

The Information as Absolute^{*}

Sergey V. Shevchenko¹ and Vladimir V. Tokarevsky²

¹*Institute of Physics of NAS of Ukraine, Pr. Nauki, 46, Kiev-28, Ukraine*

²*Professor ret., Pr. Nauki, 46, Kiev-28, Ukraine*

Abstract This article presents and grounds (i.e. presents proof of the existence, the truth, the self-consistence and the completeness of) the informational conception (“the Information as Absolute” conception) in physics and philosophy. The conception defines the information as an ultimately common, real and fundamental concept/phenomenon – “Absolute”, which exists as an absolutely infinite set (“Information” Set) of elements (members) and informational (e.g., logical) links between the elements; where any element itself is some informational structure also. Correspondingly, for example, Matter as the substance, radiation, etc., is some development or realization of informational patterns, constituting a specific - and practically infinitesimal comparing to the Set - subset of the “Information” Set. The conception allows for the resolution, or at least for a consideration on a higher level of comprehension, of the basic ontological and epistemological problems in philosophy and natural sciences; in physics it allows to suggest reasonable model, which makes more clear basic physical notions, such as space, time, matter, etc.

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1. Introduction

Yet in Ancient times, or maybe earlier, two main ontological, (and, correspondingly, - epistemological) philosophical conceptions were formed – Materialism and Idealism. Both conceptions were – and are till now – based on beliefs in some transcendent fundamental Essences. In Materialism such Essence is some eternal “Matter”, in Idealism a number of (also eternal and transcendent) Essences are considered – “Gods”, “Spirits”, “Ideas”, etc.

As both conceptions are no more then some beliefs, it is impossible to prove the truth of any of them, though corresponding attempts, discussions, disputes – sometimes rather radical – took place over and over again yet within rather long time.

But in reality the problem of the transcendence – as well as many others - is resolvable because indeed fundamental Essence, which is the base of all / anything, namely – the

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information, isn't transcendent and can be, in principle, studied. The substantiation of corresponding informational ("the Information as Absolute" conception) conception in physics and philosophy is presented in this article.

The conception defines the information as an ultimately common, real and fundamental concept/phenomenon – "Absolute", which exists as an absolutely infinite set ("Information" Set) of elements (members) and informational (e.g., logical) links between the elements, where any element itself is some informational structure also. Correspondingly, Matter as the substance, the radiation, etc., as well as Consciousness, are some developments or realizations of information. They exist as specific - and practically infinitesimal comparing to the Set - subsets of the "Information" Set.

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2. On the concept of "Information"

It is rather interesting that the discussion "so what is the information?" in scientific, technical and philosophical literature goes on in many years already without any consistent results. (Abdeev, 1994):

"Depending on a branch of science where an investigation was carried out, information got a large number of definitions: information is an indication of a content, obtained from external world in the process of adaptation to the world (Wiener); information is a negation of the entropy (Brillouin); information is the communication resulting in a decreasing of an uncertainty (Shannon); information is a transmitting of a diversity (Ashby); information is an originality, novelty; information is the measure of a structure's complexity (Moll); information is a probability of a choice (Yaglom); etc. Every these definitions reveals one or another aspect of this polysemantic concept".

Here is no room for a detailed analysis of this discussion, we note only that its productivity turned out to be rather poor, from what follows, for example, large number of existent definitions of information. Chernavsky (2001) gives more than twenty different ones. Capurro and Hjørland (2003) quoted some dissertation where about 700 definitions were collected.

Let's consider some of the definitions (mainly cited in Abdeev, 1994) that have essential semantic distinctions:

1. (Philosophical *encyclopedia*) "Information (lat. "informatio" – an examination, a notion, a concept): 1) a report, a notification about a state of affairs or about something else that is transmitted by a person; 2) decreased, removed uncertainty as a result of the communication obtained; 3) a notation inherently relating to a control, the signals in the unity of its syntactic,

semantic and pragmatic parameters; 4) transmission, reflection of the variety of any objects and processes (of alive and non-alive nature)".

2. "Information means some order, a communication is the creation of the order from a disorder or, at least, growing of the regulation that existed before the communication was obtained".

3. "Information is the manifestation of the property of the objects of alive nature to reflect in the form of some mental sensations the movement of the objects in surrounding World".

4. "Information... is a quality of the objects, phenomena, processes in the objective reality, of man-made controllers, which lies in the capacitance to conceive an internal state as well as the state and the impacts of an environment and to preserve, sometime, the results; to transmit the data about the internal state and cumulative data to another objects, phenomena, processes".

5. "Information is a philosophical category that is considered along with such as Space, Time and Matter. In the most common form information can be presented as a notation, i.e. a form of some relations between a source which communicates and a receiver which obtains a notation".

6. "Information, as well as Matter, exists and has always existed... information is some integral attribute of Matter and Movement which realizes a certain way of Matter existence and presents some measure of the changes which follow all processes occurring in the World".

7. "The phenomenon of information is a multi-stage, irreversible process of coming into being of a structure in some open imbalanced system that begins at a random memorized choice which this system carries out when it transforms from chaos to an order, so the process is completed with a purposeful action according to an algorithm or program that are in accordance with the semantics of the choice." (Melik-Gaikaz'an, 1998).

8. "Information is some qualitative and quantitative characteristic of the level of reflection. Generally information is a quasi-force which is directed against disorder and chaos; in this sense it cannot be separated from structure and regularity of material systems" (Berg and. Spirkin, 1979).

9. (Weizsäcker, 1959, quoted in Yankov (1979), page 39) "Now many peoples begin to recognize that it is necessary to consider Information as something third that differs from Matter and Consciousness... This is Plato's Idea, Aristotelian Form, invested by such a way that the human of XX century assumes to know something new from it".

10. (Wiener, 1983) "Information is information, not matter or energy. No materialism which does not admit this can survive nowadays".

11. (Landauer, 1999) "...Information is inevitably inscribed in a physical medium. It is not an abstract entity. It can be denoted by a hole in a punched card, by the orientation of a nuclear spin, or by the pulses transmitted by a neuron", and, at last -

12. "...If you are interested in the question – "what is information?" and find corresponding definition in some book (which is, generally speaking, rather difficult; since the authors usually keep from giving such a definition), then in great likelihood other authors will not agree with this definition." (Petrushenko, 1971).

It seems quite natural that last author had, rather possibly, some grounds for so evident pessimism. However, as that will be shown below, in reality the problem of the definition of the concept/ notion “information” can be solved, or at least can be evaluated in the general way, by using logical analysis.

Besides note that all listed definitions have common conceptual flaw – each of them is tautological: “information is information” (or “data”, “algorithm”, “communication”, “evidence”, etc.) Thus any attempts to define the concept/ notion “information” through something, which is more common and fundamental, turn out to be ineffective, whereas now in textbooks one can find a number of “information theories” - Shannon theory, a number of complexity theories, theories of algorithms and automata, etc.

3. On the concept of “the set”

Next fundamental concept that will be necessary to build this informational conception is the one of the “set”. It turns out that in attempts to define this concept in mathematics the same problem as at defining of information arises, since any definition becomes a tautology – the set is the set, ensemble, manifold, collection [of the elements], etc. The difference is practically only in that the mathematics was evolving by way of maximal formalization and using rigorous logical rules/ limitations at creation of a next domains of this science; when the attempts to formalize concepts/ elements/ concatenations in the information theory were essentially lesser productive.

Now in a number of the set theories the notion of a "set" is taken as an *undefined primitive*, which can be defined only *restrictedly*, i.e. by *defining its properties in a limited system of axioms*. Though there are some set theories where the notions of the set are defined “completely” (e.g. Vavilov, 2007) as well as the theories where some “more common” [relating to the set] notions are used, for example - the notions of the categories and the toposes (Goldblatt, 1979; Baez, 1999; Jean-Pierre, 2003). But such notions are only some (sometimes not natural) natural extensions of classical G. Cantor’s definition: “Unter einer Menge verstehen wir jede Zusammenfassung M von bestimmten wohlunterschiedenen Objekten in unserer Anschauung oder unseres Denkens (welche die Elemente von M genannt werden) zu einem ganzen” – “By a "set" we mean any collection M in a whole of definite, distinct objects m (which are called the "elements" of M) of our perception or of our thought.”

4. The relations of information and set

So in mathematics a fine situation exists – there is a number of the information and set theories when corresponding notions aren't, in fact, defined.

To clear the problem let us recall Cantor's definition of a set above. In this definition the key is "*of definite, distinct* objects ... of our perception or of our thought" - i.e. to define a set turns out to be impossible without notions (terms) which relate to the notion "information". And, in turn, information appears if and only if some alternative (diversity) of some elements of some set appears. I.e. the system "a set + an information" exists always as a unity – the *set is a form (a mode) of existence of the information*. The notion "set" here, naturally, is used in a broad sense, i.e. not only as a "collection of some elements". On a set any informational connections (e.g., mathematical operations) between the elements can/ should be defined (see the definitions of the information above, definitions of the categories, the toposes, etc.), which define the set's (and the set's elements') specific properties by establishing some axioms system.

It is well already known that complete set-theoretic axiomatic system is, very probably, infinite, and now we can conclude that the same inference is true for the informational theory. Nevertheless, the recognizing of the unity between the concepts of set and information allows building here rather general and effective approach at further consideration of this informational conception.

5. Some properties of information

As it was already mentioned, unlike the notion "set", the notion "information" is essentially lesser formalized; that is a rather poor system of axioms exists for the information. Current formalized theories – Shannon's one (applications in the communication theory and physics), theories of complexity, algorithms, and automata (cybernetics) – reflect (allow to formalize) the properties of this concept/ notion only restrictedly. Such a situation follows from both - infinite complexity of this notion and limited capability of the languages, including limited capability of individual (human's) interpretation of the words/ notions. Nevertheless we can formulate a number of common basic properties of the information in addition to the "definitions of information" in Sec.2 above, which, in fact, define only some certain specific properties of information also.

Property I1. *Any information is objective and doesn't require existence of any "sentient being" to exist.*

Property I2. *Information can exist at least in two possible modes: 1) "fixed information", e.g. a picture, a computer code listing, and 2) "dynamic information" – a changing picture, an execution of a program code in computer, etc.*

Here we should make some "epistemological" remark. For further consideration, note that any *indeed new* information about the external [to a human] World can be obtained by a human's consciousness only as a result of some experiment, *any indeed new knowledge is empirical*. This new knowledge in a science becomes be established as "axiom(s)", "postulate(s)", "Nature law(s)". Further, a human consciousness applies the axioms for more detailed analysis of specific natural processes, e.g., - mathematical problems; creating theories or solving technical tasks.

Moreover, as it was proven by K. Gödel (Gödel, 1931), it turns out to be that there exists some limit for the complexity of a mathematical theory when the theory based on a consistent system of axioms becomes be incomplete – i.e. when there exist some true statements / propositions which cannot be proven in the theory. An example, possibly, is the fact of non-provability of the continuum – hypothesis in Zermelo-Fraenkel set theory, which was proven by Gödel and Cohen (Gödel, 1940; Cohen, 1963).

Including the pointed above (the definitions 1-9, 11,12 in section 2, properties **I1**, **I2**) properties of the information, if claimed as some "postulates", *are some empirical* data also and in this sense these postulates by any means don't differ from, e.g., Newton's gravity law. However, there is the *fundamental difference* between the information's postulates and the postulates in Nature sciences ("Nature laws"). The latter, rigorously speaking, "have no right to be laws". In reality they always remain be as some hypotheses – since are based on the necessary but insufficient criterion of the reiteration of given experimental results in given experimental conditions. From the fact that in n experiments some identical (really – nearly identical) outcomes were obtained, by any means doesn't follow that the outcome in $(n+1)$ -th experiment will yield the same. Logically a physicist can only *believe* in that the next result will be "in accordance with the theory". For example, well-known Newton's statement "I do not feign hypotheses" is incorrect, for example - Newton's gravity law (as well as any other Nature law, though) is no more then a hypothesis, though claimed as the postulate in physics.

In the case of information we have *entirely another situation*. It is sufficient only once to “discover in an experiment” an information, i.e. – a language, some set, and a number of logical rules on this set (Shevchenko and Tokarevsky, 2007 - 2008), then at once it can be logically proven that for the information these rules – including, for instance, the definitions and properties above – *are always true*.

As **Property I3** is true, which we obtain by following way. Let us consider the notion of a “null (empty) set” that is introduced in any set theory: a null set is the set that contains no members/elements (e.g. Hrbacek and Jech, 1999). This set, unlike any other sets, is unique – null set exists as the single set, irrelatively of how many and whatever sets exist anywhere (at that sometimes it is possible and useful to introduce the specific empty set for a specific set, though). And further, if we recall that any set is, generally speaking, a mode of existence of some information, then we must conclude that the null set contains all/ any elements of all/ any sets. Indeed, to define the null set is necessary to point out that this set doesn’t contain this, this, this... – and so on, down to “absolute” (the term “absolute” will be correctly defined below in this section, Property **I6**) infinity, - element (set of elements); it turns out to be that the null set isn’t so empty as it is adopted in mathematics.

The notion “null set” in the “informational” language one can formulate as the statement “*there is no anything*” (or “there is nothing”). And just as that was in the case of the null set’s notion, we can conclude that the statement “*there is no anything*” contains complete information about everything – about what exists, what can exist (as well as about what “cannot exist”, but exists as a false information) in *the absolutely infinite set*, which we call here “*the set “Information”*”.

However it is necessary to make an evident revision of this statement, since it is incorrect, as there exists the information that there is no anything. Correspondingly true will be *infinite cyclic statement (further – “Zero statement”)*: “*there is no anything besides the information that there is no anything besides the information...*”. I.e. Zero statement is at the same time fixed and dynamic information.

Let’s return to the definitions 1-12 (except, of course, Wiener’s one) in section 2 above. Most of these definitions contain tacit assumption that for an existence of an information some storage device is necessary – a brain (e.g. a human’s one), papyrus, computer, some thing having some observable properties, etc. However, Zero statement containing absolutely infinite information exists when, by definition, there are no storage devices. From this follows:

Property I4. *For the existence of information there is no necessity in the existence of an external storage device, but since some storage device is, nevertheless, necessary, then only one possibility remains – when information itself is a storage device of information.* Though this implication could have been obtained earlier from the “experimental fact” that any definition of information appears to be a tautology: the facts that information can be defined only via information itself and that information is a storage device for itself, are, practically, the same.

Carrying out analysis similarly as it was in the case of null set again, we obtain

Property I5. *Any element of any set contains all/ any elements of all/ any sets, i.e. any element of any set contains the set “Information” totally.* Indeed, to characterize (single out) some element from the Set, it is necessary to point out all/ any distinctions of this element from any other element; every element in the Set exists as a bit “I/not-I”, where “not-I” section contains complete information about all/any other elements (including – about given element “in other times of its existence”); as negations, but these negations in all other respects are identical to the information relating to corresponding elements.

The list of information’s properties is infinite, but even the properties **I1- I5** convincingly show the originality and fundamental nature of the information’s concept/ notion. Besides, from these properties follows:

- (independent on anything) **existence** of absolutely infinite and fundamental set “Information”, as well as introduced here informational conception;
- **completeness** of the informational conception, since in the set “Information” doesn’t exist any conceivable operation when some element of some set could quit the Set. Besides, the Set contains all/ any possible false information. And its amount possibly infinitely exceeds the amount of true information – though when we meet with “absolute” infinities, such a statement possibly requires some separate study;
- (self-) **consistence** of this informational conception. Indeed, the consistence of some theory/ conception in mathematics implies that in this theory it is impossible to prove truth of (at least - two) logically inconsistent implications – one of the implications must necessarily be false. In other case the theory is inconsistent and therefore false. In the case of this conception such an interpretation becomes inapplicable, because of obtaining false information doesn’t lead out the set “Information”;

- just because of absolute *completeness* of the information conception we principally cannot go out of the conception in order to prove its (and the Set's) *uniqueness*.

Note, also, some another basic properties of the information:

Property I6. *Since a process of transformation (e.g. determination) of some specific information reduces to an enumeration of variants, the set "Information", in spite of its absolute infinity, is, very probably, discrete.*

Property I6 (and the text above) contains at least two notions that call for additional explanation. First is the notion "discrete" – it is applied here (though with a stipulation "very probably") to the Set totally, when there is, e.g., the notion of the continuum (continuum is, of course, a subset of the Set), which is, by definition, non-discrete. Secondly, in standard set theories often it is accepted that the "absolute infinite" set doesn't exist – if one assume that such a set, X , exists, then it is possible to create power set of this set, 2^X , and the cardinality of the second set rigorously exceeds the cardinality of the set X . However it is known, that if the continuum hypothesis is true, then the cardinalities of the continuum set and of the "discrete" power set of the natural numbers set, 2^{\aleph} , are equal, so the continuous and the discrete are in certain sense equivalent. Thus, e.g., infinity sequence of power sets for, e.g., natural number set: $Y_0=2^{\aleph}, \dots, Y_k=2^{Y_{k-1}}, \dots, k \rightarrow \infty_A$ (when ∞_A means, in turn, "absolute infinite"), must have maximal cardinality (be "absolute infinite") since in this case the concept of "next power set" loses a sense.

An other approach at the consideration of the "absolute infinite" problem follows from the zero notion. Though practically any arithmetic contains "0" and in most cases zero is used as some digit, it doesn't a usual digit and is introduced in an arithmetic by some additional rules. In reality zero indeed *is not a digit*, it is the specific empty set: "there is no digits". Just therefore in arithmetics it is permitted the division of any quantity by any infinitesimal quantity, but the division by zero is prohibited, since its result is "absolutely uncertain". Here we can say that the absolutely infinite set can be considered as the result of the division of some "usual digit/ quantity" by the zero.

Property I7. *(At least true) information in the set "Information", as well as in any of Her limited (by some attributes) subsets, can be "absolutely exact".* For example two identical texts contain absolutely identical implications.

Property I8. *From that Zero statement, which contains all data about everything, is expressible in practically any human's language rather possibly follows that any information from the set "Information" can be expressible in practically any language.*

If this language (or maybe more correctly - if a corresponding consciousness is capable) is capable for infinite development, though...

6. Application of the conception. Matter and Consciousness

It seems rather evident that the questions "What is Matter?", "What is Consciousness?", "From where (how) did They appear to be?" - are main questions in the ontology and epistemology. Under *necessarily empirical* (see section 5) approach, which a human's consciousness applies to perceive the External, it is impossible to obtain the answers on these questions – as an evidence for such a conclusion is longtime co-existence of two main competitive philosophical conceptions, Materialism and Idealism. Both conceptions hold in fact futile dispute for a number of thousands years, and this long experiment practically unambiguously shows that both conceptions are nothing else then some beliefs – it is impossible to prove the truth of any of them.

Materialism's foundation is "the system of Nature laws"; however, as that was pointed out above, any Nature law is essentially empirical and so can only be postulated – in other words, be taken without a proof, - as something fundamental. That is Materialism is nothing else than a belief in the Great Materialistic Principle "That is so because of that is so". Correspondingly Materialism, e.g., isn't capable to answer on the main epistemological questions – "What is Nature (Matter, Universe)" and "Why do Nature laws exist at all?"

Idealism is more epistemologically grounded – it states that a sentient Creator established Nature laws when He created this Nature. However, as early as in 18th century I. Kant (Kant, 1787) showed that it is impossible to prove the existence/ non- existence of the Creator. Besides, to create Nature "from nothing" for Creator is necessary to be omnipotent, when, as it was proven yet in Middle Ages, any omnipotent being is logically contradictory. Correspondingly in Idealism some "materialistic" questions appear, for example – from where and how the Creator happened to be?

Presented here informational conception allows to clear up the situation essentially. As it was proven above – any information exists always, or "in an absolutely infinite long time"; it fundamentally, logically, cannot be non- existent. For existence of information nothing is

necessary besides (outside) the information itself; including – there is no necessity in an existence of so strange thing as “non-informational Matter”. Indeed – though we cannot prove the uniqueness of the set “Information”, and so cannot exclude some external Creator, Who created the Set (and so - Who should exist “in a longer time then always”. But that is possible in principle, though), it seems quite evident, that, even if something External to the Set exists, *then this External cannot be represented as some information*, whereas the properties of Matter are expressible in any (including, e.g., in mathematical) language.

Moreover, besides Matter there is also Consciousness, which is evidently “immaterial” and evidently is expressible/ works by using information. From this follows rather reasonable conjecture that both – Matter and Consciousness - are in reality some specifically organized (and practically infinitesimal comparing to the Set) sub- sets of the set “Information”.

More specifically the concepts of Matter and Consciousness will be considered below, however, because in the variety of philosophical conceptions these concepts have a variety of the interpretations, in this section we introduce a simple common attribute by which in this paper the objects/ processes/ phenomena, etc., are subdivided into material and non- material. Since Matter and Consciousness are rather different (e.g. that follows from the fact of inapplicability of physical laws to the processes in Consciousness), specifically organized subsets of the Set, take here that *any process/ object/ phenomenon is a member of subset “Matter” if it interacts with other processes/ objects/ phenomena exchanging by exclusively true information. If a process/object/ phenomenon is capable to produce and/or to apprehend false information, then it is non-material and so is an element/ member of another – “non-material”- subset*. Now we know three comparatively autonomous subsets: “Matter”, “Alive”, and “Consciousness” (the last two subsets contain also any possible living and conscious beings besides Earth/ humanity), which constitute the subset “our Universe”. Since the subsets have common origin, they can, of course, intersect (subsets’ elements can interact) – experimentally that follows, for example, from the fact that human’s consciousness controls by some (unknown now) way the human’s body, which is, first of all, a material object.

Let us consider these fundamental subsets (further – sometimes – “sets”) more specifically.

6.1. Matter

So, Matter is a set of some elements – elementary particles, including mediating particles producing the interactions (fields), some systems of the particles and the fields (subsets of the main set), etc., where all elements interact using exclusively true information. I.e. Matter is

somewhat similar to the computer. The premise that Matter is some logically organized system isn't, of course, new - it is enough to recall, e.g., Pythagoras's "All from number" and Plato's "All from triangles" doctrines, first strings of Bible Genesis, etc. A number of specific hypotheses that our Universe is a large computer appeared practically at once with the appearance of usual computers – see, e.g. Zuse, (1969); Penrose, (1971); Fredkin and Toffoli, (1982); Tegmark, (1998); Lloyd, (1999); Schmidhuber, (2000); Lloyd, (2002); Margolus, (2003); Gershenson, (2007); Tegmark, (2007); McCabe, (2008); though this list can be much longer.

An assumption that Matter (Universe) is some set ("ensemble") exists at least since 1998 year (Tegmark, 1998).

In philosophy corresponding conception is known as "Informational Realism" - (Floridi, 2004): "...Informational realism (IR) is a version of structural realism. As a form of realism, it is committed to the existence of a mind-independent reality. ... it is suggested that an ontology of structural objects for OSR (*ontic structural realism*) can reasonably be developed in terms of informational objects... outcome is *informational realism*, the view that the world is the totality of informational objects dynamically interacting with each other".

However, all these suggestions are nothing more than some hypotheses, surmises; which are based, first of all, on the fact of remarkable adequacy of the languages, especially mathematical, to external reality. Including the suggestion that the information is some base of Matter – Wheeler's "*it from bit*" doctrine:

"...It is not unreasonable to imagine that information sits at the core of physics, just as it sits at the core of a computer. It from bit. Otherwise put, every 'it'—every particle, every field of force, even the space-time continuum itself—derives its function, its meaning, its very existence entirely—even if in some contexts indirectly—from the apparatus-elicited answers to yes-or-no questions, binary choices, bits. 'It from bit' symbolizes the idea that every item of the physical world has at bottom—a very deep bottom, in most instances—an immaterial source and explanation; that which we call reality arises in the last analysis from the posing of yes-no questions and the registering of equipment-evoked responses; in short, that all things physical are information-theoretic in origin and that this is a participatory universe." (Wheeler, 1990)

Except, though, C. F. von Weizsäcker's 1950-54 years idea of the quantum theory as of a theory of binary alternatives ("UR- theory"), which has rather weighty reasoning. Weizsäcker "...Mathematically, ... had just stumbled..."(Lyre, 2003) about well-known fact that any vector in 3-D space can be represented also by some combination of two-dimensional spinors, from what follows at least two important consequences: (i) – three-dimensionality of the "position space" (i.e. the space here), and (ii) - any object which in quantum theory is represented by a Hilbert space can be described in a state space which is isomorphic to a subspace of tensor products of two dimensional complex spaces.

Now we can say that in the informational conception such suggestions obtain logical grounds when the adequacy of the languages (if applied correctly, of course) at describing,

e.g., Matter, has nothing surprising – for the information is inwardly inherent to form some logical connections.

6.1.1. Space and Time

Space and Time are defined in *encyclopedia* as some “universal forms of Existence of Matter, its prime attributes”, which characterize “extension/ length” and “duration” of the Existence. It is rather easy to note that these definitions contain some evident flaws – the concept “Space” is defined through, rigorously speaking, non- defined concept “extension”, “Time” – similarly through the concept “duration”. Though the concepts of the extension and of the duration can be, to some extent concretely, determined empirically, the same questions remain – from where/ how did these “forms of Existence” appear?

In this informational conception (more see Shevchenko and Tokarevsky, 2013, 2013a) *Space and Time* are defined as some *universal logical rules/ possibilities, which are necessary to single out (to discern) different elements in the whole Set “Information”*. As well as “length” (or “space interval”) and “duration” (or “time interval”) exist in the Set also

At that *Space* allows to discern the *fixed information* constructing the elements (system of the elements), when Time controls dynamic changes of the elements and systems of elements – up to the system/ Set “Information” (and, of course, up to the system/ set “Matter”) as a whole; as well as the interactions between Matter’s elements should be discrete (quantized) also.

A human directly (by human’s senses) doesn’t perceive Space as a logical condition, but is capable to perceive fixed information and so sees distinct elements (objects) in Space as “lengthy” or separated by “extension/ length”.

To define *Time* there is a lot of approaches now, up to the statement that Time doesn’t exist – see, e.g., Rovelli (2009). J. A. Wheeler wrote about Time in a similar way as in *encyclopedia*:

“...But time: how is time to be reduced to more primitive concepts? Explain time? Not without explaining existence... Explain existence? Not without explaining time. To uncover the deep and hidden connection between time and existence ... is a task for the future.”
(Wheeler, 1986)

Nevertheless there is well known Wheeler’s paraphrase of the writer Rag Cummings “definition” of Time: “time is what prevents everything from happening at once... [when] space is what prevents everything from happening to me”. That was rather probable a joke to some extent (and note – really in the Set everything have happened and is happening at once “always” fundamentally), but this joke contains much truth. And it becomes indeed correct if

stated as “*Time is a logical rule, what prevents cause-effect (dynamic) events from happening at once.*” An effect logically must be after a cause. *Something* is necessary for realization of cause-effect logical events being different. In the Set – and, of course, in Matter, this “something” between cause-effect events even can be infinitesimal, but *it never can be equal to zero exactly*. In our Universe this something we call “time interval”.

As well as there can be different space intervals (in the Set - they can be infinitesimal also), but – analogously to time intervals – space intervals between fixed information patterns (at “the same time”) never are equal to zero exactly.

6.1.2. Mater as “computer”

Matter in our Universe is some analogue of a computer, where always rather simple, as that noted in many researches, program code operates (see, e.g. Lloyd, 1999; Fredkin, 2000; Schmidhuber, 2000; Lloyd, 2001; Margolus, 2003). This follows from the fact that (fundamental) Nature laws are comparatively simple, the number of the laws is not large; at that, the laws (as well as the elementary particles, or, more correctly, their taxonomy, which is relevant to the particles’ structure) can be reduced to a number of the groups of high-level symmetry.

To build a computer, as it is well known, some simplest controlled logical elements, which allow realizing in the computer main logical operations, are necessary. So it is plausible to suggest (Shevchenko and Tokarevsky, 2007) that the computer “Matter” is built on a base of such elements, which we call further “fundamental logical elements” (FLE) that are some analogs of Weizsäcker’s “Urs”. The FLEs constitute a dense FLE – lattice in the spacetime – some analogs of Penrose’s “spin-network units”(Penrose 1971), “causal set” (Sorkin, 91), “Space-time points in causal space” (Finkelstein 69), etc.

The FLEs themselves are, naturally, some informational structures also. Since in the Set “Information” every of Her elements is always connected with all other ones by some informational relations, to make up some stable structures from the FLEs, the FLE might have the property that informational connections inside the FLEs and between FLEs, including dynamic ones, in the informational structure “Matter” must be much stronger than any other FLE’s connections in the Set.

A human doesn’t observe structures of the FLEs directly and doesn’t read “primary information” – similarly he, e.g., doesn’t observe flipping of logical elements in a PC and only sees the pictures on the display. Nonetheless, he sees (logs out by the instruments) some results of the work of “operation systems” developed by (or for?) Nature.

As in the case of usual computer, for the FLE it is sufficient to have, at the minimum, two possible states (“0” and “1”), i.e. to have a possibility to form 1 bit of information, and to have some control inputs to flip the FLE by an external signal. So simplest cause-effect (dynamic) operation in Matter is the flipping of a FLE that is carried out during the minimal time interval, τ_0 . If we assume, also, that the minimal length in Matter is the length of the FLE, l_0 , then maximal speed of propagation of an information in Matter will be: $c = l_0 / \tau_0$.

In this conception it is premised that minimal intervals are Planck time and Planck length; correspondingly maximal speed of propagation of an information is equal to speed of light.

A movement, for example – in space, of a particle under an impact of a force (of the cause) or after the impact, i.e. – mechanically, is a cause – effect process. Since material particles are constituted from the FLEs, it is reasonable to conjecture (more see Shevchenko and Tokarevsky, 2012) that the particle’s movement can be reduced to a process of sequential flipping - with a substitution/ shift – of “material” and “spatial” (or “etheric”) FLEs (or, what seems as much more possible, there exist etheric FLE only). So for material objects to exist, to move and to change – what one observes in Matter, is necessary to exist of some system, where these processes could be realized. Such a system is “Matter’s spacetime”. In this spacetime the rules/ possibilities “Space” and “Time” have a number of specific traits. As the rules, they operate universally, as in the whole Set. As possibilities they constitute, rather possibly (one of main premises in the informational physical *model*; more see Shevchenko and Tokarevsky, 2013) some – at least very large for recent observations – 4-dimensional Emptiness. In this Emptiness a dense lattice of “ether” FLEs is placed. The FLEs have 4 degrees of freedom to flip and can cause flips of neighbor FLEs.

These 4 dimensions are: 3 spatial + 1 “temporal”. Here the term “temporal” is in quotes, since rigorously speaking corresponding dimension isn’t temporal. In reality, in Matter two “times” act (or the rule/ possibility “Time” is “two-faced”) – “true time” and “coordinate time”. “True” time is universal in the Set, including in Matter. Every step, change, etc., even if it occurs in spatial points only, always is accompanied by a “true” time interval and so this interval isn’t specifically directed relating to any of the dimensions, pointed above. So the true time interval is always positive logically, principally. However there exist – and for Matter that is critical (see refs. above) – some reversible logical sequences/ algorithms, which can evolve in two, “ \pm time directions”. Just to realize such a sequences, in Matter’s spacetime there is fourth -“temporal” – dimension. Corresponding rule is in, certain sense, some analogue of the “true” time. For example, if a particle doesn’t move in a spatial direction in the spacetime and so moves in the “temporal” direction only, the “true time interval” and “temporal interval” are equal. But for antiparticle at rest these intervals have equal absolute

values, but different signs. So this non-spatial dimension is called here as “coordinate time”, or “co-time”.

So in the informational model it is premised, that there is no specific “material” FLEs, though we cannot exclude totally such a possibility. Any of material (“massive”) particles that constitute material objects is a specific cyclic disturbance of the ether FLE lattice, which appears after impacting on a lattice’s FLE with transmitting to this FLE some momentum in the co-time direction. After a spatial impact on the particle, it start to move in space. If the [initial] momentum is spatially directed, then a photon appears – so for photons the lattice is something as Huygens – Lorentz “luminiferous aether”. But there is essential difference – this aether was some 3-D medium for spreading of 3-D electromagnetic waves; when in reality every particle, including photons, is a 4-D algorithm. But, since this algorithm can be observed in space and *true time* only, its corresponding 3-D spatial projection is observed as some (EM or de Broglie) wave. So one can say that the lattice is, in fact, some “everythingferous” aether. Besides note, that after a particle’s creation, further every material particle’s (and, of course, of any material object’s) algorithm never stops. Thus all, what one observes as Matter, always moves in true time and in the 4D lattice with speed of light and so all material objects in our Universe exist always in one true time moment (possibly inside the Planck time interval) simultaneously. The last inference means, however, that all, at least observable by humans, Matter was in some time created inside the Planck time interval. If the duration of Beginning of our Universe was longer, then there exist some other Matters that constitute the Universe, but they cannot be detected by existent now instruments, which are capable to interact only with the objects that are within the true time moment were the instruments are.

Every material object *can* exist in spacetime individually, so Matter is, essentially, a set of some self-sufficient automata, which are uninterruptedly run. However, because all elements in Matter are also uninterruptedly reciprocally interacting, at least through the gravity, that constitutes some intricate hierarchical structures of the elements; up to the informational structure (“computer”) “Matter” as whole.

Space and Time, as the rules/ possibilities for the realization of some changes in the structures, are totally universal for Matter, so processes in Matter are highly standardized and physical and other theories universally using the spatial and temporal variables quite adequately translate onto human consciousness’s (e.g., mathematical) language the primary Matter’s program code that operates in reality on the FLE lattice.

6.1.3. The problem of Beginning and evolution of Universe

Ad interim let us make a couple of introductory remarks:

(i) – from the properties of information follows that any Set's element contains the Set totally in the “not-I” part; i.e. as the negation, where the information is maximally compressed. However, there are some other types of more specified information compression – when a fixed information contains in some tacit form possible corresponding dynamic information completely. An example – all information that can be obtained in some theory, or more correct, almost all information, if we recall the incompleteness theorems – is contained in the theory's axiom system. All further development and applications of the theory – theorems, tasks, calculations, etc. – don't create any new information, including dynamic one, in addition to the information that the axioms tacitly contain. L. Wittgenstein wrote: “Proof in logic is merely a mechanical expedient to facilitate the recognition of tautologies in complicated cases.” (Wittgenstein, 1921; point 6.1262). In reality not only proof of something provable [e.g. of theorems] is “a mechanical expedient”; “a mechanical expedient” is the formulation of any provable (for given system of axiom) problem – e.g. of a theorem – itself;

(ii) – as it is well known, to transform an information requires to spend some energy – to start computer is necessary to connect up the computer to some power supply. However in the works of C. Petri, T. Toffoli, E. Fredkin (see Petri, 1967; Toffoli, 1980; Margolus, 2003) and references in these papers) was shown that some information can be transformed without energy dissipation, if in corresponding device the logical elements have specific - **reversible** structure (e.g., so called “Fredkin – Toffoli logical gates”) are used. Just to support reversal operations/ algorithms the coordinate time exists in Matter.

From (i) follows that fixed true information - in form of “up to Beginning statement”: “*there is no this Universe, as well as Its evolution*” - existed in the Set “Information” “always”, “absolutely long before” the Beginning. And this “Book of Fates” for our Universe, formally consisting of only one sentence, contained all and absolutely exact data about the Universe, including data about the cause and the method of Creation, as well as about everything what in corresponding time will happen with every element of the set “our Universe”, with every elementary particle and system of particles, including every human being and every human's thought. From (ii) follows, that it was sufficient to impact on some primary informational structure with some starting energy and further there will be no necessity in additional energy for the impacted structure's – i.e. for Matter's - evolution; or, at least, this additional energy is minimal; the evolution reduces to some redistribution of the initial energy portion. Possibly this fact was rather important for a thrifty Creator of our Matter.

That is, our Universe was not created “from nothing”. And the main problem of Big Bang hypothesis (or any other hypothesis in traditional physics) – a shortage in starting energy of 10^{85} - 10^{90} MeV – in the informational conception becomes, in certain sense, of course, inessential – the logical singularity of “up to Beginning statement” was quite sufficient for the creation of Matter as the result of a “Big Logical Bang”.

Both Creation and further Evolution of the Universe were only some realization of “always” ready scenario; similarly start and work (evolution) of a program on a computer take place, for example – calculation of infinite sequence of decimal digits of number “ π ” by a known algorithm, which – really, though tacitly, contains all “ π ” digits. What was this start? That could do a “computer user”, (the “Creator” in traditional formulation) – then Idealism is correct. With, however, an important addition - now a Creator ought not be omnipotent and transcendent; in this case, our Creator simply knew some necessary (for us now unknown) alphabet and words. On another hand – whereas the program code in our Universe (at least in Matter) is rather simple, we cannot exclude a materialistic scenario when both - necessary primary code and the start of corresponding program - happened accidentally.

6.1.4. Zeno aporias

Zeno aporias, e.g., (Dowden, 2010) are well known near 2500 years already, but aren't resolved on a satisfactory level. There is nothing surprising, since the aporias relate to properties of the notions of the space and the time; when any Meta-physical notion can be analyzed substantially only in framework of presented here informational conception. There are a number of aporias, but in fact all of them arise from the apparent logical inconsistency of the notion a “change”, if a system can change continuously: any fixed state of the system must be simultaneously as past, present, and future state (except, in certain sense, “the Achilles” aporias, though). So here we consider only two aporias – “the Achilles” and “the Arrow”.

The Achilles. Briefly the aporia is as (Dowden, 2010):

“Achilles, who is the fastest runner of antiquity, is racing to catch the tortoise that is slowly crawling away from him. Both are moving along a linear path at constant speeds. In order to catch the tortoise, Achilles will have to reach the place where the tortoise presently is. However, by the time Achilles gets there, the tortoise will have crawled to a new location. Achilles will then have to reach this new location. By the time Achilles reaches that location, the tortoise will have moved on to yet another location, and so on forever. [So] Zeno claims Achilles will never catch the tortoise.”

From Fig. 1 one can see, that at the movement of T-particle, because of unremovable motion along the co-time axis, real spatial motion always contains some reversal sections as projection of the 4D “co-time directed helix”.

Photons move in the space only, and photon’s flipping point trajectory is a 4D helix also, which is projected on 3D space as the EM wave. But their motion doesn’t contain reversal sections and so if two photons were radiated simultaneously in different space points, the back photon never overtakes the other one, as well as any T-particle cannot catch a photon.

The Arrow. Again as (Dowden, 2010):

“Zeno’s Arrow Paradox takes a different approach to challenging the coherence of our common sense concepts of time and motion. As Aristotle explains, from Zeno’s “assumption that time is composed of moments,” a moving arrow must occupy a space equal to itself during any moment. That is, during any moment it is at the place where it is. But places do not move. So, if in each moment, the arrow is occupying a space equal to itself, then the arrow is not moving in that moment because it has no time in which to move; it is simply there at the place. The same holds for any other moment during the so-called “flight” of the arrow. So, the arrow is never moving. Similarly, nothing else moves. The source for Zeno’s argument is Aristotle (*Physics*, 239b5-32).

The Standard Solution to the Arrow Paradox uses the “at-at” theory of motion, *which says motion is being at different places at different times and that being at rest involves being motionless at a particular point at a particular time.*”

It is evident, that the seems as non-satisfactory – the “at-at theory” is practically nothing more then usual evident description of a motion and doesn’t add something new to well known, but incomprehensible, fact – the arrow of course flies out the bow. Or it doesn’t fly, is motionless, if it is in a quiver.

In the informational conception the arrow aporia is considered as a next realization (a formulation, concretization) of the global problem (further “the PastPresentFuture-problem”) that any change logically contradicts with attempts to define explicitly given state of changing object, which is at each state as some unity of former, this and next states (or it is in past, present and future times), which are all different by definition. When such a definition/description is possible for any fixed object.

At that in the conception the PPF problem seems as unsolved completely till now. But it seems evident, that the resolution will be grounded on the properties of information above, first of all - **I5**, which states that any element – *including the element “given object in given state”* of any set contains all/ any elements of all/ any sets, *including the element “given object in all/every other states”* ; and **I6**, which states that the Set “Information”, in spite of its absolute infinity, is, very probably, discrete. Any future state doesn’t arise “from nothing” or as “future state used for its building something materials that was absent in previous state”. Since all information, including that is necessary for arising (all) new states, always exists in

each instant object's state. Including all arrows flied out their bows - through an absolutely infinite sequence of *discreet* arrow's states, when every of the states exists "in absolutely infinitesimal time intervals".

6.2. Consciousnesses

Here remains, however, the problem of creation and functioning of another, till now uniquely known "[practically!] non-material" subset in Universe – of human's consciousnesses: was the origin of consciousnesses some "mechanical" (and unavoidable) product of the evolution of Matter (this problem relates to subset "Alive" also), or was not?

And if that was so – then is it possible that a *tendency to a self-organization of any subsets*, which can be singled out by a certain way from the Set, *is an inherent property of information?* Human's experience provides the evidence that the consciousnesses of the humans are stable, i.e. (practically) any informational structure "human's consciousness" from main informational structure (a set) "[humans'] Consciousness" is stable. At that there aren't now some grounds, however, for conclusion that the set/ informational structure "Consciousness", where individual consciousnesses operate, is also stable/ o-stable as a whole. As that was already mentioned for Matter, to be stable in the Set for any informational structure is necessarily to be constituted from some primitive sub-structures when the logical links between the sub-structures must be much stronger then the links of them with all other elements in the Set. In Matter this condition is valid as a result of: 1) using of stable FLEs, and 2) because of that in any interaction of material objects only true information is used, like in a usual computer. An example - the logical gates constituting a computer are also always impacted by gravity, by external chemical compounds, by radio waves, etc., but these impacts are much weaker then electric connections between the elements, besides – a computer can process stably only true information.

A computer, of course, is a "purely material" dynamic informational structure, however it operates with the information created by a consciousness, which (i.e. the information) "is imposed" upon material informational exchange between elements of computer, including, e.g., - between the electrons of atoms, constituting the computer. At first sight the consciousness of a human works similarly to the computer, however there are essential differences. First of all – when working up a false (for example – non-consistent) or "non-understandable" information, i.e., information that requires additional data as an explanation, the consciousness, unlike a computer, doesn't "buzz". Moreover, any computer in principle cannot go out of a given strictly prearranged mathematical model (even inside "Gödel's limits" for this model), when the consciousness is capable empirically perceive - and further cognize - quite new things, though at birth a human has no, or, at least very little,

supraliminal knowledge about the External and the capability of human's brain to store and to work up well-defined information is much weaker than of a computer's one.

Besides, in spite of evident scantiness of the human's capability for storing and working up "usual", "Shannon-wise" information, a consciousness is *really* capable to work with much larger data arrays comparing with the arrays that can be worked up in any computer. That turns out to be because consciousness operates with *notions/ concepts*, when a computer operates with large – but fundamentally finite data arrays defining a given notion in a given computer. Any notion, however, is always an element of the Set, so to be defined it requires absolutely infinite (including "Shannon-wise") data contained in the Set.

Certainly, a computer can operate using a program code containing some functions of an adaptation and self – learning, e.g. an "artificial intelligence" code. However any code no more than fixes (in the best case) the state of rational knowledge of the programmer when the code was developed, and further the computer isn't capable to go out of this state. As to the consciousness – it uninterruptedly (at least, sometimes that happens) reads and analyzes more and more of new data on the notions from the Set. And here **Property I7** of the information becomes especially important; from it follows in this case that *a small change* in "Shannon quantity" of information (or, for example, in an algorithm) can lead to *cardinal informational (conceptual) changes*. The examples in a human language are widely known – the texts containing commas in different positions can have cardinally different meanings, when their realizations in a computer as a sequence of bits (of the states of electronic gates) at that can be practically identical. So a reading from the Set of a new – rather limited in "Shannon" or "algorithmic" senses, and so perceivable by the consciousness, information – can lead to cardinal changes, for example, in scientific ideas concerning external World; the development of science (real development; as we remember – logical development of any theory and its applications in practice don't add any new information to that was already found experimentally and introduced in the theory as axioms) – is, as a rule, a bifurcated process.

A computer cannot determine and select *essential* bifurcations, except for those that were determined/ chosen by a [programmer's] consciousness already, it cannot go beyond the limits of the set "Matter". "Materialistic" analysis of the meaning of some bifurcation, that is, an elucidation of its importance/ impact on some informational system, e.g., on some science, calls for infinite "material" informational capacity and processing power of the computer, even if one doesn't take into account that there are infinite number of "useless" bifurcations that should be excluded from consideration "at a glance".

The consciousness, as the practice shows, turns out to be capable on such analysis, in particular (and possibly - mainly) by using the intuition. It seems rather probable that the intuition is just a specific capability of the consciousness, which allows for the consciousness to *be oriented in infinite weave of informational connections* between the elements of the Set, “written”, by the same token, on some unknown infinite language; and “decode” this information, further representing it in a rationally understandable language.

Therefore it seems again that the sets “Matter” and “Consciousness” are fundamentally distinct, and intersect in some comparatively small region. Though they are similar in some sense, what is not surprising taking into account their “common origin” from the Set “Information”. Both Matter and Consciousness consist of separate informational structures – in Matter the structures are elementary particles, systems of particles, for example – human body or a Galaxy; in Consciousness the structures are humans’ consciousnesses, thoughts; possibly – consciousnesses and thoughts of some another sentient beings in the Universe. Though both sets use the same (common) fundamental logical rules/possibilities to single out different structures, i.e., Space and Time, the rest of operations of material and conscious structures are qualitatively different. The rule “Space” in [at least human’s] consciousnesses works in a quite different way, then in Matter. Seems nobody can say – where in [Matter’s] spacetime is a thought placed? Yet another example – when all material processes are sequential in time – from the past to the future, a consciousness is capable, at least limitedly, to walk in time, remembering and modifying mental events in the past, and to forecast, to some extent, the future. However seems reasonable to consider how many “times” act in the set “Consciousness”, besides the “true time”, of course. ***** bread piece Nevertheless, as that is pointed above, like for the material objects, for a stability of separate conscious structures is (rather probably) necessary for them to be built on a base of some “immaterial” fundamental logical elements (c-FLEs), which, similarly to material FLEs, must be sufficiently stable in the Set.

However, we cannot exclude a version when separate consciousnesses can operate *stably* only using a stable material matrix, for example – on a human’s brain.

Generally speaking, we cannot exclude that a global set “Consciousness” contains a number of subsets, that is - the subset where human’s consciousnesses exist/ operate, some subsets where operate the consciousnesses which are considered by existent religions, etc. And, if any consciousness can operate only on a stable material matrix, then what is the Matter in our Universe?

7. Discussion and conclusion

The base of proposed here informational (“The Information as Absolute” conception) conception is the rigorous proof of that everything what exists (can exist, “cannot exist”) is/are some elements of absolutely infinite “Information” Set. The Set, in turn, is some unity of some set of “inert” elements and of an “active” Logos, though to separate notions “inert” and “Logos” is impossible – they are complementary, both are defined only in a unity; besides any “active” element – a motion, a changing, etc., as well as any logical rule, are informational elements also.

The conception possibly seems as some next version of Neoplatonism, however, that is not fully correct. There are no, in certain sense, “active” Ideas and “inert” Matter, both exist “parallel” to each other; Ideas are more “descriptions” than “active instructions”. The conception includes also other philosophical and religious conceptions – in some similar way as it includes existent information and set theories (as well as the science totally, though); in some similar way – but not identically. Existent information theories - i.e., Hartley – Shannon’s, complexity and automata theories, logics, language theories, etc., - correspond only to some specific properties of the information. These properties (for example – the possibility to measure the “quantity of information” by using the values of logarithms of the probabilities of possible outcomes) rather probably co- relate with some very common “rules of existence and interactions” of the elements in the Set “Information”, besides – these theories are rigorously formalized and developed in compliance with criteria of truth, consistency, completeness, etc. Thus the existent information and set theories – as well as the mathematics as a whole (which in reality eventually is the information theory), – are directly involved in this conception, and can be directly applied at least at investigations of Matter.

On higher level of consideration the mathematics itself calls for the substantiation, though. K. Gödel defined the purview of the set theory as (quoted in Maddy, 2005): [if the concept of set] “...is accepted as sound, it follows that the set-theoretical concepts and theorems describe some well-determined *reality*...” The suggested here conception well clears - *what* is this “well-determined reality”, which, in fact, mathematics studies.

In contrast to mathematics, the subject domain of philosophical and religious conceptions cannot be formalized practically, first of all because these conceptions consider the problems of existence [of the elements and systems] of information outside the set “Matter”; where the verity relation at interactions of the informational structures becomes be not rigorously necessary. Correspondingly, philosophical and religious postulates become comparatively uncertain; and to ground this uncertainty, in religions (in fact – in Idealism also) the principal

impossibility of the cognition [at least by human's consciousness] of the divine design is - tacitly or not - postulated. Materialism, as a rule, considers this problem rather superficially, though (or may be since) the conception of the existence of some eternal Matter is absolutely equally mystical and transcendent as the conceptions of, for example, eternal God in Christianity or eternal Spirit in Hegelian philosophy.

In the informational conception any philosophical and religious postulates and "designs" turn out to be cognizable. In turn, studying the Set's properties, Materialism obtains some possibility to study rationally materialistic versions of the Universe's Beginning and evolution. In Idealism now there is no necessity for Creator being as an omnipotent (and so - transcendent) essence, etc.

In the conception seems as we cannot exclude, that a tendency to a self- organization for (at least of some) subsets that are singled out by a certain way in the Set "Information", is inwardly inherent to the information. This assumption, probably, is rationally analyzable, though here exists a possibility that some problems, similar to those that occur during attempts to prove the uniqueness of the conception, can appear. But the assumption can be important when solving of, e.g., the problem of the appearance of living and, further - sentient, beings on Earth. Possibly one can note here a probable non - trivial likeness of the Set "Information" and of the Alive (including - of conscious Alive) - as in the Set every element of the Set contains full information about the Set, the DNA of practically every cell of an organism contains full information about the organism. Though here evident difference exists - when in every Set's element full information about the Set "is maximally compressed" in the "not-I" section, in a DNA the compression is much lesser and data can be "really decompressed" - as a new clone of an organism.

Returning to ontology, if a self - organization is an intrinsic property of information, then the Set as a whole can be, in principle, classified as some "Prime Creator", Deo, - as, e.g., G. Cantor said (quoted in Wikipedia): "...The actual infinite arises in three contexts: first when it is realized in the most complete form, in a fully independent otherworldly being, *in Deo*, where I call it the Absolute Infinite or simply Absolute..."

But, on another hand, here a problem appears - can we consider an Essence as rational, when this Essence *is always absolutely complete* and so cannot change anything in Herself? Insofar as even the Essence will attempt to change something, for example - to begin evolving of an Universe, She must absolutely exactly follow to the scenario of this change, when this scenario exists "always", including - "absolutely far before" the Beginning; with

the evolution of anything, of every element of the Set, including, e.g., of every human, that follows to some always-existent scenario also.

Proposed conception allows also studying on a higher level of understanding the problems in natural sciences. An epistemological example was mentioned above – i.e., the problem of remarkable adequacy of languages of scientific theories in describing and analyzing of material objects and their interactions. Until now most radically this problem was solved by P. Dirac in his famous “postulate”: “shut up and calculate!” Now we can say practically without any doubts - “be calm and calculate”, because Matter is an informational system and so there is no startling in that material processes turn out to be logically (mathematically) analyzable when some formal system of postulates of some science is applied. If decoding of the corresponding information is correct, of course.

Another example – development of so called “Theory of Everything” (ToE) that should “unite” four known now “fundamental” (gravity, electromagnetism, weak and strong) forces, which became popular in physics in last few decades. Some attempts to create such a theory appreciably revived after the theory of electro-weak interactions (which united two fundamental forces), and Standard model (some unification electro-weak and strong force was made) were developed.

However, even without taking into account the informational conception, it seems evident that such a theory cannot be the ToE – besides that not all in physics can be reduced to some forces one can, e.g., note that experimental science (which is unique source for indeed new information – see above) will develop, resulting, with a large probability, in a discovery of next “fundamental” forces; what will require the development of “Theories of next Everythings”. But from this informational conceptions follows that eventually a true Theory of Everything will be a theory of some informational structure “Matter”, which is singled out by some way in the Set. But taking into account, nonetheless, that Matter continues to be a part of the Set and material objects interact with every element – including some ordered systems of elements – of the Set, and so Matter remains be an open system.

The informational conception can be applied in physics already now more specifically. For instance, one of fundamental postulates in quantum mechanics (QM) about identity of all particles of the same type becomes quite natural – (see Property **I7**) – the information is unique thing that can have identical copies, so elementary particles of the same type with great probability are the clones of a corresponding informational structure (algorithm). As a next example we can mention experimental fact that (practically) every elementary particle has own specific partner - the antiparticle. This very possibly follows from the thesis that the

algorithms of material particles principally must be based on reversible FLEs and therefore also should be reversible. Then the particles are the algorithms with direct sequence of the commands, when the antiparticles – with the reverse one. S-particles, e.g., photons, don't move in co-time (aren't controlled by corresponding rule) and so haven't their antiparticles.

As well as becomes be understandable another QM principle – that at the evolution of some QM system its parameters are uncertain. Indeed, since Matter is some computer, the situation here is very similar to the situation when in some PC some program code runs. For, e.g., spatial variable, a particle “obtains” a specific position relating to external Matter at least only when the particle's certain FLE flips. Between these moments the position (and possibly some other properties of the particle) are uncertain for the external – analogously in a computer the state of a running code becomes uncertain on the time interval need for some electronic gate to flip. Moreover, if a code contains some subroutines – the state of the code becomes uncertain on the time interval need for next subroutine to carry out its calculations.

The notions of Space and Time are fundamental for physics, they are Meta-physical. The understanding of these notions as fundamental absolute rules/ possibilities that don't depend on any process in Matter or on any “reference frame” allows, for example, to understand – why the (at least) “special relativity theory” is incorrect when it negates existence of absolute spacetime and postulates the equivalence of all inertial reference frames and so turns out to be inconsistent. More about the application of the informational conception in physics see (Shevchenko and Tokarevsky, 2012, 2013, 3013a) .

In the biology the problem of the transition “Matter → Alive → Consciousness” seems as more understandable also. It is well known that it is very difficult to explain the appearance of life on Earth as a result of some random, purely physical-chemical, processes. The probability of corresponding chain of reactions is too small for life appeared here in observed 1-2 billion years. But, though material things and living (as well conscious) beings are evidently different – and belong to different subsets in Universe, all they have the common base since all they are eventually some informational structures. So material, “living” and “conscious” structures indeed can interact by using some unknown now forces, and that is indeed so, as that follows, e.g., from everyday facts, when conscious actions transform into a material action, for example – when a human's consciousness controls his material body. Thus at least primary physical-chemical processes, resulting in creation of some protein macromolecules and DNA (RNA), could be go under the control of some primitive *non-material*, “virtual” informational structure, which evolved eventually, for example, in the human's consciousness and which built by such a way to herself a comfortable house a body.

Though we cannot exclude, that at the computers' evolution some sensors will be developed, that are sensible enough to be controlled by consciousness surely, including directly by thoughts. Then a variant is possible, when human's consciousness in some time will move to a new residence, obtaining a stable a well reparable iron organism, which doesn't require for its existence biological food. Though such "humans" will, possibly, with a very great pleasure drink benzine that was seasoned, say, 40 years in an oak tun.

Above we considered mainly ontological and epistemological aspects that relate, first of all, to Nature sciences, but the conception can be applied in humanitarian domains of philosophy also. Here seems worthwhile to make also some remarks relating to main existent doctrines that consider ways of future evolution of the humanity – idealistic and materialistic. The idealistic (first of all – religious) ones usually consider this evolution as fatally controlled by some mighty external forces. Materialistic, first of all Marxism, doctrines contend that the evolution is controlled by some "materialistic" ("historical materialism") economical laws; in a society "the [material] Being controls the [individual and social] consciousness".

Though Marxism, as it seems, turns out to be correct explaining the social evolution on passed historical period ("primitive communism" – capitalism succession of social systems), in the informational conception this doctrine seems as it have, very probably, fundamental limitations. This conclusion follows from – as that follows from the conception – from that human's consciousness isn't material principally. The consciousness's (in reality – of some eternal program that a couple of billions years ago created first proteins, etc.) evolving scenario with great probability have not finished on "the human's consciousness" state, it contains a sequels where the complexity of the consciousness, its capabilities to apprehend new information and to control more and more in the Set will be realized. When human's material needs – though important for the consciousness (including for its existence) now – will become, as a result of technological development, some minor components in human's life. So it seems rather reasonable to suggest that in a next social systems the rule "the [individual and social] consciousness controls the [material] Being" will act. When Marxism remains be as an instruction – how to made a capitalism; as that was made thoroughly by communist parties in former socialistic countries.

As a result, it seems as rather probable, that observable now in our Universe evolution "Matter → Alive → [human's] Consciousness" will continue as "...[human's] Consciousness → "[human's-?] Consciousness-1" → "Consciousness-2" ...; where "Consciousness-n" mean next subsets in the Set basing on another – and probably arranged by qualitatively another way - corresponding primitive ("fundamental") logical elements.

In "The Problems of Philosophy" (Russell, 1912, ch. 2) B. Russell wrote: "...but whoever wishes to become a philosopher must learn not to be frightened by absurdities". Now we can

say, that this is not so. There isn't any absurdity in the Set "Information" and Her specific realizations. The realizations can be very complicated, paradoxical or highly paradoxical, but cannot be absurd; whereas all in our Universe (and outside) are the "words", and all – elementary particles and Galaxies, the men and women - are merely some informational structures.

On another hand Russell was in certain sense right – for his time. Indeed, philosophy was rather strange science. When "usual" sciences study some non- provable, but at least testable – using logical or experimental methods – problems, after Kant became be clear that the philosophy "studies" the problems which – at least ontological and epistemological - are non-provable and non-testable. So in philosophy one indeed sometimes can meet now with those absurdities.

Now any problem becomes, at least in principle, be cognizable. As well as, e.g., ontology of Space, Time, and Matter, rather probably becomes "nature" science – some subject branch of physics. However, not every informational structure in the Set can be studied by nature science methods, for example – if a false, uncertain or bifurcating information is essential at/for some structure's existence/evolution. In such cases the structure becomes be too complex for be described by a formalized theory having a limited number of postulates. Besides – as that was mentioned already – any separate structure cannot be separated in the Set totally; every structure is – more or lesser – an open system.

It seems rather possible that such situations henceforth will be studied by the "non-natural" science, philosophy, which obtains now ultimately fundamental subject of investigation – the Set "Information". Which, in spite of Her ultimate complexity, is a conceivable, non-transcendental object, and for Her studying there exist already now a number of instruments – the set and language theories, cybernetics, theory of bifurcations (synergetics), other sciences, including, of course, natural ones, though.

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