surrounding matter.

But, suddenly, we can no longer separate a matter from the transformation of the emptiness that surrounds it caused by its presence.

The reality of matter thus also contains its interactions, which are its phenomenal manifestations.

They are inseparable from the material object as it is inseparable from them.

When we try to be content with measuring the material object, we abandon our knowledge of the surrounding space and vice versa, which will be demonstrated by quantum physics.

Indeed, there is no way of knowing everything about the object and its interactions with the surrounding space.

This is called wave-particle duality.

It is also the source of the famous inequalities of Heisenberg.

It is again the cause of the superposition of states that causes matter to exist also in potential form and therefore beyond what an experiment can show, the latter expressing only one of the potentialities.

This is not a limit of our skills, nor a limit of experience, nor even a limit of theory.

It is a characteristic of the world.

We can not conceive of matter without its interaction properties.

These properties can not be studied without conceiving that they emanate from a matter.

But we can not conceive the interaction without transformation of the vacuum, for example without the fields.

We can not oppose diametrically neither matter and emptiness, nor matter and energy, nor matter and light.

We can not say that matter exists and moves in space and time, because at the same time this matter produces this space-time and this emptiness

of space produces matter, but that there is a universe which is the indivisible compound matter-light-energy-vacuum-space-time, as the physicist Cohen-Tannoudji suggests.

The identity of a particle is inherent in the way it interacts.

The particles are not elementary in themselves, they are elementary in or with respect to a given interaction.

Written by physicist Gilles Cohen-Tannoudji in "La Matière-Espace-Temps"

He adds, with Jean-Pierre Baton:

The smallest entity of matter is no longer an object, it is a relationship, a relationship, an interaction, what we call a quantum of action.

In The Horizon of Particles.

The electron is not thinkable without its procession of potential photons. Explains Gilles Cohen-Tannoudji in La Matière-espace-temps.

These potential or virtual photons are among the elements of the quantum vacuum.

So the electron does not exist without other corpuscles.

It is not describable by itself because it needs its environment to exist.

The environment, the quantum vacuum contains all kinds of matter in the virtual state, reports Cohen-Tannoudji:

All matter and all interactions are present in the empty space provided that we consider this space for intervals of time sufficiently brief.

And he recalls: It is this new conception of phenomena that is perhaps the most important innovation brought by quantum theory.

Quantum concepts no longer relate to the object itself, but relate to phenomena.

A phenomenon is a physical reality placed in well-defined.

Conditions of observation:

The definition of these observation conditions implies the complete control of all the steps of the measurement: the preparation of the system and the apparatus, the determination of all the states that are experimentally observable and the detection of the signals emitted during the coupling.

Between the system and the device.

The quantum phenomenon thus conceived is the opposite of a passively observed event, it is an experimental fact consciously constructed and elaborated.

This modification of the status of the concepts marks such a novelty compared to the usual scientific process that it has caused many confusions and misunderstandings.

Adapting concepts to the description of phenomena is not tantamount to denying the existence of an objective reality, independent of observation. It is simply taking note of the unreliability of conventional concepts that claim to directly describe the independent reality.

In quantum theory, one does not give up on objectivity; objectivity is achieved at the cost of a whole job, a whole journey.

No single quantum concept exhausts the totality of the reality that is the object of research, but the share of information that each quantum concept gives us on this reality is reliable, usable to compose, with other concepts, more and more faithful representations of reality.

Moreover, according to the fundamental idea of complementarity, quantum reality can not be exhausted by a single representation, but not a duality of representations, contradictory with each other but complementing each other: being quantum is neither a wave nor a corpuscle, but it can be involved in wave phenomena and in corpuscular phenomena, and it is through the complementarity of these two categories of phenomena that objectivity can be drawn quantum.

When we observe the world, one of the questions posed is: does matter exist beyond observation, experience?

The answer may seem simple: matter existed before no man observed it.

But what does the concept of "matter" mean or contain beyond what we can observe? How to reason on it?

Describing a phenomenon means being content to say what seems to appear without deciding whether it is an optical illusion, an error of appreciation, a deception, an artifact, an impression linked to a false or a real conceptualization, a precise or erroneous observation.

The expression "phenomenon" is essentially related to the question of the objectivity or subjectivity of the human operation of knowledge of the material world.

It aims to specify what we see by distinguishing it from what we believe we know or that we are looking for material reality, whether because we say we want to go beyond of the phenomenon or, on the contrary, that one claims that this is not possible that one thinks the phenomenon to be paranormal, spiritual, psychological, because one denies the very existence of this material reality by not preserving as human images or ideas about the world, or simply because one thinks one is not able to know more than one observes.

From these different points of view, the problems posed are different, the conceptions that matter is the basis of all seeking in the phenomena the deep nature of this matter and its laws whereas the others seek only a precise description observed phenomena and conditions of this observation.

Even the scientific point of view can lead to contradictions as quantum physics has shown, with researchers discovering that there is matter as it is observed and that there is matter before observation and that observing we lost some of the information.

On the other hand, they find that the material can not be described by its only active states but by also indicating its potential states.

The successive situations of matter are not stories according to current states but stories linking together all the potential states, the current state being only one of the potential states, with a certain probability to be chosen.

The theoretical knowledge on the subject can only indicate this probability and it can not at all make it possible to predict which state will be current among all the potential states.

The physical phenomenon therefore has several different limits.

First, it is not content to give the floor to the subject but to the couple matter-observer or material-apparatus.

Secondly, it only shows one of the potentialities and not the only one.

Thirdly, it can not give all the parameters concerning a given individual matter because it can never entirely dissociate an individual matter from its environment (material or empty, reminding that the void is the nothing that with regard to the matter inert mass but not in terms of energy)

But this is not the only problem posed by the phenomenon.

Another question of the same type is the phenomenon which manifests the existence of a generally stable structure.

Does this mean that it is composed of material objects always the same or can it change completely of material compounds while maintaining constant properties globally.

One may wonder whether the fact that the phenomenon remains constant comes from a material object that remains the same.

For example, if we take a series of measurements very slightly distant in time and space and each time we detect an electron, does that mean that it is necessarily the same object electron that is displaced or is it possible that the electron has disappeared and another electron has appeared?

And the question is far from posing only for particles of microphysics!

Take a human being.

It is agreed that we are the same as we were yesterday, for example.

However, many of our molecules have disappeared, replaced by others.

But we consider that our overall structure, its functioning, its properties and capacities have been conserved as a whole despite, and even thanks,

this change of the material components of our body.

This overall conservation of structure through important changes of components is a common fact within phenomena, be they physical, chemical, biological.

The cloud retains its global structure but changes constantly components and place of those and by important internal currents without which it could not even exist, its molecules tending to fall by gravitation.

The star, which seems to us immutable in the sky, also knows incredible transformations that allow it to maintain its global balance between radiation and gravitation.

And the examples go beyond physics.

The city is a world in perpetual change but retains a global reality, for example through daily population inflows and outflows.

Genetics has posed the question of the stability of a person's genetic identity.

However, it has been found that the genetic capital of an individual changes over the course of life, the replications are not quite the same.

It was then realized that the mechanism of genetics was based on the fabrication not only of the self but also of the non self, followed by mechanisms of correction by eliminating the self.

This means that there is an overall balance conserved through processes leading out of this balance.

This helps to understand that, generally, the overall process leads to the conservation of the species, but that, if the elimination of the non self is altered, the same process can be used to build other species.

Genetics is not photocopying or rather photocopying is not the original.

Science and Philosophical reasoning on this one give no reason either for phenomenalism and also for physicalism, for positivism or for its diametric opposite of physicalism or narrow materialism.

The first, referring partially to Kant but actually to Plato, claims to reject the material. The second claims, in the manner of the old mechanistic thesis, to bring the world back to matter-thing-object.

Is matter chaotic, emergent, nonlinear, quantum? The question is asked and this brings us to speak of chaotic phenomenon, phenomenon of emergence, non-linear phenomenon, quantum phenomenon, etc.

Because no one can say: here is how reality is.

Stuart Kauffman writes in Complexity, Vertigo and Promises.

What qualifies an emergent phenomenon is a collective property that is not present in any of the individual molecules.

The laws that govern emerging systems are related to the mathematical laws of phase transitions occurring in such systems, and more generally in everything that happens at a level higher than that of individual molecules.

We can also quote Grégoire Nicolis in The enigma of emergence.

Emergence phenomena occur in a range of laboratory-scale systems, from fluid mechanics to chemical kinetics, optics, electronics, and materials Science.

The emergent order does not appear only because of the properties of each of the elements but of their self-organizing interactions.

It is a collective order.

It has a brutal appearance of structural novelty.

Emergence presupposes a global behavior that was not included in the properties of each of the parts and a behavior occurring abruptly discontinuously.

Quantum physics is certainly the one that has brought to the surface the discussion of the difference between phenomenon and material reality.

It has indeed been led to give up several a priori physics on our scale, thus giving up any answer to questions like what happens when.

Thus, one can not consider the movement of the electron around the nucleus of the atom as a simple rotation or even as any movement.

Nor can we describe what happens in a quantum leap, a notion which is however fundamental in quantum physics since everything is made to

jump from at least one quanta because the quantum is the basic unit of all matter, light, interaction, energy, movement.

We can not follow the trajectory of an electron around an atomic nucleus and if it was really a movement, it would lead, in a short moment, the electron to fall irremediably on the nucleus.

And this is just one example: we can never describe what happens in a quantum phenomenon in terms of objects passing through here, who do that, who will do this or that, who exchange something, who are here or will be there.

We can not follow an individual object or consider what has happened as interpretable in terms of individual movements or actions of individual objects.

It is astounding and intellectually challenging for scientists and it brings a number of scientific and philosophical questions.

The founders of quantum mechanics have relaunched some major philosophical questions: the reality of the outside world, the objectivity of knowledge, causality, individuality and the substantiality of physical beings.

They have continued to have to explain themselves with the theory of knowledge and with the ideal of science that Kant had developed through an interpretation of Newtonian physics.

This explanation with Kant puts in full light the philosophical springs of the great debate on determinism. Explains Peter Atkins.

If we ask a question of wave nature to the electron, for example by making it diffract through slits, its response will be of a wave nature.

If one asks him a question of corpuscular nature, for example by detecting it with a fluorescent screen, his answer will be of corpuscular nature.

The nature of the apparatus therefore determines the type of phenomena observed.

The notion of trajectory, in the classical sense of the term, which is an essential concept of traditional physics, collapses under our amazed eyes.

The corpuscular aspect of the electron appears only intermittently, it is impossible to observe its trajectory continuously.

For the particular electron, we do not know for sure where it will hit the screen.

But the electrons are all emitted under the same conditions.

This destroys the conventional idea that the initial conditions are sufficient to determine the subsequent movement of a particle.

If we want to have a location not too bad of the electron, we must use a large lens and illuminate the object with waves of small wavelength, ie high energy, which disrupts the impulse attributed to the electron.

Or we reduce the disturbance to the electron pulse by using a longer wavelength light whose grains are of less energy, but we have a very fuzzy image.

In any case, it is impossible to know exactly and simultaneously the position and the momentum of an electron.

The concept of particle with a well-defined position and speed is therefore only a representation of the reality that has its defects, its shortcomings.

In general, one should not confuse a representation of reality with reality itself: The concept of dog does not bar Spinoza already noted.

Before the irruption of the Planck constant, the majority of physicists, just like the man of the street, considering a particle of matter supposedly isolated from the others, did not hesitate to attribute to it by the thought of the individual characteristics well defined such as position, speed or any other internal property.

The particle, with all its properties, was a thing in itself.

It existed inherently, like stones or trees.

This starts from a realistic point of view: a reality exists before any observation.

The natural aim of physics is then simply to describe as precisely as possible this reality, composed of objects that are supposed to be independent of the way we know them.

Quantum mechanics does not fit well with this view of things.

The orbits of electrons are difficult to relate to a real movement in space.

The notion of trajectory seems to dissolve inside the atom.. we must give up exploring the character of suddenness and discontinuity implied by the idea of quantum leap, the electron not seeming to be localized in the manner suggested by this image (the model of the Bohr atom).

Bohr explains that it is impossible to get a clear separation between the behavior of atomic objects and their interaction with measuring devices that define their conditions of existence.

This means that the velocity of a particle, for example, is not a property of the particle, but a property shared between the particle and the measuring instrument.

From this, Bohr deduces that one must be wary of any reasoning about the unobserved objective reality.

Etienne Klein writes in *Regards sur la matière*.

We can read in *The Quantum Object* of Lochak, Diner and Fargue:

Quantum mechanics formalizes as observables the possible results of measurement experiments performed on a quantum object.

It is not a description of the object itself, but a calculation of possible observations.

This does not mean that in the absence of observation the object has no properties, but they are not described by quantum mechanics.

The possibility of such a realistic description is the stake of a scientific and philosophical debate which lasts for more than sixty years.

Thus, to speak of the quantum objects means not to give of these objects a description aiming at making understood what they are, but to describe the phenomena to which they give birth.

And one of the peculiarities of the quantum level is that the object is no longer really an object in the sense that we heard it until then.

We can no longer follow its trajectory in space-time.

It does not have a form and a mass which belongs to him in fixed.

It can appear and disappear.

It can turn into energy (in motion, interaction, light corpuscles) or be constructed from energy.

No more matter that can not appear or disappear but only transform itself.

Finished the matter which is fixedly equipped with its mass, its position, its speed, its energy.

Finished also the hope to access another knowledge than that of the interaction between the measuring device and the material (and some even affirm the interaction with the observer and even with his conscience!)

It is the return to an idealism in Science.

It is at least to such a conclusion that came many authors, physicists and philosophers.

For some of these authors, quantum physics indisputably leads to the impossibility of saying anything about the reality of matter, but only to discuss the phenomena observed, which they consider completely different.

Indeed, in the observed phenomenon, there is a human action and an action of an apparatus of human origin whose choice is not indifferent and changes the results, the images that they give of the real matter.

Some authors have made the connection with the impossibility of knowing the thing in itself, which would be beyond the knowledge of the phenomenon (an interaction between observed reality and observer), a thesis apparently resuming that of the German philosopher Kant and which would be at the origin of the philosophical positivism that took

place especially at the beginning of quantum physics.

Recall that positivism in physics (represented in quantum physics by the Copenhagen School) consisted in saying that one can only study the phenomena and deduce probabilistic rules, but not describe what happens in the reality, which is questionable.

According to this thesis, experience tells us nothing about the reality of matter.

For example, if we detect an electron, it does not mean that there would be an electron if we did not do what it takes to detect it!

It is a fundamental questioning of the possibility of understanding the world.

The quantum physicist Werner Heisenberg explains that it is the radical separation between the "object" and the observer through his measuring devices that is illusory:

In classical physics, Science started from belief or should we say illusion?

That we can describe the world without making ourselves intervene.

The quantum theory does not have really subjective characteristics because it does not introduce the physicist's mind as part of the atomic phenomenon.. but it starts from the division of the world between object and the rest of the world, as well as from the fact that we use classical concepts for our description.

This division is arbitrary.

The quantum physicist Werner Heisenberg exposes this philosophical return to Kant in *The Part and the Whole, the World of Atomic Physics*:

Quantum mechanics and Kant philosophy.

The Swiss Félix Bloch brought results to understand the electrical properties of metals, the Russian Landau and the German Peierls discussed the mathematical problems of quantum electrodynamics,

Friedrich Hund developed the theory of chemical bonding, Edward Teller calculated the optical properties of the molecules.

Carl von Weizsäcker, then eighteen years old, also joined this group.

For his part, he brought a philosophical note to the discussions.

Although he studied physics, it was felt that whenever the physical problems dealt with in our seminar led to problems of philosophy or the theory of knowledge, he listened with special attention and then took part in the discussion. with a lot of passion.

The opportunity of having many philosophical discussions when a young philosopher, Grete Hermann, came to join them in Leipzig..

She wished to discuss with the atomic physicists their philosophical assertions, claims that, at first glance, She considered false.

Grete Hermann had studied and worked under the direction of the philosopher Nelson at Göttingen; there, She had received a training based on the thought patterns of Kantian philosophy as interpreted by the philosopher and naturalist Fries at the beginning of the 19th century.

It was one of the requirements of the Friesian school and therefore also that of Nelson, that philosophical reflections should have the same degree of rigor as that demanded by modern mathematics.

Indeed, Grete Hermann thought that he could prove in all rigor that the law of causality in the form Kant had given him must remain entirely valid.

The new quantum mechanics, however, still challenged, to a certain extent, this form of the law of causality and it was on this point that the young philosopher was determined to lead the fight to the end.

The first discussion she had on this subject, with Carl von Weizsäcker and myself, began with the following remark: In Kant's philosophy, the law of causality is not an empirical statement that could be justified.

Be refuted by experience; on the contrary, it is the condition of all experience, it is one of those categories of thought that Kant calls "a priori"

Indeed, the sensory impressions communicated to us by the outside world would only constitute a subjective set of sensations, to which no object would correspond, if there were not a rule by virtue of which the

impressions result from a process which preceded them.

This rule, namely the univocal connection between cause and effect, must therefore be admitted a priori if one wants to affirm that one has experienced or experienced something, whether it is an object or a process.

On the other hand, Science deals with experiences, and precisely with objective experiences.. only experiences that can also be controlled by others, which are therefore objective in this precise sense, can be the subject of Science.

It follows obligatorily that all science must suppose the law of causality, and that science can exist only to the extent that the law of causality exists.

This law is therefore in a sense the tool of our thought, with which we try to transform the raw material of our sensory impressions into experience.

And it is only to the extent that we succeed in making this transformation that we possess an object for our Science.

How can it be that quantum mechanics tends, on the one hand, to make the law of causality less strict, and on the other hand pretends to remain a science?

Werner Heisenberg explains that it is the radical separation between the object and the observer through his measuring devices that is illusory:

Werner Heisenberg summarizes the position of Albert Einstein who opposed the Copenhagen interpretation as follows:

This interpretation (says Einstein) does not tell us what happens, in fact, regardless of the observations, or during the interval between them.

But something must happen, we can not doubt it.

The physicist must postulate that he studies a world that he has not made himself and that is present, essentially unchanged, if the scientist is himself absent.

Werner Heisenberg answers:

It is easy to see that what this criticism demands is once again the old materialist ontology. But what can be the answer from the point of view of the Copenhagen interpretation?

To ask that one: describe what happens in the quantum process between two successive observations is a contradiction in adjecto, since the word to describe refers to the use of classical concepts, whereas these concepts can not be applied in the interval separating two observations.

The ontology of materialism was based on the illusion that the kind of existence, the direct realist of the world around us, could be extrapolated to the order of magnitude of the atom. However, this extrapolation is impossible.

Einstein thus criticizes this current attitude at the time among quantum physicists:

At the source of my conception, there is a thesis rejected by most current physicists (Copenhagen School), which reads like this: there is something like the real state of the system, something that exists objectively, independently of any observation or measurement, and which can be described, in principle, with processes of expression of physics.

(In "Preliminary remarks on fundamental concepts")

Einstein's position in philosophy of knowledge is quite personal: at the same time, he defends a realism that makes matter an entity independent of man and experience, existing outside our capacity to apprehend and even to observe it, but it also makes human categories to know the world an intellectual necessity for the man of a thought independent of this material reality.

And yet, he considers that the two domains are one:

We must first of all point out that it is not possible to distinguish between sensible impressions and representations, or at least it is not possible to do so with absolute certainty.

We will consider sensitive experiences as psychic experiences of a special kind.

I believe that the first step to pose a real external world is the formation of the concept of material object, and even material objects of various kinds.

From the multitude of our sensitive experiences we take, mentally and arbitrarily, certain complexes of sensible impressions that often repeat partly in connection with sensitive impressions that are interpreted as signs of other people's sensitive experiences, and we associate the concept of corporeal object.

Considered from the logical point of view, this concept is not identical to the totality of the sensible impressions to which it refers.. it is an arbitrary creation of the human (or animal) mind.

On the other hand, this concept owes its meaning and justification exclusively to the totality of the sensible impressions that we associate with it.

The second step consists in the fact that in our thought (which determines our expectation) we attribute to this concept of material object a meaning which is to a high degree independent of the sensible impressions which originally gave it birth.

This is what we mean when we attribute to the material object a real existence.

The justification for such an assertion rests exclusively on the fact that by means of such concepts and the mental relations established between them, we are able to orient ourselves in the labyrinth of sensible impressions.

The very fact that all of our sensitive experiences is such that by means of thought operation with concepts, creation and use of functional relations between them, coordination of experiences sensitive to these concepts, it can be put in order, this fact, I say, can only to surprise us and we will never understand it.

It can be said that The eternal mystery of the world is its comprehensibility.

He also writes in *The Evolution of Ideas in Physics*: Physical concepts are free creations of the human mind and are not, as one might think, solely determined by the outside world.

In the effort we make to understand the world, we are somewhat like the man trying to understand the mechanism of a closed watch.

He sees the dial and the hands in motion, but he has no way of opening the case. If he is ingenious he will be able to form some image of the mechanism, which he will make responsible for everything he observes, but he will never be sure that this image is the only one capable of explaining his observations.

He will never be able to compare his image with the real mechanism.

This is one of the great things that Kant did to recognize that there would be no sense in putting a real world outside without this comprehensibility.

Quantum physics has brought Kant's discussions back to the physicists, but in fact the Copenhagen School's discussion of Einstein is quite different from the philosopher Kant's point of view.

Kant asserts that what characterizes the foundation of the very reality is constancy, identity, positivity, while the interacting matter is changeable, contradictory, never identical to itself.

Kant believes that the foundations are necessarily in formal logic (principle of identity, all equal to the sum of parts, principle of non-contradiction, ...)

Quantum physics gives many examples of the opposite.

Kant thinks that the change of a property into its opposite is impossible and that the internal change does not exist spontaneously, that is to say without external action.

Quantum physics also gives many examples.

Thus, the radioactive nucleus decomposes spontaneously, the proton changes itself into a neutron within the atomic nucleus in a similar spontaneous way, the atom emits radiation even if it is not stimulated, the matter changes into energy and vice versa the matter and the light are exchanged, the proton jumps spontaneously between its different states, as does the neutrino, to take only examples.

The simultaneity of opposites exists, no matter to Kant: matter and light are both wave and corpuscle, yet two opposites.

The universe is both matter and light. The quantum vacuum is both matter

and antimatter.

Contrasts coexist in quantum physics at all levels.

The whole is not the sum of the parts, as the components of the atom show.

The particle or atom is never in a single state but in a superposition of states.

And, if the experiment is problematic, it is not because it would not reach the reality of these states but because it will find only one of these potential states superimposed and that we can not know in advance which one.

The existence of the state superposition of all quantum systems goes completely against Kant's philosophy that everything is in one state and can not have multiple contradictory states within it.

The interaction between matter and observer does not pose the problem that Kant raised (that of a tight boundary between pure reality and the phenomenon) but that of a traversable border between two levels of organization of reality, the quantum level and the macroscopic one, where the quantum effects are dissipated (decoherence)

There is an illusion but it is not at the quantum level: it is that of the chosification at our scale by the mass that we thought was attached to matter, by the position and speed that we thought we were describing continuously.

Movement, by the form that was also believed to be inseparable from matter.

<It is not the observation at the quantum level that disturbs the knowledge of matter but the observation on our scale that modifies the underlying phenomena at the level of the particles. It's very different and it does not bring water to the mill of Kant's design.

The material universe is not made of matter since there is also energy or interactions.

It is not a matter of matter as we see it on our scale, that of which our apparatuses are made: matter possessing an inert mass.

The foundation of the universe is the quantum vacuum resting on matter and antimatter without inert mass and called virtual matter.

There are many differences between the philosophical problems raised by Kant in his time and those raised by quantum physics, even if we find a point of convergence: the highlighting of phenomena as the basis of science and no possibility of knowledge of the object itself.

Kant distinguishes the sensible from the domain of experience from the intelligible from the domain of knowledge over nature and opposes them diametrically.

He joins many quantum physicists in their renunciation of interpreting nature and their acceptance of a limitation to only expound the results of experiments, considering that science will not go further in the knowledge of the real Universe.

Particles are not identifiable objects.

They could be considered as events of an explosive nature.

One can not arrive neither in the case of the light nor in that of the cathodic rays to understand these phenomena by means of the concept of corpuscle isolated, individual endowed with a permanent existence.

Writings by the physicist Erwin Schrödinger in Quantum Physics and Representation of the World.

One of the hypotheses arising from the problems posed by quantum physics is that the particle is nothing but a phenomenon of a lower level of organization, but this level can not be made of objects of the matter-light type, the so-called hidden parameters question having been negatively solved.

It is thus the void and the virtual particles that would be the foundation of the emergent phenomenon of matter-light.

It remains to conceive, thus to philosophize on, this emergence.

It is in the quantum vacuum that the disordered space-time exists which founds all these transformations.

It actually contains energy fluctuations over very short periods of time.

Times during which no measure can be made by instruments on our scale.

We do not see the fluctuations of the vacuum but they are nevertheless proved by the alterations of the measurements and the existence of the quantum phenomena.

And these fluctuations, like all wave phenomena, have an appearance of corpuscular type: electrons, positrons, photons, quarks, gluons, etc., corpuscles that exist, too, over extremely short periods.

The demonstration of the existence of virtual electron and positron pairs called vacuum polarization, is achieved by the presence of durable particles called real particles, although they have no more reality than those of the virtual, on the contrary.

Certainly, quantum physics poses many philosophical problems.

But it is not especially the observer-man who is involved.

What this physics describes is not the material objects but their interactions, which is very different.

And this for a fundamental reason: the material objects, as we conceive them on our scale, are only an effect, we can even say an illusion produced by the microscopic phenomena, themselves produced by an even lower level which is the quantum life.

Matter is an emergence of structure within the void.

This means that it makes properties appear and disappear.

These properties are therefore not attached to fixed objects.

The electron is never the same.

It is not a thing, in the sense that we mean it like a table or a tree, but a property that is preserved through jumps between virtual particles, made thanks to virtual photons.

Duality wave-corpucle, superposition of states, jump from one state to another, causal discontinuity, no excluded third: if there is a philosophy that is suggested by quantum physics, it is much more that of Hegel , the dialectical thought that of Kant, the critical thought.

To say that there is only matter is to pose a world without dialectical contradiction: if there are corpuscles, we need waves, if there are material objects, we need fields, there is matter of inert mass, there is also energy without mass, if there is matter, there is also antimatter.

Never physics reaches a single principle because it would found a dead world, without dynamics, without history, without change or movement.

Emerging structures instead of fixed objects.

Why quantum physics poses so many philosophical problems?

The end of the mystification of the physical matter, or objectification.

The physics of matter and the dialectical philosophy.

The quantum phenomenon.

The quantum state concept: a new look at ancient phenomena.

The material body and the object of quantum physics.

Against empiricism: Does science not theorize and is it limited to the facts?

Matter and quantum vacuum.

Historical Materialism and the Principle of the Social Phenomenon.

The phenomenon in philosophy.

Phenomenon is derived from the Greek phainomenon, "what appears" from phainestai, "to be visible," "to appear".

Any fact that manifests itself to the senses or consciousness.

Greek philosophy was one of the ancient philosophies to distinguish the

observed world from the real world, notably Plato in the myth of the cave (in "Phaedrus").

Jean-Jacques Szczeciniarz writes in Dictionary of History and Philosophy of Science, under the direction of Dominique Lecourt:

It is first in the context of an analysis of perception that the analysis of the phenomenon has developed.

The most significant testimonies relating to the nature of the phenomenon among the ancients have been preserved by Plato and Aristotle.

Plato borrows this theory of perception from Empedocles (in "Timaeus") and Protagoras (from "Theaetetus")

Aristotle knows Plato's examination of Protagoras's thesis (in "Metaphysics") and reproduces it for criticism.

All these testimonies present the concordant image of the phenomenon as a physical reality engendered in the space between the sense and the sensible object by the disposition of meaning and by the nature of the object. Hence the fact that the phenomenon is a relative being.

The fundamental distinction introduced by the notion of phenomenon is that between the matter that seems to be observed through observations and the thing-matter.

The phenomenon is not the object.

Nobody directly observes the material object and can only be a reconstitution of our brain with the help of concepts.

In science, a reality that can be observed and studied in isolation (example: a phenomenon biological).

In Kant as opposed to noumenon, it is all that is the object of a sensible experience, therefore the real as we can apprehend it through the a priori forms of space and time.

The phenomenon, says Kant, is what appears in time or space and is an object of experience.

As a result, the object, manifested as through the phenomenon, is different from the object itself.

On the other hand, without understanding, the only thing that can, by forming an opinion through concepts and reasoning of purely human origin, to think as objects the things that appear to our senses, the phenomenon can not to be founded.

The thing itself persists as an unknown thing of which only the phenomenal constitution is apprehended. Kant, in Critique of pure reason: The phenomenon is called the indeterminate object of an empirical intuition.

The phenomena are the only objects that can be given to us immediately and what in them immediately refers to the object is called intuition and the phenomenon that is related to a consciousness is called perception.

The phenomena are only representations of things we do not know what they can be in themselves.

As representations, they are absolutely not subject to any law of connection, except that prescribed by the power which connects.

Matter in the phenomenon what corresponds to sensation but what makes the various of the phenomenon is coordinated in the intuition according to certain reports, form of the phenomenon.

All the possible perceptions and therefore all that can happen to the empirical conscience, that is to say all the phenomena of nature, as to their connection, must be subject to categories, and nature depends on these categories as the original foundation of its necessary conformity with the law.

So what must be considered as a phenomenon in the sensible world? has also in itself a power, which is not an object of sensible intuition, but by which, however, it can be the cause of phenomena, we can then consider the causality of this being under these two points of view, as intelligible as to its action, or as a causality of a thing in itself, and as sensible as to the effects of this action, or as causality of a phenomenon in the sensible world.

If, as it should, we should we consider the objects of the senses as mere phenomena, yet we also recognize that they have as their foundation a thing in itself, although we do not know how it is constituted in itself.

The subject of every phenomenon is not ours. given a posteriori.

This is why the diversity of the phenomenon is coordinated in intuition according to certain reports.

It is necessary that the form is a priori in the mind, ready to apply to all, and it must therefore be considered independently of all sensation.

The phenomenon.

The noumenon.

The thing in itself.

The noumenon thus appears to be at first opposed in Kant to the phenomenon, as the intelligible to the sensible in Plato.

However, the Kantian noumenon is an essentially problematic and negative concept: we would call noumena, we read in the Critique of Pure Reason, things that are both pure objects of the understanding and given as such.

To an intuition but not to sensible intuition.

They would therefore be the object of an intellectual intuition, which, for Kant, unlike Plato, is not ours, and of which we can not even conceive the possibility.

We see the paradox: the Kantian noumenon, that is to say the intelligible, is in fact the inconceivable.

The human being is denied, in Kantian philosophy, any direct and intuitive contact with the Idea. Sensitive and finite, his ability to know is limited.

The positive counterpart of this limitation is revealed in moral philosophy.

Before addressing this point, some terminological distinctions are necessary: Kant, as opposed to the phenomenon, is assimilated to the noumenon, the thing in itself, and the transcendental object.

It is, however, necessary to distinguish them: the thing in itself is the thing independently of any relation to any act of knowledge.

It is a kind of elusive absolute.

For Kant, the notion of phenomenon means, in fact, every object of possible experience, that is, what things are for us, relative to our mode of

knowledge, as opposed to the noumenon, the thing in itself.

That the mind can, of course, think, but not know.

Kant believes that the phenomenon is not the world because it contains intentionality strictly human that profoundly changes the reality.

It is this remark that leads certain quantum physicists, especially in its early version in the so-called Copenhagen version, to claim Kant's philosophy to reject any version, reasoned in formal and causal logic, of quantum physics.

Kant asserts that what characterizes the very foundation of reality is constancy, identity, positivity, while the interacting matter is changing, contradictory, never identical to itself.

Kant believes that the foundations are necessarily in formal logic (principle of identity, all equal to the sum of parts, principle of non-contradiction..)

Quantum physics gives many examples of the opposite.

Kant thinks that the change of a property into its opposite is impossible and that the internal change does not exist spontaneously, that is to say without external action. Quantum physics also gives many examples.

Kant states: When we turn to the world, when thought is directed to the external world (for thought, the world given internally is also external), when we turn to it, we turn it into a phenomenon.. it is the activity of our thought which adds to the hereafter so many determinations: the sensible, the reflective determinations, & c. Only our knowledge is phenomenon, the world, in itself, absolutely true; only our application, our behavior ruins it for us: what we do to it is worthless.

What makes it non-true is the fact that we introduce a mass of determinations.

Hegel's point of view is radically different, even opposite.

By asserting that: The objects of which we immediately know are mere phenomena, that is, they have no basis for their being in themselves but in an Other.

Hegel recognizes in Science of Logic that Kant had the merit of posing a problem that has a foundation.

But he solves it almost in opposition ...

For Hegel, in fact, the world goes beyond phenomena, even beyond the laws that describe them: The law does not go beyond the phenomenon.

On the contrary, the kingdom of laws is the "calm " image of the existing or emerging world.

Or : An experiment based on induction is admittedly valid, although it is recognized that the perception is not complete.. but what we can only admit is that we can not produce any instance against this experience, inasmuch as it is true in itself and for itself.

For Hegel, it goes far beyond the limits of human observation.

It is the study of the world of results that is limited.

Final states do not contain the whole reality:

The fund of the thing is not exhausted in the end, but in all its fulfillment.

The result achieved is not all concrete; it is only with the process of which it is the term. The end taken independently of the rest is the universal dead, just as the tendency is only a simple effort, still deprived of realization, and the naked result is the corpse that the trend has left behind. To grasp the thing is to expose it in its development.

The phenomenon is a process of coming and going, which itself does not happen or disappear, but is in itself and constitutes the actuality and movement of living truth.

For Hegel, there is no matter without transformation, without history, without development. What moves is the contradiction.

It is only because the concrete is committing suicide that it is what moves. Says G.W.F Hegel, in his preface to the Phenomenology of the Mind.

Many things are interacting through their properties.

The phenomenon is in the unity of appearance and existence.

This unity is the law of the phenomenon.

The law is therefore positive in the mediation of what appears.

It is the reflection of the phenomenon in its identity with itself.

This identity, the foundation of the phenomenon which constitutes the law, is a proper moment of the phenomenon.

The law is therefore not beyond the phenomenon, but presents in him immediately.

The kingdom of laws is the quiet reflection of the existing or phenomenal world. Says Hegel in: The Doctrine of the Essence. And he adds in Science of Logic: That which contradicts itself is not resolved in zero, in abstract nothing, but essentially in the negation of its particular content, in other words, such a negation is not complete negation, but negation of the determinate thing, the resulting, negation, being determined negation, has a content.

It is enriched by its negation, it is the unity of itself and its opposite.

A thing is therefore alive only insofar as it contains a contradiction and has the strength to grasp it and support it.

But when an existing person is unable, in his positive determination, to move on to negative determination and to keep them one in the other, in other words when he is unable to bear within himself the contradiction, he is not a living unity, but collapses and succumbs to contradiction. (...)

It follows from the examination of the nature of the contradiction that when one says of a thing that it contains a contradiction, it does not mean that it is damaged, or faulty.

**All determination, all concrete, all concept are essentially a unity of different and differentiable moments, which become contradictory by the essential and determined difference which separates them.
(Hegel in Science of Logic)**

Like Kant, Hegel thinks that reason drives consciousness to adapt to particular phenomena universal categories.

However, this process is not smooth and always has an element of uncertainty and imprecision, since objects exist in a range of variations that make it difficult to match them to universal categories.

Thus, to the extent that consciousness is oriented toward the stable categories of thought, it is also aware of a set of norms governing how phenomena conform to these categories.

These norms, or laws of thought, reside neither in objects, nor in the spirit, but in a third dimension, in the all organized social.

For everyone, self-awareness belongs to collective self-awareness. The laws of thought, morality, and conventions belong to social life.

This set of laws governing collective consciousness, Hegel calls it Spirit.

The Spirit is the place of the ethical order, laws and customs. Individuals interpret and act according to the laws and customs individually, but they do so in accordance with this community spirit.

The ethical life has two manifestations.

First, it is the foundation of the actions of individuals.

Secondly, it is externalized in what is called culture and civilization.

These two moments of the ethical spirit, or ethical life, are in tension with each other.

The Phenomenology of the Spirit of Hegel, published in 1807, is based on a precious philosophical intuition: consciousness is not an accomplished institution, it is constructed, transformed to become other than itself.

From this intuition, Hegel traces the epic of consciousness through its different stages, the evolution of consciousness, from the sensible consciousness to the absolute spirit.

The Phenomenology of the Spirit is thus the history of consciousness in the lived world.

Hegel's philosophy is a phenomenology insofar as he is interested in the world as it appears for a consciousness, from naive consciousness to reason.

This science of phenomena aims to free the essence of the things of the world.

In his Introduction to Small Logic, Hegel states:

It will be readily admitted that the mind finds contradictions in the phenomenal world, that is to say, that the mind finds contradictions in the phenomenal world, that is to say in the world such that it appears to subjective thought, to sensibility and to understanding.

It can be established as a fact that all knowledge and every immediate principle contains a mediation, and the doctrine of immediate Science asks in vain for objections to the understanding for destroy it.

It is, indeed, characteristic of the vulgar understanding to separate the immediate element and the mediate element of knowledge, and to attribute to each of them an independent and absolute existence, which makes it the presence of an insurmountable difficulty when he wants to unite them.

He adds, in Science of Logic:

The law is not beyond the phenomenon, but presents in it directly, the domain of laws is the quiet reflection of the existing or phenomenal world.

Better, both are a totality, and the existing world is itself the realm of laws which, as a posited being or in the self-resolving independence of existence.

Existence returns to the law, as its foundation, the phenomenon contains both, the simple reason and the dissolving process of the phenomenal universe, whose foundation is essentiality.

The domain of the laws is, it is true, the truth of the understanding, truth whose content is the distinction found in the law, but the domain of laws is at the same time only its first truth, and it does not exhaust the phenomenon.

An idea developed also by Hegel in Philosophical Propedeutics:

The law of the phenomenon is its quiet, general reflection.

It is a mediating report of permanent general determinations whose distinctions are outside the law.

The generality and permanence of this mediator relationship lead to the necessity of the law.

but without the distinction being determined in itself or internally, so that one determination is immediately in the concept of the other.

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what is innate or what is acquired

+ Einstein in Scientific Designs.

Posted by [Veronica IN DREAM](#) at 11:20 PM