GENERAL THEORY: THE PROBLEMS OF CONSTRUCTION

Serge Patlavskiy

a physicist (L'viv National University), founder and director of the
Institute for Theoretical Problems of Interdisciplinary Investigations,
L'viv, Ukraine
email: serge.patlavskiy@rocketmail.com
homepage: http://generaltheory.webs.com

Abstract

The author holds that a scientific theory of consciousness can be constructed only within the conceptual framework of a suitable meta-theory. In the paper the key problems of constructing a General Theory (as a kind of meta-theory) are discussed. It is suggested that if we aim to explain Reality in all its complexity, the conceptual framework we construct should take into account three factors – informational, material, and energetic – simultaneously. It is shown how the intellectual products of the different levels, like a theory and meta-theory, relate to each other, and the ways in which they differ. Also, the basic elements of the process of cognition are defined, some fundamental laws and principles are formulated, a non-statistical method of study is presented, and a specific systemic modeling is exemplified. All this enables the author to propound an applied theory of consciousness, and articulate an idea of a new scientific discipline – Interdisciplinary Investigations. The author hopes that the paper will inspire a wide-ranging discussion among the theorists who work in the fields of consciousness studies, artificial intelligence, psychology, psychiatry, and among all those who would like to see a comprehensive paradigm be achieved in these fields in the future.

Keywords: general theory, intellectual product, criteria of formal correctness, meta-theoretical canon, non-statistical analysis, integrated information system, applied theory of consciousness.

1 On sense and relation (by way of introduction)

I hold that if there are at least two existent entities, then an *explanatory framework* (a set of explanations) can always be constructed which would treat these entities as constituting a *system*. In other words, the very existence of two entities makes it possible to *enframe*[1] them as some system. Then, each of these entities can be considered as an *element* of that system. The element, in virtue of its very presence, *influences* the system in such or other way. If two (or more) elements are linked into one system, and one element influences the other element, this means that a *relation* between these elements, as well as a relation between the given element and the whole system exists too.

If one element establishes a relation with another element (or with whole system), it acquires its *sense* in reference to that other element (or in reference to the whole system). I accept that the sense of element is simultaneously a *denotatum* and a *notion*. Within a system, any element appears as a *denotatum-notion complex*. For example, if we treat a coin as a denotatum-notion complex, we mean that the alloy it is made of, its form, weight,

and surface embossments stand for its denotatum, while its value, date of issue and belonging to a certain country stands for its notion.

The sense of element as a denotatum is its *property*. For example, a coin, as a denotatum, has some physical properties, or features. The sense of element as a notion is its *meaning*. For example, the meaning of coin is its value, or its being a generally accepted commodity as a medium of economic exchange.

Any explanatory framework is also a system with *assertions* as its elements, or *sub-systems* (I mean here that an assertion is a system itself with its own elements). If a certain denotatum-notion complex is an element of a certain assertion, I call it a *concept*. Therefore, contrary to the established tradition, I make a difference between a concept and a notion. If the concept is being used only as a notion and without referring to its correspondent denotatum, I call this fact a *notion hypostatization* – the notion itself is considered as an independent entity. Also, the most general kind of explanatory framework I call a *conceptual framework* (or, in certain cases *epistemological framework*).

Any explanatory framework appears as a result of the *process of cognition*. If we consider the process of cognition as some sort of a system, then the *subject of cognition* and the *object of cognition* will be the elements of that system. The relation between these two elements results in what I call a *subject-object complex*. The object of cognition is an entity enframed by the subject of cognition, to wit, transformed by it into some denotatum-notion complex. Therefore, by definition, the object of cognition always has the properties ascribed to it by the subject of cognition.

I define *Reality* as including everything, together with all possible subjects of cognition. From this follows that Reality, as a whole, cannot be the object of cognition itself. This is because no subject of cognition can be found beyond Reality that would be able to enframe Reality as its object of cognition. So, by simple logical reasoning, we come to *agnosticism*, or the impossibility to cognize Reality. However, in this paper, my prime object in view will be to show that such a conceptual framework can be constructed that would make it possible for us to cognize Reality in its whole complexity, and to explain all its elements, including the very mechanisms of the process of cognition. Actually, I aim to discuss the problems of constructing the *non-agnostic conceptual framework*.[2]

Whatever explanatory framework we are going to construct, we should first *set* the sense of all its elements. The sense of element, set during the process of cognition, I call a *cognitive sense*. Also, I hold that all the elements of my explanatory framework should be treated unequivocally. Therefore, for all the concepts, as the elements of explanatory framework, to be treated unequivocally, their cognitive sense has to be set according to a few universal principles. In every case, the conceptual framework is the result of activity of the subjects of cognition during the process of cognition, and I call that result an *intellectual product*.

2 Fundamentals and basic elements of construction

2.1 Applied ADC theory

2.1.1 The levels of intellectual products

The applied theory of ***a****ppearance*, ***d****evelopment*, and ***c****ompatibility* of intellectual products (or, the *applied ADC theory* for short) is designed for examining various intellectual products. By definition, this theory takes any intellectual product as its object of study. (For comparison, Physics takes any physical phenomenon as its object of study). The applied ADC theory presumes that during the process of cognition the subject of cognitive activity creates various intellectual products sortable into four levels:

(1) the level of description (the *D-level*);
(2) the level of generalization and systematization (the *GS-level*);
(3) the level of an applied theory (the *AT-level*);
(4) the level of a meta-theory[3] (the *MT-level*).

The D-level, being to a large extent eclectic, includes simple unsorted descriptions of phenomena, as well as the data received as results of experiments with strict conditions formulated. The GS-level presumes sorting the data, determining regularities in occurrence of the phenomena, and formulating the hypotheses. The AT-level includes those assertions that have sufficient explanatory and predictive power; it also includes disciplines and research directions. The MT-level includes the assertions about the fundamental features of our Reality. It also includes the assertions that constitute the conceptual or epistemological frameworks, general theories (like the theory of everything, or *TOE* for short), general scientific doctrines, some basic principles, fundamental natural laws and general methods, belief systems, general styles in art and the very pieces of art, musical compositions, poems, and the like.

It is important noting that if a person formulates some supposition, but this supposition is not a result of generalization and systematization of research data, then this supposition is not a hypothesis (the GS-level intellectual product), but an element of person's belief system (the MT-level intellectual product).

As follows from the history of science, the development of Physics went from the D-level, through the GS-level, and up to the AT-level. Only then the MT-level was formed as a meta-theory that may be referred to as "The Modern Physical Materialistic Picture of the World". But, I insist that where we wish to construct, say, a theory of consciousness, we need to construct a suitable meta-theory in the first place, and only then to go from the MT-level to the AT-level, or to move from the specially constructed meta-theory to the applied theory. Thus, I am convinced, the meta-theory "The Modern Physical Materialistic Picture of the World", while being suitable for constructing, say, the quantum theory, at the same time is not suitable for constructing a theory of consciousness, nor for any theory of anomalous phenomena, and the like AT-level intellectual products.

I also recognize that a certain *form of information organization* (or, a *form of data organization*) exists, and corresponds to every level of intellectual products. When we only describe the world, the results of description are organized into *phenomenological observation* (or, the *set of perceived phenomena*); the generalization and systematization of research data gives birth to a form of information organization which may be called a *data complex* (or, *data array*). When we deal with theories of sufficient predictive power, in that case we receive the data which already need to be organized into *information system*. Here, we receive new data not only as the result of conducted experiments with real objects, but also as corollaries of one or other applied theory which possesses sufficient predictive power (due to such a theory we are confident that the unexamined phenomena would also behave in the predicted way), and also as results of computer simulation.

It should be admitted that these three forms of information organization have common feature of being the *discrete data sets*. Also, I shall presume, there is a fourth form of information organization which I will below refer to as an *integrated information system*, and which, as I believe, cannot be treated as a discrete data set.

Let me accentuate that the applied ADC theory was designed to **legitimize** talking about theories and meta-theories itself, and it can directly address questions like "What is theory?", "What is a difference between a theory and a meta-theory?", "How to construct a meta-theory?", and similar questions. For example, how can we know at what level is the given intellectual product? Here, the applied ADC theory states that the level of intellectual product can be determined **objectively** by examining the *aim* and *criteria of approach* formulated when constructing the given intellectual product. Here, by criteria of approach I mean a set of consecutive steps required to achieve the formulated aim. The given pair of the aim and criteria of approach constitutes a *canon* for the resulting intellectual product.

Consider the following example: if the aim is to cognize Reality in all its complexity (or, say, to impress the whole world by one's piece of art, *etc*.), and the criteria of approach presume constructing a suitable conceptual framework (or some piece of art), then the resulting intellectual product will be of MT-level. At the same time, the intellectual product that aims just to list the various versions of TOE would be just of GS-level.

Next. The applied ADC theory states that where the aim and criteria of approach correspond to each other, then the constructed intellectual product will be *rational*. But, if the aim is, say, to reach the Moon, and the criteria of approach presume climbing up the nearest mountain, then the resulting intellectual product "The Moon can be reached by climbing up the mountain" will be *irrational*.

It is important to note that if we consider the aim as being taken alone, it cannot be characterized as rational or irrational. The same holds when we consider the criteria of approach without connection to a certain aim. For instance, the "climbing up the mountain" may help to construct the rational intellectual product if the aim would be "To be the first who can see the sunrise". I may even suppose that whatever aim we formulate, it may always be the element of one or other rational intellectual product – everything here will depend on the criteria of approach we choose.

From the above follows the *Principle of rationality*: whatever aim can be formulated, such criteria of approach can be always found so that the resulting pair of the aim and criteria of approach will constitute a canon for constructing a rational intellectual product.

The applied ADC theory also addresses the question of relation between the intellectual products of different levels. For example, it states that the given AT-level intellectual product may have only one correspondent MT-level intellectual product, while the given MT-level intellectual product may serve as a conceptual framework (or parental meta-theory) for many AT-level intellectual products simultaneously. The applied theory of heat, say, cannot simultaneously have *materialism* and *idealism* as its parental meta-theories, while the meta-theory "The Modern Physical Materialistic Picture of the World" may host both the applied theory of heat, and the applied theory of piezoelectricity.

2.1.2 The completed and uncompleted groups of intellectual products

The applied ADC theory also states that whatever intellectual product we take, there is always such a *completed group* of intellectual products that the given intellectual product is an element of that group. An example of such a group is as follows:

> **the D-level assertion:** if we rub the ebonite stick with wool, the stick starts to attract small pieces of paper;
> **the GS-level assertion:** all charged things attract or repulse each other; maybe, there is a universal quantitative description of this phenomenon (the word "maybe" means that some hypothesis is being formulated here);
> **the AT-level assertion:** whichever two electrically charged material bodies we take, the force between them is proportional to the product of the charges and inversely proportional to the square of the distance between the centers of these bodies;
> **the MT-level assertion:** Reality is purely materialistic (to wit, no "supernatural forces" are required to be involved to explain the observed phenomena).

As one can see, in this example the assertions of all four levels are present, and are in proper mutual interrelation. That is why I call the given group of intellectual products completed. If in our example we remove the MT-level assertion, the group would no longer stay full, and would be called *uncompleted*.

We will have an uncompleted group also when one (or two, or three) assertions of different levels, albeit present, are in improper relation. For example, if, in our example, we replace the D-level assertion with this one – "If we let go of an apple, it will fall.", then we will receive an uncompleted group of intellectual products too. It should be admitted that the D-level assertion "If we let go of an apple, it will fall." may be the element of some other group of intellectual products, and this new group may also be completed. For this new group to be completed, the MT-level assertion may remain the same as in our example above, but the AT- and GS-level assertions would have to be changed thus:

> **the GS-level assertion:** every material body attracts by the Earth, and all the bodies in our Solar system, as well as in our galaxy, attract each other; maybe, there is a universal quantitative description of this phenomenon;

> **the AT-level assertion:** any particle of matter in the universe attracts any other with a force varying directly as the product of the masses and inversely as the square of the distance between them.

So, as follows from the applied ADC theory, if we want to construct a theory of consciousness as an AT-level intellectual product, then we have to form a completed group of intellectual products with the theory of consciousness as an AT-level element of that group, and with some suitable meta-theory as an MT-level element of that group.[4]

2.1.3 On the relation between the intellectual products

Next. The applied ADC theory states that the AT-level intellectual products (say, the applied theories) constructed within the limits of the same meta-theory may be organized into one or more *disciplines* (research directions, *etc*.). All these applied theories make use of the same *general method* as the element of their parental meta-theory, and apply this method while studying the certain classes of phenomena. The discipline (as a set of applied theories) constructed within the limits of my own meta-theory is called *Interdisciplinary Investigations*.

It should be taken into account that here I talk about a *new paradigm* of Interdisciplinary Investigations, by which I mean a new understanding of what Interdisciplinary Investigations are (see Section 3.4 below). I insist that Interdisciplinary Investigations being understood as a "marriage" between Physics and Psychology (if applying Mario Bunge's, 1973, interpretation) cannot lead to any effective results because of the fact that Physics as well as Psychology have their own methods of studying their own objects, and these methods are incompatible. Therefore, I talk about Interdisciplinary Investigations as of a new all-sufficient discipline that applies its own specific method (it will be discussed in Section 2.7.1) when studying a specific class of natural phenomena (which include consciousness-related, rare, anomalous, non-repeatable, and like phenomena).

The applied ADC theory also addresses the relation between the intellectual products of the same level but being constructed by different subjects of cognitive activity. Here it states that the MT-level intellectual product of one author cannot be criticized nor disproved from the standpoint of the MT-level intellectual product of another author, and that we can only investigate these products for compatibility. The *investigation for compatibility* presumes comparing the aim and criteria of approach formulated by one author with the aim and criteria of approach formulated by the other author when constructing their correspondent intellectual products (this point will be detailed in Section 5.3).

From the above it immediately follows that only a theorist who has his/her own meta-theory constructed can perform such an investigation while assessing the meta-theory constructed by another theorist – this is the only case when the assessment can be objective and such one that would have definite scientific value. Thus, the attempts of other persons to assess the given meta-theory would be just the expression of their personal (or subjective) "likes" and "dislikes" with small scientific value.
From the above also follows that, say, Christianity cannot be criticized from the standpoint of Buddhism, and *vice versa*, since both are certain self-contained belief systems – the MT-

level intellectual products. That is also why we cannot criticize an artist for having depicted a cow with six legs, since it is how an artist expresses his meta-theoretical beliefs, or, simply speaking, sees the world around him – we can either love his painting (this is a case when our visions of the world are compatible), or leave it, and pay attention to the works of other artists.

The applied ADC theory also holds that the meta-theory (since being just a collection of basic principles, postulates, and axiomatic assertions) does not need to be proven, and that its correctness depends on whether the applied theories constructed within its limits are correct and possess sufficient predictive and explanatory power. If the correctness of meta-theory is proven in such a way, this would mean that its meta-theoretical aim was formulated **objectively**. From the above follows that the meta-theory which I am going to present below (or any belief system like Christianity) does not require to be proven in virtue of its being the MT-level intellectual product.

In addition, I call *intellectual legacy* a totality of intellectual products as a result of cognitive activity of some subject of cognition over time. If by a subject of cognition we mean a scientist, it will be a set of books, papers, patents, inventions, *etc*.; if by a subject of cognition we mean an artist, it will be a set of paintings; and so on. In total, the applied ADC theory consists of thirty eight assertions (see Appendix 1).

2.2 The criteria of formal correctness and the problem of intersubjectivity

In the former section we touched the question of which levels the intellectual products can be. Let us now consider the problems that appear when we try to construct the intellectual product of one or another level. Since every intellectual product is constructed by a certain subject of cognitive activity, therefore it is always to a great extent *unique*. The ancient adage says: "*Quot homines, tot sententiae*", which means that no two minds can think alike. This is due to the fact that every person constructs a new thought being based on his/her unique *subjective experience*.

Of our special interest will be the unique subjective experience that pertains to *consciousness-related phenomena*. Here I hold that only the theorist who has a rich unique subjective experience of his/her own consciousness-related phenomena has a chance to construct an explanatory framework for addressing these phenomena. But, on the other hand, the process of construction of such a framework would mean that the theorist is performing a scientific activity, and, as it is commonly accepted, the results of scientific activity must be (or, at least, must tend to be) *objective*. So, how to reconcile the subjective and objective aspects in this case?

First of all, I suggest treating as extremely important the *intellectual purity* of resulting intellectual product while constructing a conceptual framework for explaining consciousness, by which I mean the non-contamination by ideas of others. From this follows that, having constructed a personal version of the theory of consciousness, a theorist must accept full personal responsibility for every idea expressed in that theory, and must not "hide beyond the backs" of others who are commonly treated as "big authorities".

There is also no sense in interpreting the ideas of famous thinkers of past times, since we cannot know for sure what these thinkers had in mind when expressing their ideas, if only because of the fact that we cannot, so to speak, smell the air of epoch in which the given thinker lived and worked. That is why a paper on consciousness which is just an interpretation of the ideas of others would be of small scientific value.

Second, I insist that the conceptual framework needed to construct a theory of consciousness (and, theories of other complex phenomena) should be constructed in obedience to some requirements (or criteria). Here I suggest that whatever conceptual framework we construct, it

(1) should not contain tautologies;
(2) should not contain notion-metaphor transmutations (*e.g.*, "power" – it is a concept in Physics, but being used in Psychology, say, as "power of imagination", it becomes a metaphor);
(3) should not contain hypostatization (which occurs when something abstract is treated or represented as a concrete reality);
(4) should not contain incorrect definitions (when the unknown is defined through another unknown);
(5) should not contain multiplication of hypotheses (which occurs when the new hypothesis is being based upon the previous one, instead of being the result of generalization and systematization of research data, as the applied ADC theory requires);
(6) should not breach Okham's principle (the most evident and simplest explanation has to be preferred);
(7) should possess inner consistency (or, be formally non-self-contradictory);
(8) should be rational (when the aim and criteria of approach correspond to each other).

I refer to these requirements as the *criteria of formal correctness*[5] (or, in a certain context, the *criteria of scientific approach*), treat them as essentially universal, and apply them when constructing my own meta-theory. I realize that it is always a great responsibility to be a legislator, but the field of consciousness studies, to be removed from the point of stagnation, demonstrably requires some legislature.

So, I expect that the *cognitive environment* for the science of consciousness will be formed by the theoreticians who accept the mentioned above strict criteria as the rules of their cognitive activity directed at construction of one or another conceptual framework or a certain theory. Next I presume that the cognitive activity, in order to be called *scientific*, must obey these rules as well, and I even suggest defining *Science* as an intellectual product constructed in obedience to the criteria listed above. However, Science is not just a collection of knowledge. It is the very process of gaining new knowledge by using appropriate methods.

By imposing a requirement that the conceptual frameworks must obey the criteria of formal correctness, I am, thereby, intending to apply the general principle of *making the other things equal* which is widely used in science when carrying out experimental research. So,

if all conceptual frameworks will obey the same criteria of formal correctness, they will become in this sense equal (they will be of equal quality), despite of being constructed by the different theorists. If this requirement is met, we receive a possibility to solve a problem that may be called a *problem of intersubjectivity*.

This problem, being an objective feature of any communication, becomes especially topical when we wish to construct a scientific theory of consciousness. However, it is not very crucial for Physics, since the external-to-investigator physical phenomenon is treated by the different investigators in basically the same way. For example, if a physicist talks about piezoelectricity, the other physicist understands well enough what is being talked about. But, while studying consciousness, the consciousness-related phenomena are, in most, private; therefore what is consciousness for one investigator may not be the same for the other investigator. In result, the subjective opinions come into conflict with each other, and no comprehensive paradigm can be achieved.

I believe that the problem of intersubjectivity is the main obstacle when erecting a science of consciousness, and I suggest the following idea of how to cope with that problem. Let us accept that every theorist constructs his/her own personalized version of the theory of consciousness being based on his/her unique consciousness-studying data[6], and that the intellectual purity of that version is sufficient. If a case is that all such theories obey the same criteria of formal correctness formulated above, then, according to the applied ADC theory, these theories could be investigated for compatibility, and we would be able to come to the *comprehensive version of the theory of consciousness*.

Summing up, I state that whatever two or more subjects of cognitive activity we take who have got their own intellectual products constructed, then, on condition that all these intellectual products obey the same criteria of formal correctness, these intellectual products will be always mutually compatible.

The above statement can be either proved or disproved. However, to prove or disprove that statement, say, when trying to solve the problem of intersubjectivity in the field of consciousness studies, we must have sufficient *quantity* and *quality* of the personalized versions of the theory of consciousness. In the general case, the **subjective** becomes **objective** not directly (or by some magic), but via some additional factor (namely, the criteria of formal correctness) which is treated as objective, and responsible for the quality of the constructed theories.

2.3 Approaching the General Theory

My aim is to show that such a conceptual framework can be constructed to make it possible to explain the objectively existing Reality. The conceptual framework I am going to present below is called *Nonstatistical Analysis* (or, *Nonstatanalysis* for short) – it is an MT-level intellectual product, or a certain meta-theory. This framework grounds on assumption that the subject of cognition is able to conduct the process of cognition of Reality because the very process of cognition is itself an element of Reality, and obeys the same general law(s) of Reality.

As an element of my meta-theory I also developed a special *non-statistical method* (it will be discussed in Section 2.7.1 below). This method is able to deal with consciousness-related, rare, anomalous, and non-replicable phenomena. In other words, this method that can be used even in the absence of statistics of appearance of the phenomenon in study (hence the name of my meta-theory).

I also touch the problem of constructing a suitable model when formalizing the investigated phenomenon. The case is that even within a discipline with its paradigm already established (such as Physics) it is problematic to reconcile the different models of the same object of study. For example, it is hard to reconcile the model of atom that considers the electrons as tiny balls orbiting the nucleus and simultaneously revolving around their own axes of rotation, with the model of atom that considers the electrons as clouds, especially when these clouds are in the form of dumbbells. But, as it turns out, both models are useful in certain cases. So, while constructing the conceptual framework of my meta-theory, I also consider different kinds of models and apply them in complementary manner.

As it appears, the main model used by Physics is a decompositional one: the Whole decomposes into parts; thus, the original Whole irreversibly destroys (in some contexts I refer to the decompositional models as the *physical* ones). Contrastingly, the dissociational model, I use, presupposes emergence of other Wholes which originate in their parental Whole; this way, the original Whole preserves (in some contexts I refer to the dissociational models as the *informational* ones). For example, I formalize the elementary particles as the elements of the same dissociational model, and talk about the *informational model of an atom* (Patlavskiy, 1999, Figure 11d)[7]. Also, a brain as a Whole should be treated not as being decomposed into neurons as its parts, but as being dissociated into neurons as new Wholes.

While constructing my meta-theory I also formulate several laws (like the Law of Conservation of Consciousness), principles (like the Principle of Cognitive Indeterminacy), properties and correlations, which are the building blocks of my meta-theory. For example, I formulate a principle according to which for a conceptual framework to be able to explain the self-organizing and evolving complex systems, it must itself possess the property of self-organization and evolvement. I also show that a special feature of construction of the meta-theory is its level-by-level structure, and that the meta-theory stays *full* on every level (this will be discussed in Section 4.3).

My meta-theory can be used as a conceptual framework for various applied theories. The first one is the applied ADC theory. I also construct other applied theories, and show that, say, the theory of emergence of life and consciousness, the theory of consciousness, and the theory of evolution can exist as theories only if they **constitute a trilateral union**; being separated, they can exist only as hypotheses. But, before going into a detailed description of my meta-theory, I would like to talk about the role information and consciousness play in Reality we live in.

2.4 Information and Consciousness as treated by Nonstatanalysis

Before formulating any assertion concerning the possibility to cognize Reality, we should first address the question of its existence. To begin with, I formulate a meta-theoretical assertion that *information* (or consciousness as an ability to transform physical signals into information), *matter* and *energy* are three equally important fundamental factors which influence the existence and development of our Reality.[8] The *existential condition* formulates as follows: for anything to exist, it must be describable simultaneously by informational, material and energetic characteristics. Here, the energetic characteristic has sense of *effectiveness of interrelation/interaction* between the factors that describe by informational and material characteristics correspondingly.

Then I suggest that the correlation (or interplay) of these three systemic characteristics gives rise to *entropic* characteristic of the whole system (here I provide more exact definition of a system, initially given in Section 1, and now state that, on the average, anything we enframe can be formalized as some system). Therefore, the *developmental condition* formulates as follows: for a system to develop, its entropic characteristic must be permanently decreasing. Formally, we may put down that

information + mater + energy => entropy

and call this relation the *equation of expediency*. Hence, every existing and developing object is solution of a certain equation of expediency.

I hold that the natural or inherent purpose of any entity is to stay existent and developing. As was mentioned above, any existent and developing entity can be formalized as a system that describes simultaneously by informational, material, energetic, and entropic characteristics. Therefore, the purpose of any *system{entity}*[9] is to possess such a set of informational, material and energetic characteristics so that it can stay existent, and to possess such a value of its entropic characteristic so that it can stay developing. By *development* of a system I mean a permanent reduction of the value of its entropic characteristic.

By *purpose* I mean an idea to change the value of the entropic characteristic of some complex system used to formalize a certain entity during enframing it as an object of cognition. By enframing (see Note 1) I mean a cognitive act of putting some entity (regarded as the element of *Noumenal Reality*) into certain limits thereby transforming it into the object of our interest, or into the object of cognition (regarded as the element of *Phenomenal Reality*; for details see Section 4.2 below). Hence, there can be no cognition without there to be some limitation. There can be no *pure reason* that would be able to cognize entities without enframing. For example, to study consciousness means to enframe it (or to limit it) as some object of study too. If there is no limitation, there can be no studying, and no cognition as such.
For there to be a purpose, there must be *changeability* of the value of entropic characteristic of a system, and the idea to change this value. In general case, by *idea* I mean choosing between the available possibilities. If there is only one possible (or natural) way of development of a system, then I talk about the *natural idea* and, consequently, *natural*

purpose. I mean that when being squeezed in a canyon, both the consciousness-possessing organism and water will move in the same direction – there is no other possibility where to move. A *special idea* (or the idea generated by an organism) appears when there are other possibilities of development of a system, and we are free to choose between these possibilities. In this case, we receive *special purpose* or a purpose modified by consciousness.

Let us now consider the first fundamental factor mentioned at the beginning of this section. So, when talking about information, I make a distinction between its *Shannonian* and *non-Shannonian* concepts. While the Shannonian concept of information considers information as a sequence of digits on some material carrier like paper or magnetic type, which can exist independently of the subject of cognition, the non-Shannonian one presumes that information appears only in the result of subject's cognitive activity.

To be more specific, I hold that what is recorded on a material carrier is not information, but the *physical signal(s)*. For instance, a book does not contain information, but the black-and-white dots only. For there to be information, there must be some subject of cognitive activity who transforms these physical signals into *information for him/her*. Moreover, the same physical signal may be transformed into the very different information by different subjects of cognitive activity. For example, "dropping the hat" may mean rushing ahead for one person, and retreat back for another person.

However, I accept a possibility of using the Shannonian concept of information where appropriate (say, in computer sciences, in Physics, and the related disciplines). In general, I believe that all the concepts (including the concept of information) are theory-laden, therefore, instead of the question "What is information?", we should ask the questions "What is information for computer science?" and "What is information for the science of consciousness?".

In general, by information (in its non-Shannonian understanding) I mean a factor by means of which a given subject of cognitive activity constructs a model of environment, and uses that model for such of other purposes by acquiring, disposing and utilizing material and energetic resources of environment.

To distinguish between the Shannonian and non-Shannonian concepts of information, in addition to the term *information*, I suggest using the term an *increment of information*, and treat it as bearing relation to the concept of *new element of subjective experience*, or a *new element of knowledge* (I treat the last two as synonymous). In other words, the idea is to leave the term information for computer sciences, but, in the science of consciousness, to talk about the increment of information.

To a first approximation, an increment of information is that by which a system which possesses some knowledge differs from that same system that does not possess that knowledge yet. Actually, it is a *difference between the known and the unknown* for the given subject of cognitive activity. We receive the increment of information always in the result of changing the informational characteristic of the system{organism}.

The presence of the increment of information (which, being defined more accurately is the difference between the values of informational characteristics in the instants of time t_1 and t_2) means that a system (say, an organism) received new information. Hence, to a first approximation, I define consciousness as an ability of any living organism to be informed (about food, kins, the workings of inner organs, the attacks of pathogens, etc.).

Let us now see whether any fundamental law that pertains to information can be formulated. Having postulated the equal importance of three fundamental factors – information, matter and energy, and having a need to keep the meta-theory consistent (as dictated by the seventh criterion of scientific correctness; see Section 2.2), I was bound to formulate such a law. So, in addition to the existing laws of matter conservation and energy conservation (or, better say, the law of matter-energy conservation), a *Law of Conservation of Consciousness*[10] is suggested. The law has three assertions:

Assertion 1: one complex self-organizing system (either a natural living organism or an artificial structure) possesses only one *exemplar of consciousness.*[11]

Assertion 2: all such systems possess exemplars of consciousness that are equal in terms of their natural mechanisms, so their potentialities.

Assertion 3: the total number of all exemplars of consciousness in Reality is limited and conserves.

From this law follows that it is the organism, as a whole, that possesses an exemplar of consciousness, but not its separately taken cell or complex connection of cells (like a brain).[12] If we take an amoeba, we should treat it as a whole organism, despite of being a mono-cellular one, and which possesses its own exemplar of consciousness.

As it follows from Assertion 2**,** whatever life-form we take, it possesses an exemplar of consciousness of the same potentiality. This means that human consciousness is not unique, and share basic features with exemplars of consciousness of other living creatures. I hold that all the living forms are equally conscious as well as being equally alive.

It also follows that it would be incorrect to compare the cognitive abilities of representatives of different species – we can compare only the cognitive abilities within the same species. So, the question "Who is cleverer: a bird, or a human?" should be treated as scientifically incorrect. In general, Assertion 2 puts an end to the currently dominating doctrine of *anthropocentrism*. The first and third assertions also have many important consequences (which will be addressed later).

2.5 Formulating a canon for Nonstatanalysis

When constructing my meta-theory I start from the fact that we currently do not have effective theory of consciousness, and that we have no sufficient explanations for many natural phenomena. Modern Science cannot explain many complex phenomena, but, instead of improving and broadening its current theoretical base (including the methods of study), it tries just to put in question the very existence of these "inconvenient" phenomena,

or, in a manner of speaking, to bury the unexplainable artefacts back into the earth. In my view, the cause of such a state of affairs lies in the absence of suitable explanatory framework that would help scientists explain complex phenomena. At the same time, all attempts to construct the required explanatory framework fall short because they are constructed within the limits of unsuitable meta-theoretical superstructure.

A situation is to a large degree paradoxical: on the one hand, Science uses consciousness to create effective physical models of Reality; on the other hand, it cannot create the model of consciousness based on physical concepts; therefore, the very existence of the science of consciousness and the possible place consciousness might occupy in the modelled Reality is still under big question for Science. So, I see my task as a need to construct a meta-theory that, in its turn, would give the possibility of constructing within its limits the required applied theories of consciousness-related and other complex phenomena.[13]

But, what is meta-theory, and how to construct its epistemological (or conceptual) framework? The applied ADC theory helps to answer these questions. According to it, any meta-theory is an MT-level intellectual product, and, to construct it, the suitable aim and criteria of approach have to be formulated.

So, I start with formulating the **aim**, and delineate it as a need to show that there **is** only one Reality (*i.e.*, that there are no parallel realities) so that all the phenomena and processes belong to it (it is the *first sub-aim*), and obey some universal law of development (it is the *second sub-aim*). From here on I will refer to that assertion as the meta-theoretical aim (or the *MT-aim* for short). I presume that the word "is" (given in bold when formulating the aim) means "to exist and evolve" simultaneously, therefore the existential and developmental conditions (considered in Section 2.4) are included into formulated MT-aim through the word "is". To the point, the first sub-aim achieves through achieving the second sub-aim.

My main **criteria of approach** presume:

(1) suggesting a conceptual framework able to show the place that meta-theory occupies among other intellectual products;
(2) elaboration of the principles of formation of the base of notions (or, prime categories);
(3) elaboration of the theoretical base (which includes a general method, a suitable modeling, and a system of proofs);
(4) suggesting the level-by-level structure of meta-theory, making it full and consistent on each level;[14]
(5) taking into account all the available research data;
(6) solving the problem of relation between the theoretical model of Reality, and Reality as it exists independently of the process of cognition; and some other criteria (see Patlavskiy, 1999, p.3).[15]

The applied ADC theory states that the aim and criteria of approach constitute some limits, or canon. Then, the aim and criteria of approach, used to construct a meta-theory, constitute together the *MT-canon*. There can also be the *AT-canon*, the *GS-canon*, and the *D-canon*

(they will be exemplified in Section 5.1 below). So, Nonstatanalysis, as a certain meta-theory, is constructed with assertions that fall within certain limits, or fit the MT-canon formulated above.

As was mentioned in Section 2.3, my meta-theory received its name after the general method, and now I add that this method is constructed in accordance with third criterion of approach. As will be shown in Section 2.7.1, this method can be applied for studying rare, non-repeatable, anomalous, and various consciousness-related phenomena – it is a method that does not require statistics of appearance of the phenomenon. Consequently, the phenomena which can be studied by this method I call the *non-statistical phenomena of Reality*.

It is worth noting that, according to the existing tradition, a phenomenon is being classified after the discipline. For example, the physical phenomena are studied by Physics, the social phenomena are studied by Sociology, and so on. But, in Nonstatanalysis, there are only two big classes of phenomena: the statistical and non-statistical ones, since here the phenomenon is being classified after the method that is being used to study the phenomenon most effectively. For example, there can be some traditional physical phenomenon (say, a ball-lightning), that, to be explained, requires application of non-statistical method. Then, such a phenomenon will be classified not as physical, but as non-statistical.

So, to meet the first criterion of approach, I have constructed the applied ADC theory (the reader may feel as if hearing some tautological notes in this assertion; that is right, and I will address this problem in Section 3.2.2). To meet the second criterion of approach, a new base of notions was formed, and many new terms were introduced. Among them are such terms as the *theoretical base of the process of cognition*, the *means of cognition*, the *cognitive space*, the *cognitive paradox*, *etc*.

I hold that no progress of science is possible without introducing new concepts, and the question is not whether to coin new terms or not, but how to do this so that the new terms were understandable for others. Therefore, I have elaborated special rules for constructing the new concepts, and called them the *principles of cognitive sense setting* (or the *CSS principles* for short). For example, the cognitive senses of concepts *ion* Na^+ and *ion* Cl^- are set based on the initial concept *NaCl* according to the CSS principle called "Dissociation". Other examples: the cognitive senses of such concepts as *thought*, *consciousness*, *mind*, *intellect*, *intuition*, *information*, *system*, *state*, *method*, *etc*. are set according to the CSS principle called "New content".

Another example: a cognitive sense of the new concept *cognitive frame of reference* (or *CFR* for short) is set by transforming the initial existing concept *physical frame of reference* (or *PFR* for short) according to the CSS principle called "Transformation of concepts at interspatial transitions". In general, I consider twelve CSS principles (see Appendix 2).

I would like to stress that my meta-theory consists of assertions that use the concepts being introduced in the way described above. Such a way of concept introduction enables *unequivocal treatment* of these concepts. For example, a physicist introduces a notion that is not familiar to the biologist, and *vice versa*. But, if these two representatives of different scientific disciplines were using the same CSS principles to introduce their concepts, then the two correspondent concepts, even using the different terms (or, being put in different words), would have similar cognitive sense and would become familiar to both scientists. Therefore, the application of CSS principles leads to creation of a universal *interdisciplinary language*.

Also, if we know which CSS principle was used to construct the given concept written or spoken in an unknown language, then we may **predict** its cognitive sense, or, simply speaking, to understand its meaning. The fact is that while there are zillions of all possible words, there are, as I believe, only twelve CSS principles, and this gives a chance of *deciphering* some complex texts (these ones, which, as is presumed, express rational ideas).

So, we have just considered the principles of constructing the concepts. As we know, the concepts are the elements of an assertion. Therefore, let us now see which principles I use when filling my meta-theory with assertions.

2.6 The First basic idea of Nonstatanalysis

The third criterion of approach presumes constructing a suitable theoretical base. It is important mentioning that it is not constructed from scratch, and is rooted in the theoretical base of modern science. Let us now see how I come from the latter to the former. First, I introduce a concept *cognitive space*, by which I mean a pair of two already existent concepts, namely the *theoretical base of the process of cognition*, and the *means of cognition*. (Here, the new concept was introduced through the CSS principle called "Association"; see Appendix 2).

According to a comprehensive definition, the theoretical base includes various theories, methods, models, and, virtually, any kind of knowledge being used when explaining some phenomenon. The means of cognition, according to the comprehensive definition too, stand for the natural sense organs, artificial devices and various laboratory equipment, reagents, tools, instruments, *etc*.

The role of the concept of cognitive space is then in showing that the theoretical base and the means of cognition are interlinked: they always depend on each other, and should correspond to each other. For example, let us take "computer" as a means of cognition, and "knowledge of how to use a computer" as a theoretical base. Then, without knowledge of how to use a computer, a computer is useless, and *vice versa*, without a computer, our knowledge of how to use a computer is useless too. In other words, the theoretical base and the means of cognition are mutually dependent and correspond to each other, or are linked by *inverse link* (or inverse relation). If to put the idea schematically, we receive:

theoretical base + means of cognition + inverse link => cognitive space

Next, I call the *A-type of cognitive space* (or, the *A-space* for short) the one which comprises the theoretical base and the means of cognition of modern science (say, Physics).

Second, I consider some element that would help me perform the required transition, and the idea of that element becomes clear from the following example. Let us consider a cognitive space whose theoretical base presumes the flatness of the Earth, and whose means of cognition are just the human's sense organs. Let us call it the *A'-space*. Then, the assertion "The Earth is a globe" will be treated as a paradox from the point of view of the A'-space. But this same assertion will be not treated as a paradox from the *A''-space* if the theoretical base and the means of cognition of the A"-space are sufficiently developed to prove sphericity of the Earth. In this case, I call the assertion "The Earth is a globe" a *cognitive paradox* (see Patlavskiy, 1999, Figure 1).

So, the cognitive paradoxes are those elements that help me to come from one cognitive space to another cognitive space. Then, bearing in mind my MT-aim (namely, to show that Reality includes all possible phenomena), I sort out all possible phenomena into the ones that can be explained within the A-space, and the ones that can't. Then, I call the theoretical base and the means of cognition required to explain the rest of phenomena (or, these still unexplainable phenomena) as the *B-type of cognitive space* (or, the *B-space* for short).

But, which assertions should be used as cognitive paradoxes to enable making a transition from the A-space to the B-space? In general, I have found seven such assertions and called these paradoxes the *algorithms of interspatial transition* (see Appendix 3). These allow me to fill up the meta-theory with assertions needed to construct the B-type of cognitive space.

So, to achieve the formulated MT-aim, namely, to explain all possible phenomena and prove they all belong to the same Reality, I formulate the *First basic idea* of Nonstatanalysis: to explain Reality in all its complexity, the subject of cognition has to conduct the process of cognition as in the A-space, so in the B-space. From this follows that the *general method* of Science must include as the methods currently used by Physics and other existing disciplines, so the method(s) required to study still unexplainable and other non-statistical phenomena. Here, by *method* I mean an expedient set of one-time performing actions required to change the state of a system. So, in what follows, we will see how I come to the idea of non-statistical method.

2.7 The theoretical base of Nonstatanalysis

2.7.1 On the general method

I start by examining the schemes of the process of cognition (see Patlavskiy, 1999, Figures 2 and 3), analyze how the forms of information organization evolve, and come to the idea that there must be some additional, or fourth form of information organization.

In Section 2.1.1, I have indicated that phenomenological observation, data complex, and information system, as the first three forms of information organization, are just the **ever evolving** collections of discrete data about a certain object of study. But, the discovered

fourth form of information organization possesses a few qualitatively new and important features. So, I call this new form of information organization an *integrated information system* (or *IIS* for short)[16] and mean by it a **limit** towards which information (or knowledge) about the object of study tends.

So, the IIS is something more than mere collection of data. The other important feature of this fourth form of information organization is that it covers not only the object of cognition (as do the first three forms), but also the very subject of cognition, so that even the mechanisms of cognition become the object of cognition too (see Patlavskiy, 1999, Figures 4, 5, 6). This moment is very important since my MT-aim presumes explaining all possible phenomena and processes, including the mechanisms of cognition, and to achieve the aim I must somehow formalize these mechanisms as an object of study.

In general, to introduce the fourth form of information organization I formulate a special postulate:

(1) a particular information system exists which includes **expediently full** information (or knowledge) about the object of cognition.

However, for this assertion to fit Nonstatanalysis' MT-canon (let us recall that the MT-aim talks about existential and developmental conditions, as well as about some natural law), it has to be augmented by the following four assertions:

(2) such an information system cannot already be treated as a set (or, collection) of discrete data about the object of study;
(3) such an information system is described by three *systemic characteristics* (informational, material, and energetic) and one characteristic of its state (or *entropic characteristic*);
(4) such an information system possesses some properties, universal for all similar systems;
(5) such an information system evolves according to some *law of development*, universal for all similar systems.

I refer to these five assertions, taken together, as the *Postulate on existence of the integrated information system* (or the *Postulate of IIS* for short). This postulate is a meta-theoretical five-part assertion that looks like a paradox from the point of view of A-space, since it is currently accepted that no object can be described in full. For this assertion to be not treated as a paradox, a transition has to be made from the existing one to some new cognitive space. In other words, for this assertion to not look as a paradox, we have to come from the A-space to the B-space, simultaneously using the Postulate of IIS as the basis for the B-space's theoretical base. Let us now see of what immediate use the concept of IIS might be.

According to Kant (1929), the only service of the idea of *noumenon* (which, according to him, are the things in themselves, in contradistinction to the things of appearance, or *phenomenon*) is to "mark **the limits of our sensible knowledge** and to leave open a space which we can fill neither through possible experience nor through pure understanding"

(Kant, 1929, p. 294; bold is mine). By criticizing the idea of pure reason, he stresses that we cannot "positively extend the sphere of the objects of our thought beyond the conditions of our sensibility, and assume besides appearances objects of pure thought, that is, noumena, since such objects have no assignable positive meaning" (*ibid.*, p. 293).

Now then, in my case, to mark the limits of knowledge, I use the idea of IIS, and make Kantian critique of pure reason already not actual, since the noumenon become expressible using the concept of IIS. In other words, to grasp (or enframe) the noumenon (or an entity that is beyond the process of cognition), we may now use the model of IIS instead of "pure reason".

Let us now consider other cases in which the idea of integrated information system may be applied. As follows from the Postulate of IIS, whatever IIS we take – the IIS{atom}, the IIS{living cell}, the IIS{geographical site}, the IIS{galaxy}, the IIS{historic moment}, the IIS{human}, *etc*. – they all possess the same properties, are being described by the same set of characteristics, and obey the same law of development. Here, an atom, a living cell, *etc*. are enframed as systems. In general, the enframing of some entity and its formalization using the model of integrated information system constitutes the *method of IIS*.

Let us now see how this method works, and in which cases. The main feature/condition of applicability is as follows: when we cannot have all required information about the object of study (say, the object is rare, or non-repeatable) we may formalize this object as an integrated information system – the IIS{object}. Then, since, according to the postulate, every integrated information system evolves obeying the same universal law, we receive an opportunity to **predict** the behavior of IIS{object} even if we have only one case of appearance of that object, or having only some minimal research statistics.

In Physics, to predict the behavior of an object, there must be sufficient research statistics amassed, and, therefore, the statistical methods are dominating. But, are the traditional statistical methods effective when studying complex phenomena? Here I suggest that while the application of statistical methods may (in some cases) help **to prove the very existence** of some complex phenomenon (as it was the case, say, with various PEAR Lab's experiments; see Jahn and Dunne (1997), the non-statistical method **enables study** of complex phenomenon **in its development** and **in interaction** with other phenomena and processes.

For example, the phenomenon of remote viewing can be easily explained through the *inter-system interaction* of integrated information systems, since the method of IIS enables formalization of both the human and the remote site as the IIS{human} and the IIS{remote site} correspondingly, and addressing a standard interaction between these integrated information systems.

It is worth noting that there is a sense of applying the method of IIS only when, during the experiment, we **cannot ignore** the presence of informational factor and the change of entropic state of the investigating phenomenon. But, in the cases when such factors may be safely ignored (say, when we are not interested in what the person thinks about, but in how

much her brain weights, what is its volume, and how many neurons it consists of), there would be a sense of applying the traditional statistical methods of science.

The important conclusion here is that the method of IIS was developed to be used **not instead of**, but **in addition to** the existing methods of science, and this moment permits Nonstatanalysis to serve as a parental meta-theory (or provide an epistemological framework) as for the new discipline called Interdisciplinary Investigations that studies the non-statistical phenomena, so for Physics and other existing disciplines that address the statistical phenomena of Reality.

2.7.2 On the system of models

The third criterion of approach, besides the general method, presumes also constructing a suitable modeling. Here, I have elaborated the *associational* (*AS*), *decompositional* (*DEC*) and *dissociational* (*DIS*) models, and application of these models I call the *IIS-modeling* (see Patlavskiy, 1999, Figure 8b). In doing so, the A-space makes use of DEC-models, while the B-space makes use of DIS-models. As was mentioned in Section 2.3, these models may be referred to as *physical models* and *informational models* correspondingly, and, while formalizing the phenomena and processes, they are being applied in a *complementary mode*,[17] or as a *system of models*.

For example, if we formalize Solar System as the element of AS-model, then this element, as something Whole, may either *decompose* into atoms as the elements of DEC-model, or *dissociate* into other Wholes like IIS{star}, IIS{planet}, IIS{asteroid}, *etc.* which are the elements of DIS-model (see Patlavskiy, 1999, Figure 11c). Similarly, if we formalize Government as the element of AS-model, then this element, as something Whole, may either decompose into clerks as the elements of DEC-model, or dissociate into other Wholes like legislative authority, executive authority, and judicial authority which are the elements of DIS-model.

In fact, the idea to consider as decompositional, so dissociational models follows directly from the *Principle of system-structure indeterminacy*. I formulate it thus: the more we try to comprehend something as a system, the less we are able to comprehend it as having certain structure; and *vice versa*, the more we try to comprehend a structure of something Whole, the less we can comprehend it as some system. However, to comprehend something in full means to comprehend it both as a system and of having a certain structure. Therefore, to comprehend something as a system, I suggest formalizing it as an element of dissociational model, and, to comprehend something as having certain structure, I suggest formalizing it as an element of decompositional model. For example, we may formalize the working engine as something Whole, or as an element of DIS-model, whereas, having picked this engine to pieces, we may use DEC-model to formalize the set of engine's parts.

I must admit that there are many notable distinctions between the DIS- and DEC-models. Say, in the A-space (DEC-model) there is a *cause-effect relation* between the elements, while in the B-space (DIS-model) there is an *inverse relation* between the elements.[18] The DEC-model formalizes some collection of discrete elements, while the DIS-model

formalizes the Wholes by which I mean the entities formalized as the integrated information systems.[19] In the A-space (say, in Physics), a system may have infinite number of degrees of freedom, while in the B-space, the integrated information system may have only three (nor more, nor less) degrees of freedom plus a big-but-finite number of entropy states of that same system.

In the A-space (DEC-model) there is a concept *physical frame of reference* (or *PFR* for short), but for the B-space (DIS-model) I introduce a concept *cognitive frame of reference* (or *CFR* for short). The PFR is linked with observer (who only records the events), but, in principle, this kind of the frame of reference may be linked even with mechanical device designed to record the incoming physical signals. However, the CFR is linked with subject of cognition – an agent who does not only record the events, but also conducts the process of cognition due to possessing consciousness. In some sense, the PFR refers to CFR as *third-person perspective* refers to *first-person perspective*.

If we return back to our example of remote viewing, after applying the method of IIS and formalizing the human and the remote site as the IIS{human} and the IIS{remote site} correspondingly, these two integrated information systems are being regarded as the elements of the same DIS-model. It is important noting that the standard inter-system interaction of integrated information systems can take place **only** for the elements of the same DIS-model.

By the way, the concepts of *space* and *time* which have their cognitive sense in the A-space (say, in Physics) lose their sense in the B-space. Therefore, the inter-system interaction of the integrated information systems as the elements of the same DIS-model happens *in no time* (to wit, instantly), and *in no space* (to wit, despite of the distance between these systems).[20] And this moment enables me to explain the various cases of telepathy.

As to the AS-model, it is used to formalize the entities which we are going to cognize, but still stay beyond the process of cognition. For example, the IIS{Reality}, being an element of AS-model, is already "grasped", or enframed, but is still not cognized, or not transformed into an object of cognition. It is important to indicate that whatever system of AS-DIS-DEC models we take, there can simultaneously be only one element of AS-model, a big-but-finite number of the elements of DIS-model, and the unlimited number of the elements of DEC-model.

It should be mentioned that the elements of DIS- and DEC-models possess **sharply different properties**. For instance, unlike the elements of DEC-model, the elements of DIS-model do not possess the *property of entropy additivity* (for more properties see Patlavskiy, 1999, Table 2). I also recognize four *degrees of complexity* of AS-, DIS-, and DEC-models (see *ibid.*, Figure 12), and use the system of AS-DIS-DEC models of the required *degree of complexity* as dictated by the explanatory needs. Say, the known in Physics phenomenon of nonlocal entanglement, to be explained, requires constructing the system of AS-DIS-DEC models of the fourth degree of complexity.

To know whether the given system of models provides an adequate representation of Reality, it is not sufficient just to rely on the principle popularly known as "seeing is believing". So, to test the validity of all assertions as the elements of the constructed meta-theory, a special system of proofs was elaborated.

2.7.3 On the system of proofs

The system of proofs of Nonstatanalysis grounds on the following three postulates, and one principle. The first postulate states:

a) **if** the hypotheses, theorems, laws and postulates form a closed and all-sufficient explanatory framework;
b) **if** such an explanatory framework enables a subject of cognitive activity to perform the process of cognition in reference to any object of cognition (this means that the Big circle of the process of cognition is not torn; see Figure 2 below); and
c) **if** during the process of cognition such an explanatory framework self-improves by moving from level to level (see Section 2.5 for the fourth criterion of approach),

then every element that constitutes such an explanatory framework (*i.e.*, postulate, law, theorem, hypothesis, *etc*.) should be treated as valid and pertinent, and such one that requires no more proofs of its validity and pertinence of its usage.

The second postulate states:

a) **if** the MT-level intellectual product consists of assertions that all fit its MT-canon;
b) **if** the problems of subjectivity of both the aim and criteria of approach that constitute that canon are solved (see Section 5.3, and Appendix 1, assertions 27 and 36 correspondingly),

then any assertion of the given MT-level intellectual product is true, and requires no more proofs of its validity and pertinence of its usage.

The third postulate states: every phenomenon (process or problem) should be treated as real if it is formalizable and explainable using the B-space's theoretical base. This postulate follows directly from existential condition (formulated in Section 2.4). In other words, to prove the reality of the phenomenon means to show that it can be formalized as the IIS{phenomenon}, and it can be an element of either AS-, DIS-, or DEC-model.

Let us now consider a *Principle of indeterminacy of the subject's functional status*. Suppose, some event must happen in the future (say, a powerful earthquake). Now, consider a person who makes public one of the following statements before the event has happened: 1) I can evoke the earthquake; and 2) I can forecast the earthquake. Then, after the event has taken place, the person will be treated either as possessing a means of evoking earthquakes, or as a forecaster **depending on** the statement he has made before the event.

So, this principle states that there is no ways to prove whether the person's function was to be a cause of the event, or just a forecaster of the event – these two possibilities are equivalent, and the person's functional status stays undetermined.[21]

2.7.4 Entropy and the Law of IIS development

Let us now consider the behavior of the elements of DIS-model and the cause that makes them to change their states. As follows from the Postulate of IIS, the entropic characteristic speaks about the state of integrated information system. The entropy I am talking about always reduces within certain CFR. So, in Nonstatanalysis (unlike Thermodynamics), entropy is a subjective factor. For example, the same distribution of material things (say, toys) in a room may be a sign of low order (high entropy) for a father who is waiting for guests at dinner party, and of high order (low entropy) for his child who, at this very moment, is playing right under the table in the dining room.

So, the Law of IIS development (as an element of the Postulate of IIS) says why and how the entropic characteristic of integrated information system changes. This law consists of many partial laws, for example: any change of informational characteristic of IIS (with appearance of the increment of information) brings about the change of its material characteristic, provided its energetic characteristic changes optimally.[22] The full formulation of this partial law is as follows (see Patlavskiy, 2005, Section 2.5.2, Law 3):

(1) every change of informational characteristic causes the change of material characteristic with effectiveness dependent on the value of energetic characteristic;
(2) every change of material characteristic causes the change of informational characteristic with effectiveness dependent on the value of energetic characteristic;
(3) every change of energetic characteristic causes either
    a) simultaneous change of informational and material characteristics, or
    b) the case when informational characteristic changes, but material characteristic stays quasi-unchanged, or
    c) the case when material characteristic changes, but informational characteristic stays quasi-unchanged.

If the entropic characteristic of the same IIS changes, or if we consider several integrated information systems as the elements of the same DIS-model (I consider, in fact, a certain chain of systems), then I call this a *veritas chain*. A typical example of such a chain is the DIS-model of the organism's development starting from the IIS{inoculation}, through the IIS{childhood}, the IIS{adulthood}, and up to the IIS{senility} – whichever IIS from this chain we take, it formalizes the alive organism. In other words, the fact that the organism stays alive is an undeniable truth, or, in Latin, *veritas*.

Next, I call *veritas transition* a transition from one true state to another true state of the same IIS within the same DIS-model. I also make a difference between the *weak* and *strong*

veritas transitions. The latter takes place when the values of entropic characteristic of initial and resulting states differ considerably.

Let us consider another example of veritas chain. Say, a person wishes to have dinner. Then the following veritas chain is being built having the CFR linked with that person: the IIS{feeling of hunger}, the IIS{kitchen}, the IIS{fridge}, the IIS{cooker}, the IIS{table}, the IIS{plate}, the IIS{spoon} – these are the elements of the same DIS-model. Then, the DIS-AS transition takes place and we receive the IIS{repletion} as the element of AS-model.

I should also mention that whichever veritas chain we take or construct, it may be *very big (long, large) but necessarily finite* (or *big-but-finite* for short). Consider the following example: whatever number of nucleotides a DNA molecule is composed of might be, that number (or the longevity of a DNA molecule) is always big-but-finite; whatever number of living organisms is on the Earth, that number is always big-but-finite; whatever number of stars is in the Universe, that number is always big-but-finite; and so on.

I hold that the Law of IIS development (to wit, the fact that any IIS tries to reduce its entropy) is universal, and pertains to any entity that is formalizable as an integrated information system. If we formalize Reality as the IIS{Reality} – the element of AS-model, then all its phenomena and processes may be formalized as the elements of the same DIS-model: the IIS{phenomenon^1}, the IIS{phenomenon^2}, and so on, which constitute the big-but-finite veritas chain too. That is why all existent entities are *existentially and developmentally compatible* among themselves, by which I mean that the existence and development of the IIS{phenomenon^1} does not render impossible the existence and development of the IIS{phenomenon^2}.

The existential and developmental compatibility is also responsible for the facts that the Universe is filled up with coexisting stars and galaxies, the Earth is filled up with myriads of coexisting organisms, and that is why a system (say, a cell) can divide into two quasi-identical and simultaneously existent systems. In Section 3.1, we will go from the problem of coexistence of organisms to the problem of their existence, or their origin, but let us first consider the Law of Entropy Conservation and make some important conclusions.

2.8 The Law of Entropy Conservation

As was stated in Section 2.4, having a need to keep the meta-theory consistent, the Law of Conservation of Consciousness was formulated. Also, as was mentioned therein, the developmental condition presumes changeability of entropic characteristic of a system. So, the development of a system is as important as its existence. Within the Universe, there can be nothing existent that is not simultaneously developing, or, as a system, changing its entropic state. But, what can be said about the entropic state of the Universe as a whole, and what causes the developmental (and evolutionary) processes within the Universe?

In answering these questions, I start with assuming that the Universe is a system which, by definition, must include everything (including space), and must be considered as a closed

system. This means that there is nothing that our Universe can interact with. Since the Universe is a closed system, then its entropic state does not change. In other words, the Universe, as a whole system, is not changeable or evolving.

Being based on the above mentioned considerations, and having a need to keep the meta-theory consistent, the *Law of Entropy Conservation* was formulated: the entropic state of the Universe formalized as the integrated information system being the element of AS-model stays unchanged at all changes of entropic states of the integrated information systems being the elements of the DIS-model (of the veritas chain) spawned by the given AS-model.

This law directly requires that the entropic states of the systems (that are the elements of the chain) must be permanently changing to keep the entropic state of the Universe unchanged. From this *prime principle of development* follows all that variety of developmental processes we observe around and within us.

The formulated law has two derivative principles. The first one states that if we take two systems as the elements of the same chain, then the reduction of entropy of one system causes the increase of entropy of another system. I will call this case *competition*. The second derivative principle is that in case we take three systems as the elements of the same chain, then the entropy of the first and second systems can be reduced at the expense of increasing the entropy of the third system. I will call this case *cooperation* (between the first two systems).

Now then, there is one prime and two derivative principles that the Universe operates by. Therefore, if we consider evolution as a natural process driven by the prime principle, then, while constructing the theory of evolution and describing its mechanisms, we should take into account both the first and second derivative principles, namely, the *principle of competition* and the *principle of cooperation* between interacting systems.

Summing up, I would like to mention that Nonstatanalysis accepts the laws of matter and energy conservations, and adds the laws of consciousness and entropy conservation.

2.9 Concluding remarks

The fourth criteria of approach will be considered in Section 4.3; the sixth one will be discussed in Section 4.2 below. As to the fifth criterion of approach, here I coin a term *R-fact* (short for *reliable fact*), and use it to make a difference between the *known* and still *unknown* non-statistical phenomena. So, by this term I mean a reliable, well documented observational and/or experimental scientific fact, which, at the same time, does not find its explanation within the limits of any of the existing scientific theories. Among the R-facts there is a déjá vue phenomenon, a phenomenon of hypnosis, a placebo effect, an effect of transmutation of fundamental particles, a precise self-orientation of birds during their seasonal migrations, a phenomenon of being stared at, a phenomenon of nonlocal entanglement, and many others.

To summarize, I would like to note that, by now, the B-space's theoretical base consists of dozens of partial postulates, laws, principles, doctrines, correlations, theorems, properties, and other elements. This new theoretical base is incompatible with, and leaves no room for *anthropocentrism*, *reductionism*, *physicalism*, *epiphenomenalism*, *panpsychism*, and the like doctrines which are tolerable in the A-space. By design, the B-space has to give a possibility to explain as the known complex facts, events, and processes, so the ones that still are awaiting to be discovered. I predict that whatever phenomenon could be discovered in the future, it would necessarily be formalizable either in the A-space, or in the B-space.

3 The applied theories of Nonstatanalysis

3.1 The applied theory of the origin of life and consciousness

3.1.1 On the ways of entropy reduction

As was mentioned in Section 2.4, for some entity to exist, it must be formalizable as a system which describes simultaneously by informational, material, and energetic characteristics. Bearing this existential condition in mind, I presume that the value of entropic characteristic of such a system can be reduced:

(1) by changing the informational characteristic; or
(2) by changing the material characteristic; or
(3) by changing the energetic characteristic; or
(4) by a combination thereof (the Law of IIS development addresses all possible combinations; see Section 2.7.4 for a partial law).

If we take a stone and an organism, and, by applying the method of IIS, formalize them as the IIS{stone} and the IIS{organism} respectively, both these systems will be described by their three systemic characteristics, including the informational ones. So, any entity, in virtue of its being existent, is describable by a changeable informational characteristic – this idea is at the heart of my doctrine of *pan-informationism*.

Now then, the entropic characteristic of the IIS{stone} can be reduced in the ways mentioned above, including the first one, namely, by changing its informational characteristic. This may happen (sometimes spontaneously) due to inter-system interaction between the IIS{stone} and the IIS{human} when the human enframes the stone as an object of interest, and, as a result, the stone may even start flying in the air (as in the case of poltergeist).

But, a stone is not itself able to reduce its entropy through changing informational characteristic considerably enough for the effect of *self-organization* (or entropy self-reduction) to become present. By this effect I mean a case when some complex system, having acquired a certain low value of its entropic characteristic, tries to keep this value at such a low level itself and making that value even lower.[23] However, an organism **is** such a complex system, and it **can itself** (especially, through changing its informational

characteristic) keep the value of its entropic characteristic on a sufficiently low level, and make that value more low.

Let us now concretize the ways in which an organism can reduce the value of its entropic characteristic. So, the way to do this is either/or:

(1) through dealing with physical signals, and, via the increments of information, transforming these signals into the elements of experience;
(2) through consuming food and other material resources;
(3) through taking part in energetic interactions and optimization of usage of available resources;
(4) through a combination of these three ways.

So, if to compare the possible ways of entropy reduction in the first and second cases, we may easily come to conclusion that there is, in fact, no cardinal distinction between the dead and animated matter. I mean that the IIS{stone} and the IIS{organism} differ only in the value of their entropic characteristics and, consequently, in absence/presence of the effect of self-organization. The latter assumption gives me a possibility to suggest an *applied theory of the origin of life and consciousness*.

3.1.2 On the peculiarities of water structure

The commonly accepted view is that life on the Earth first appeared in the ancient ocean. I share this view, and, when trying to explain concrete mechanisms of the advent of life, I rest on the idea that water is a specific chemical that includes regions with *naturally low entropic states.* I believe that these regions appear due to the tetrahedral (pyramidal) molecular structures that water consists of. I presume that any pyramidal structure (either on molecular or on macro-scale) possesses natural ability of reducing its entropic state.

As a case in point, having used the third-generation synchrotron light sources which enables to perform small-angle X-ray scattering with much higher accuracy and reproducibility, Huang *at al.* (2009) discovered the presence of two distinct and temperature independent kinds of molecular self-arrangement in liquid water: one with tetrahedral structures as a minority and one with a high hydrogen-bond (H-bond) distorted asymmetrically as a majority; and these regions, according to the authors, are characterized by low and high entropy values: "the tetrahedral structure is of lower energy – lower entropy and the distorted structure of higher energy – higher entropy" (Huang *at al.*, 2009, p.15217).

I assume that, in this case, for every region with naturally low entropic state, where the value of entropic characteristic is sufficiently low, the effect of self-organization is present. But, why and when does this effect appear? To answer this question, let me first indicate that the regions with naturally low entropic state in any object may appear in principle because the IIS{object}, as any other integrated information system that obeys the Law of IIS development, is always trying to reduce its entropy.

Second. In the general case, the effectiveness of the attempts to reduce own entropy sharply increases after the entropic characteristic of the IIS{object} reaches its sufficiently low value. This happens because the intensity/effectiveness changes not linearly, but obeys some exponential law (see Patlavskiy, 1999, Figure 13), and this exponentiality, in its turn, appears because of peculiarities of interaction between the IIS' systemic characteristics. For example, when an energetic characteristic is of a certain value, then the little change of material characteristic brings about a sharply increasing change of informational characteristic of the IIS{object}.

So, as follows from Patlavskiy (1999, Figure 13), the effect of self-organization appears only after the value of entropic characteristic of the IIS{object} crosses the point $\mathbf{S_{self\text{-}org}}$. Then, in obedience to the Law of IIS development, the IIS{object} with value of its entropic characteristic $\mathbf{S < S_{self\text{-}org}}$ starts looking for the most effective ways of keeping the achieved low value **S** intact, and making it even lower, and, in doing this, the object is free to choose between the three ways of entropy reduction mentioned above, or use a combination thereof.

In fact, Huang *at al.* (2009) discovered a decomposition of "total scattering structure factor S(*Q*) into a part SN(*Q*) associated with "normal liquid" behavior and an anomalous part[24] SA(*Q*) associated with critical phenomena" (Huang *at al.*, 2009, p.15215; here, symbol *Q* denotes the scattering momentum transfer). As I suppose, this decomposition appears because the entropic characteristics of these water structures are naturally *fluctuating* around the point $\mathbf{S_{self\text{-}org}}$. In so doing, if the value of entropic characteristic of the IIS{water part} becomes less than $\mathbf{S_{self\text{-}org}}$, then we receive the low entropy water parts; if the value of entropic characteristic of the IIS{water part} is higher than $\mathbf{S_{self\text{-}org}}$, then we receive the high entropy water parts.

Consequently, the continuous reduction of entropy of the low entropy water parts (or, the parts which possess the property of self-organization) **increases** the entropy of the high entropy water parts, and this, in its turn, causes the persistent in time and observable experimentally distinction between these parts. So, at ambient conditions, water is a natural mixture of low and high entropy parts. That is also why water possesses the experimentally detectable anomalous physical features.

3.1.3 From a low entropy water part to a unicell

As was shown in previous section, water naturally (or in virtue of being such a natural substance) consists of the parts with low and high entropy states. Then, if the ambient conditions are favorable (there is sufficient quantity and quality of the dissolved chemicals, and the temperature is apt), then the IIS{low entropy water part} can continue reducing its entropy by dealing with dissolved chemicals (and this corresponds to changing its material characteristic) and by warming itself up (and this corresponds to changing its energetic characteristic).

However, this is not sufficient for life to appear yet. By this I mean that the presence of the complex organic chemicals and sufficient ambient temperature **is not a cause of life**, but

only a necessary condition for realization of the second and third ways of entropy reduction, namely, by changing the material and energetic characteristics.[25]

But, what about the first way of entropy reduction listed in Section 3.1.1? As it turns out, the entropy reduction through dealing with physical signals and, via the increments of information, transforming them into the elements of experience becomes actual after the value of entropic characteristic of the IIS{water part} crosses the $\mathbf{S_{self\text{-}org}}$ point, and its effectiveness increases with entropic characteristic becoming more and more low.

So, as I believe, the first way of entropy reduction (namely, through changing the informational characteristic) is that very important **additional possibility** that, together with other two possibilities, enables the low entropy water part to stay self-organizing and decreasing its entropy further up to transformation of the IIS{low entropy water part} into the IIS{unicell}. In doing so, the low entropy water part could well be the common predecessor for all the unicells. I mean that, say, archaea do not necessarily descend from bacteria, and they could well appear simultaneously and independently of each other.

So, the IIS{unicell} could appear as the element of AS-model in the result of DIS-AS transition after formation of the following veritas chain: the IIS{low entropy water part^1}, the IIS{low entropy water part^2}, ..., the IIS{low entropy water part^n}, and whether we receive the IIS{bacterium}, the IIS{archaeum}, or the IIS{eukaryote} as the elements of AS-model will depend on the value of material and energetic systemic characteristics of the integrated information systems that constitute the veritas chain.

In fact, the unicell appears in image and likeness of the IIS{unicell}, namely, as a complex system with delineated borders. This is because the IIS{unicell}, as a theoretical model of the unicellular organism, is in one-to-one correspondence with the real unicellular organism (this kind of correspondence will be detailed in Section 4.2 below). So, I hold that it is the universal structure and properties of the IIS{living object} that predetermine the structure and properties of the real living object.

The IIS{unicell}, or, in general, the IIS{biotic form} plays the role of an (informational) *matrix* that makes the entity called "unicell" to become filled up with required chemicals. We cannot list all the required chemicals and constituent elements, and cannot describe all the processes taking place within the unicell, but the shortage of our knowledge is compensated by application of the method of IIS. If we formalize the organism as the IIS{organism}, it means that it describes by the expedient set of informational, material, and energetic characteristics, which, in its turn, means that these characteristics have such values that the resulting entropic state of the IIS{organism} is sufficiently low for the effect of self-organization to appear.

In transition from pre-biotic to biotic form (see Figure 1), the entity formalized as the IIS{biotic form} fills up only with such a chemical or constituent element that such an act of "filling up" does not increase the value of entropic characteristic of the IIS{biotic form}. The cell's constituent elements (like DNA, RNA, and proteins) appear not in the result of independent assembling, each from correspondent simpler blocks. Instead, we have the

filling up of the matrix that naturally exists as a certain integrated information system, or as an example of what is possible.

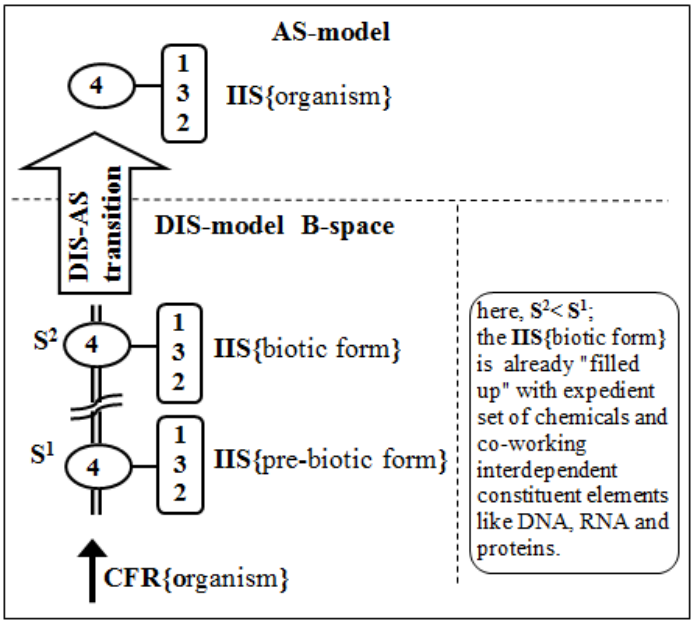

Figure 1. Transition from the pre-biotic to biotic form. See Patlavskiy (1999, Figure 11) for the system of AS-DIS-DEC models; one may also return back to examining Figure 1 after becoming acquainted with Figure 5 in Section 3.2.5 below.

The unicell is not the result of random processes that occur by blind chance. It is the result of realization of what is possible, or what is predetermined by IIS's properties. That is why the entity formalized as the IIS{biotic form} is already filled up with complexly interrelated molecules like DNA, RNA and proteins co-working as a single whole. As to the multicellular organism, it is a projection (or has structure and properties) of the elements of DIS-model of the third order of complexity, namely, the model that considers ramifications of veritas chains (see Patlavskiy, 1999, Figure 12).

I hold that water inside any living cell is, in fact, a low entropy part of water (it is definitely not tapwater, or seawater). It may be regarded as a sought-for prebiotic form. As Hazen (2005) hypothesizes, "certain primitive prebiotic isotopic, molecular, and structural forms are inevitably eaten by more advanced cells. It is also possible that these chemicals will survive as "fossils" *only* if cellular life never developed to eat them" (italics in original). So, the (prebiotic) low entropy part of water were, in fact, not eaten, but incorporated into the protocell's body, and still successfully exist.

If the value of entropic characteristic of the IIS{unicell} becomes higher than that of the IIS{low entropy water part}, then the living cell dies. The presence of parts that have the values of entropic characteristic of IIS{water} naturally less than $\mathbf{S_{self\text{-}org}}$ permits me to treat water as *simplest self-organizing complex system* (or, a simplest alive organism). Therefore, when considering the theory of evolution of the complex self-organizing systems such as living organisms (see Section 3.3 below), we will have to take the IIS{low

entropy water part} as an initial element of DIS-model which we will use to formalize the evolvement of a living organism.

However, as I suppose, it may be not only water, but any substance, which, being in the liquid (or, even, solid, gaseous, or plasmoidal) state, may include the regions with naturally low entropic states. Therefore, theoretically possible is the existence of silicon-based natural life forms (or, the high-temperature forms of life), the argon-based natural life forms (or, the cryogenic forms of life), and, even, the plasmoidal natural forms of life.

3.1.4 On the relation between life and consciousness

The mechanisms of entropy reduction through dealing with physical signals (or, by changing informational characteristic) will be discussed in next section, but now I would like just to formulate the most important conclusions. First, I define *life* as a work, being performed by a certain complex system, on keeping and evolving its own low entropy (or, *negentropic*) states simultaneously through dealing with physical signals, through consuming food, and through taking part in energetic interactions, and this work necessarily results in increasing the entropy of the ambience.

Second, by *consciousness* I mean the first way of entropy reduction in the complex systems whose entropy state is sufficiently low (namely, is less than the $\mathbf{S_{self\text{-}org}}$). From this follows that a stone does not possess consciousness yet, however it possesses changeability of its informational characteristic. And in this the mentioned in Section 3.1.1 doctrine of pan-informationism differs from panpsychism, a popularly known doctrine that everything material (including stones and atoms) possesses an element of individual consciousness.

Next, I conclude that for there to be life, there must be self-organization, and for there to be self-organization, there must be consciousness. Consequently, if there is life, there must be consciousness. This means that I treat life and consciousness as being *inseparable*, and suggest talking about *life-consciousness* in the same manner as physicists talk about *space-time*. So, I hold that there can be no organism that would be alive but lacking consciousness,[26] and this must be as true for the Earth's organisms, as for any possible *alien forms of life*.[27]

The above conclusion looks paradoxically from the point of view of A-space, since it is commonly accepted (due to the dominance of *Darwinian hypothesis of evolution*) that consciousness appeared only in high primates in the result of their evolution through natural selection. However, this conclusion does not look paradoxically from the point of view of B-space (if only because of the fact that this cognitive space has such elements as existential condition, and the Law of conservation of consciousness; see Section 2.4).

It should be also noted that while formalizing the living organism as the IIS{organism}, I consider *mental organization* as standing for its informational systemic characteristic, *bio-organization* as standing for its material systemic characteristic, and *effectiveness of bio-mental interaction* as standing for its energetic systemic characteristic (see Patlavskiy, 1999, Figure 8).

The final conclusion is that the applied theory of the origin of life and consciousness presented above corresponds to my MT-aim, namely, to the formulated existential condition. If other theorist formulates the unlike MT-aim (and, consequently, the unlike MT-canon), then the theory of the origin of life and consciousness will be different too.

3.1.5 On the distinction between animated and dead forms of matter

A wide body of opinion exists among the representatives of natural sciences, especially biophysicists, that there is nothing in the living organisms that could not be met in the non-living material systems. For example, in his paper, Ivanitskii (2010) provides a table that compares the features of the animated and dead matter, and argues that these features are basically common. Among these features, according to the author, is the ability of both the animated and dead forms of matter to memorize information about their previous states and use this information when adapting to changes in the external environment. Then, in case this information is memorized, this "kills" the alternatives, or eliminates other possibilities for development of a material system, thereby reducing considerably the time required for natural evolution. Based on these arguments, Ivanitskii suggests a definition of life from the point of view of modern Physics:

> "*Life constitutes an integrated system (biosphere) having memory and capable of directional motion, self-propagation, metabolism, regulated energy flux, and reproduction. Life* from the point of view of physics *can be briefly described as a result of a game process, an interplay between part of the system and its environment. During the game, this part acquired an ability to remember the probabilities of gains and losses in previous rounds, which gave it a chance to exist in the following ones*" (Ivanitskii, 2010, p. 353, italics in original).

The idea that some "part" of material system can, all of a sudden, acquire the ability to remember something seems to be very speculative. However, the more serious problem here is that the author totally ignores such a feature of the living organism as an ability to create new knowledge. I must admit that the views expressed by Ivanitskii are being criticized even within biophysical cognitive environment. For example, Melkikh (2011) remarks:

> "It is humans who use external links to send signals and thereby feed new information into the neurocomputer (i.e., prepare it). Evidently, no neurocomputer would work, if left to its own devices, without such preparation. In a word, neurocomputers cannot gain knowledge by themselves" (Melkikh, 2011, p. 430).

Indeed, the computer monitor loses the luminosity of its pixels with time due to the effect of burning-out, and the human loses his teeth with time due to ageing, but this common feature of losing something does not make the monitor to be akin to human. The existence of similarities between the features that we use to characterize the animated and dead matter, of itself, does not solve the problem of the origin of life, saying not of the problem of the origin of consciousness.

3.1.6 Concluding remarks

If to assume that archebiosis is the problem being solved by Nature, and the solution of this problem presumes making a transition from the state with higher to lover entropic values of some complex system, then it is exactly the problem that solves in strict obedience to the Fourth cognitive paradox (see Appendix 3). Namely, in the result of inter-state transition, the complex systems acquires not any possible state which could be acquired according to probability theory, but only the state that goes next in the chain of allowed states of the IIS{complex system}. The Law of IIS development is that natural **goal-setting** factor that makes the inanimate form of matter to transform into its living form, and which reduces considerably the time required for such a transition to take place.

As required by the Fourth cognitive paradox, the living form of matter is a solution to a certain equation of expediency, where the interrelation of informational, material, and energetic characteristics of the IIS{complex system} gives rise to its entropic characteristic with a value necessary for that complex system to become self-organizing.

Since I consider the IIS{low entropy water part} as a simplest self-organizing complex system, therefore, for me, there is no unbridgeable chasm between the dead and animate matter. In this my approach cardinally differs from the one used in many, so called, "assembly line" theories of the origin of life, where the living cell is treated as a final product of assembling from the non-living organic molecules under extreme ambient conditions like high temperatures, pressure, and violent ultraviolet radiation.

Also, as I believe, the prerequisites of existing state of the system are in the former state(s) of this system. If the natural ability of the living organism to deal with physical signals and transforming them into the elements of subjective experience plays important role on the level of human, then there are no reasons to believe that the same ability would not play the role of the equal importance on the level of a proto-cell. That is why I state that all the living forms of matter are equally conscious as they are equally alive (see Section 2.4, Assertion 2).

3.2 The applied theory of consciousness

3.2.1 On the scheme of the process of cognition

As was mentioned in Section 2.7, I come to the idea of integrated information system by analyzing the schemes of the process of cognition. But, what is the process of cognition and how it can be represented schematically?

Suppose, I am walking in the park, and all of a sudden I run into a very big, spherical, and non-transparent *Something*. The whole process of coming from not seeing that Something yet, to knowing what that Something is constitutes the essence of the process of cognition. First, in the moment of "running into", my sense organs produce physical sensory signals organized into phenomenological observation: "The Something is big, is spherical, is non-transparent".

Then, I, as a subject of cognitive activity, after processing these physical signals, and being based on my previous understanding of sphericity, bigness, and opaqueness, conceptualize them as the new elements of my subjective experience: "There can be Something, which is big, spherical, and non-transparent". Having ascribed the properties of sphericity, bigness, and opaqueness to Something, I, being a subject of cognition, thereby transform some cognitively independent entity into the object of cognition for me.

Then, being based on this knowledge, I decide to learn more, and with this end in view I construct an intellectual product: "What will happen if I take a stick and touch the Something?". Then, having touched the Something (namely, having moved the stick as a simple artificial instrument to the interface between me and my object of cognition), I receive a reaction in the form of reflected phenomenon which, through the device (here, the stick), can be felt by my arm. So, I receive a new physical sensory signal: "A stick cannot penetrate the Something", and after processing this new signal, I conceptualize it in the form of a new element of my subjective experience: "The Something is solid".

Then, being based on this knowledge I decide to learn more, and with this end in view I construct a new intellectual product: "What will happen if I take a stone and throw it to the Something?". Then, with the help of another natural device – a stone, I produce *more powerful influence* upon the interface between me and my object of cognition, and receive a reaction (another reflected phenomenon) which through the device (here, my ears) becomes a new physical sensory signal: "Vibrations of a certain frequency", and after processing this new signal (and being based on my previous understanding of what is metallic, and what is hollowness) I conceptualize it in the form of a new element of my subjective experience: "The Something is metallic and hollow".

We may repeat this procedure again and again by changing our device (for example, instead of a stone we may use a laser, then an X-ray and gamma ray equipment); correspondingly, there will be new and new phenomena as reaction to the *ever increasing influence* upon the interface. The form of organization of the receiving data will change from phenomenological observation to data complex, then to information system. We will have more and more new elements of our subjective experience. The intellectual products we create will change from the simplest ideas like throwing a stone, to planning exquisite bench studies. As one can see, everything changes here, but for the very *scheme of the process of cognition*.

Now then, during the process of cognition, all the elements of the scheme repeat themselves, and I talk about a *big circle of the process of cognition* (see Figure 2).[28]

To see the evolvement of the scheme of the process of cognition, one may refer to Patlavskiy (1999, Figure 3). The evolvement means here that the entropy of the whole scheme of the process of cognition (as of some system of interconnected elements) is being consecutively reduced. The entropic minimum would mean that we have received the expedient (or, needed, required, *etc*.) knowledge about the object of cognition (shown in Figure 2 as a reflected phenomenon).

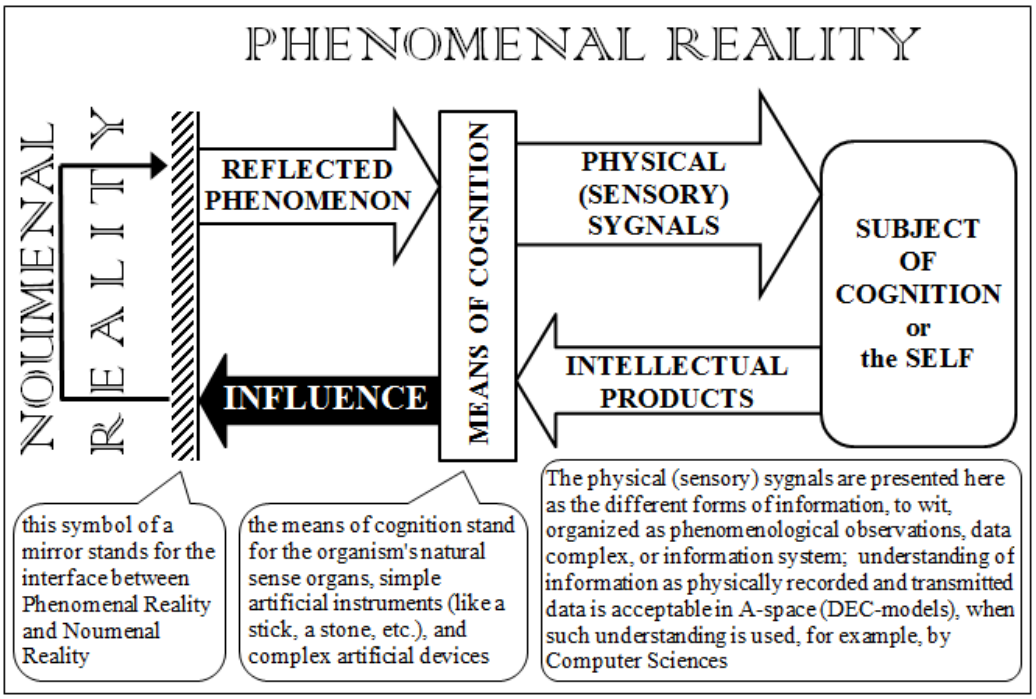

Figure 2. The scheme of the process of cognition.

As one can see, the subject of cognition (the Self) is a necessary element of the scheme of the process of cognition: it processes the incoming physical signals, transforms them into the new elements of subjective experience, and creates new intellectual products. This activity of the subject of cognition reduces its own entropy, likewise affecting the entropy of other elements of the scheme of the process of cognition.

3.2.2 Defining the object of study

Let us now see how such an activity may be termed and defined. So, I use the existing term *consciousness* and define it as a natural ability of a complex system to keep its entropy on a sufficiently low level through

(1) performing the acts of
   a) *processing* the physical sensory signals, and/or the already available elements of experience, and
   b) *conceptualization* of the processed physical sensory signals (and/or the already available elements of experience) by transforming them, via the increments of information, into the new elements of experience; and
(2) presenting the elements of experience as intellectual products of all possible levels, forms and types.

Here, the concept "consciousness" is introduced according to the CSS principle "New content" (see Appendix 2); the levels of intellectual products were discussed in Section 2.1.1; by the *forms of intellectual products* I mean thoughts, ideas, emotions, feelings,

imaginations, dreams, illusions, hallucinations, expectations, premonitions, inner speech, language, behavior, artificial material products like paintings, sculptures, musical compositions, movies, various architectural and engineering constructions, *etc*.; for the increments of information see Section 2.4; the types of intellectual products will be discussed in Section 7 below.

All forms of intellectual products are considered to be of the same nature. For example, I define *feeling* as a product of consciousness that causes immediate physiologic changes in the organism, and these changes are easily observable and physically detectable. At the same time, a thought is a product of consciousness too, but the one that does not cause such obvious physiologic changes.

Having defined the object of study, I may now proceed to constructing a theory of that object, and my task will be to describe and formalize the mechanisms of the first way of entropy reduction (see Section 3.1). But, let us first consider the following problem. By constructing a theory, our consciousness should be treated simultaneously as an object of study and the instrument of studying. Addressing this problem, I formulate a *Principle of cognitive indeterminacy*: when investigating our own exemplar of consciousness, the more strictly we enframe our consciousness as the object of study, the less effectively we may use it as an instrument of studying; and *vice versa*: the more effectively we use our consciousness as an instrument of studying, the less strictly we can enframe it as an object of study.

Actually, this principle talks about the objective obstacles on the way of construction of scientific theory of consciousness, and for a good reason. For instance, when a researcher investigates some distant physical object, his/her *ability to investigate* (to wit, his/her clarity of thinking, the ability to make logical conclusions, seeing the real things, *etc*.) stays unchangeable for a long time during the process of studying. However, when a researcher investigates his/her own exemplar of consciousness (especially, the altered states of consciousness, like the near death experience), he/she cannot further rely on the received results. It happens because the researcher's ability to investigate changes badly when consciousness goes into an altered state.

So, the above-mentioned principle talks, in fact, about the *indeterminacy of results* which objectively[29] takes place when we investigate our ability to investigate, we try to understand our ability to understand, we want to be conscious about our consciousness, we think about our ability to think, or, in general, when the *relation of functional tautology* is present. Let us recollect that in Section 2.5, while formulating the first criterion of approach, I talked about tautological notes in formulation of that criterion. Let us now detail that point.

So, the relation of functional tautology (or, the *FT-relation* for short) is a special case of inverse relation, and appears always when a system tries to formalize itself using its own means of formalization. To use consciousness to explain that same consciousness is a typical example of FT-relation (confer with ancient saying *Cognosce te ipsum,* or *Know thyself*).

Another example of FT-relation is the relation between Nonstatanalysis and the applied ADC theory. On the one hand, the applied ADC theory is an applied theory of Nonstatanalysis (in obedience to the first criterion of approach): it uses the method of IIS and IIS-modeling. But, on the other hand, Nonstatanalysis, as an MT-level intellectual product, is itself an object of study for the applied ADC theory. Thereby, we have a situation when a meta-theory formalizes itself using its own applied theory.

Next. Having in mind the presence of FT-relations as in case of the object of study, so in case of the theoretical explanatory tool, I formulate the *Principle of tool appropriateness*: for conceptual framework to be able to explain the objects which naturally possess and exhibit the FT-relations (like the consciousness-related phenomena), this framework itself has to be constructed by taking into account the FT-relations (the popular version of this principle formulates as *One nail drives out another*). So, Nonstatanalysis, being coupled with its applied ADC theory, constitutes the appropriate conceptual framework for the presented here applied theory of consciousness.

3.2.3 On processing and conceptualization

As follows from formulated definition of consciousness, the mechanisms of consciousness presume there to be the acts of *processing* (***P***) and *conceptualization* (***C***). Let us denote the succession of these acts as "...-**P**-**C**-**P**-**C**-**P**-**C**-...". However, it is not a linear succession, but a convoluted succession, or succession organized into loops. So, I call them *cognitive loops*, and make a difference between their "-**C**-**P**-", "-**P**-**C**-", "-**P**-**C**-**P**-", and "-**C**-**P**-**C**-" types (see Patlavskiy, 1999, Figure 7a).

If we take a "-**P**-**C**-**P**-" cognitive loop, then, when moving from **P** to **C**, the subject of cognition, as if, formulates a *theorem* and tries to prove it (say, to prove that this given phenomenon belongs to our Reality and obeys the same natural law – this theorem formulates in order to achieve the formulated MT-aim). When the theorem is proven (the point **C** is reached), this means receiving a new element of knowledge (or, a new element of subject's experience).

Then, when moving from **C** to **P**, the subject of cognition uses that new element of knowledge (and, if it is required, some additional already available element of experience) and grounds on it as on some *axiom* – the subject of cognition uses this axiom when trying to process another physical (sensory) signal. This whole process of moving from **P** to **C**, and from **C** to **P** I call the *theorem-axiom inversion* (the pictorial rendition of this process is provided in Patlavskiy, 1999, Figure 7).

In this way the *totality of subject's knowledge* is being formed. But it is not a totality of subject's knowledge that is being used as an axiom in every concrete case, but just some element(s) of that knowledge. So, when the given element of subjective experience is used as an axiom before processing the subsequent physical (sensory) signal, I call it the *actualized element of subjective experience*.

The theorem-axiom inversion may be exemplified thus. Consider a doctor who examines the patient's sore throat. The doctor, after processing the physical sensory signal (the electromagnetic wave reflected from the throat which frequency is in red part of e-m spectrum), conceptualizes it in the form of a new knowledge: "It's quinsy". But, the doctor grounds his/her present diagnosis on the already available, or formerly acquired knowledge – the doctor has seen something like this in the past, either in the medical literature, or by examining other patients, and now only treats that already available correspondent knowledge as an undisputable truth, or axiom.

Let us now define some basic terms. If by *concept* I mean a certain denotatum-notion complex (see Section 1), then by the *act of conceptualization* (denoted as a point **C** above) I mean formation of the new denotatum-notion complex. A denotatum-notion complex created in the act of conceptualization I call a *new element of subjective experience*, or, in different contexts, a *new element of knowledge*. An important consequence is that any element of knowledge (whatever cursory it might be) should be always treated as some whole system, or as being formalized as the IIS{element of knowledge}.

A new element of subjective experience is characterized by a certain increment of information, which shows how the value of informational characteristic of the IIS{new element of subjective experience} differs from the value of the informational characteristic of the IIS{totality of the subject's knowledge}. It is important to mention that since the physical sensory signal can also be formalized as an integrated information system, therefore, when formalizing the process of *transformation* of physical sensory signal into the element of subjective experience, we may use the same IIS-modeling. The only difference is that when dealing with physical signal as some system (unlike the element of subjective experience) we may safely ignore the entropic and informational characteristics of such a system (this will be illustrated in Figure 5 below).

If we consider a computing machine (like our laptop), we have there only the *acts of processing*, namely, the physical signals of one kind transform into the physical signals of another kind. So, the absence of the acts of conceptualization is that factor that makes a computer different from a self-organizing complex system. Hence follows a solution to the problem of *Artificial Intelligence* (or AI for short). For instance, to solve that problem, we would have to realize the factor of conceptualization in the *complex artificial system* (or, *CAS* for short), thereby transforming it into the *complex artificial self-organizing system* (or, *CASOS* for short).

The formation of the denotatum-notion complex has another important consequence. According to the Law of IIS development, any change of informational characteristic of the IIS{new denotatum-notion complex} (which means the appearance of the increment of information) brings about the change of its material and, in some cases, energetic characteristic (some peculiarities of changing the material characteristic are considered in Section 3.2.8 below). So, I will call *memorization* the process of changing the material characteristic of the IIS{new denotatum-notion complex} due to changes of its informational characteristic,[30] and, in some case, due to behavior of its energetic characteristics.

From this definition follows that memorization should be treated as an immediate consequence of conceptualization. The process of actualization of a certain element of subjective experience I call *recalling from memory*, and that process presumes searching for the values of entropic characteristic that corresponds to the IIS{sought-for element of knowledge}. In the result of such a search, the whole integrated information system actualizes.

3.2.4 Formation of the cognitive helix

The accurate quantitative assessment of the speed of succession of cognitive acts of processing and conceptualization is not an easy experimental task; however, judging from the speed of reaction on outer stimuli that some organisms demonstrate, that speed can be very high. So, I hold that the high-speed repetitive formation of the cognitive loops results in what I call a *cognitive helix*. In Figure 3 one can see a cognitive helix formed with several cognitive loops (as was mentioned in Note 28, Figure 3 is a detailing of the element **Self** shown in Figure 2):

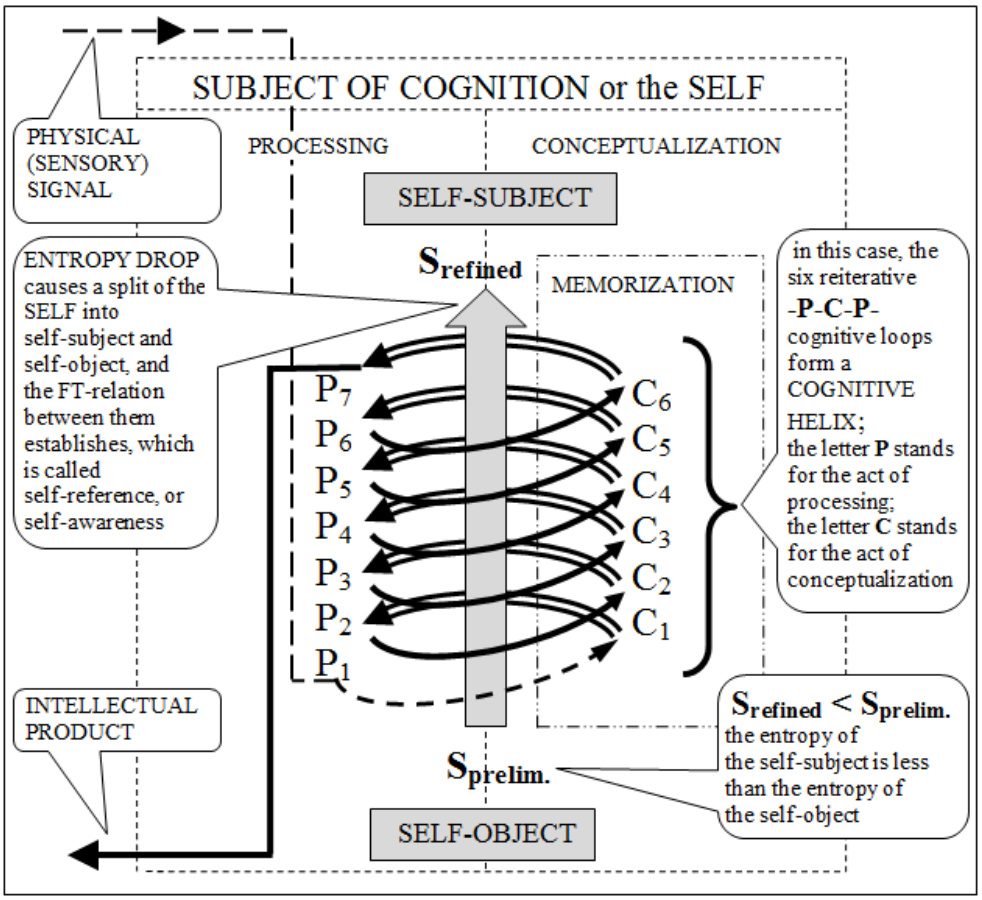

Figure 3. Cognitive loops, cognitive helix, entropy drop, and splitting of the Self.

The process of formation of the cognitive helix may be exemplified thus: if the doctor cannot diagnose from the first look, he/she needs to examine the red throat again and again, and/or to re-process his/her already available elements of experience. Correspondingly, the first look at the red throat results only in a preliminary diagnosis (or, a *preliminary knowledge* about the object of study). Then, the more times the doctor examines the throat, or the more he/she thinks about this case, the more the diagnosis becomes refined (a *refined knowledge* is being received).

So, I assume that the entropy of the refined knowledge is less than the entropy of the preliminary knowledge: $\mathbf{S_{refined} < S_{prelim.}}$, and the *entropy drop* at the both ends of the cognitive helix appears (see Figure 3 above).

The subject of cognition, or the Self,[31] because of the entropy drop, splits into *self-subject* and *self-object*, and the FT-relation between them establishes[32] what I call *self-reference* (or, in different contexts, *self-awareness*). If we consider the standard subject-object complex required for there to be a process of cognition (as mentioned in Section 1), then the self-subject stands for the subject of cognition, and the self-object stands for the object of cognition. In doing this, the self-subject is always that one whose entropy is lower.

The effect of splitting the Self into self-subject and self-object is familiar for those who know what it means to *talk to oneself* (I mean here a phenomenon of *inner speech*). Addressing the forum opponent, I explain: "... before returning home after losing a lot of money on horse races, your Self tries to prepare for the future battles. Correspondingly, your self-subject plays the role of "You", while your self-object plays the role of "Your wife". Sometimes, they exchange the roles. But, at the moment of entering your house, you already have in mind a plausible heart-rending story that you have had no choice but to help the people suffering with cholera after the earthquake on Haiti".[33]

The fact that the self-subject disputes with self-object allows me to talk about the *inner intersubjectivity*. As I believe, the organism always (to such or another degree) argues with itself – it creates/models its virtual opponent who has a different point of view. Sometimes that virtual opponent unexpectedly jumps on stage in the form of *inner voice*, and persuades the organism to do or not to do something.

The mechanism of inner intersubjectivity presumes splitting of the self into self-subject and self-object, and the latter plays the role of the modeled virtual opponent. In fact, the Self always exists only as being split into self-subject and self-object – if there is no splitting, there would be no Self, no self-reference, and no self-awareness as such. The *outer intersubjectivity* is an immediate consequence of the inner intersubjectivity, and that is why the model of the world is always a projection (or externalization) of the model of the self-object. Similarly, *outer speech* is an externalized inner speech.

Next, I define *mind* as a virtual space between the self-subject and self-object, or as a *worktable* for the Self. The phrase "to keep something in mind" means that this "something" stands for the self-object, whereas the totality of experience stands for the self-subject.

In Figure 3, the input of the physical (sensory) signals is shown using a dash line. It is because the cases are possible when there is no such input, or the input is not permanent. So, in the absence of an input, it is the already available element(s) of subjective experience that becomes processed anew, or *re-processed*. This happens when we receive new knowledge (for instance, a solution to some problem) just by examining the totality of our previous knowledge. Therefore, I talk here about a *small circle of the process of cognition* (see Patlavskiy, 1999, Figure 3).

Another important moment is that the dash line is alone, which means that the input is possible only at one point **P**, but not at different points simultaneously. This means that the subject of cognition deals always with *cumulative* physical (sensory) signal (here I reject the view that the number of the signal input points must correspond to the number of sense organs). Since the subject of cognition requires the cumulative input to be always of some intensity, therefore, say, the blind-from-birth person has the other sense organs exacerbated.

So, making use of the IIS-modeling, I formalize self-subject as the IIS{self-subject} and self-object as the IIS{self-object} – the elements of the same DIS-model (with inverse relation between these elements), and the IIS{Self} as the element of AS-model (see Figure 4).

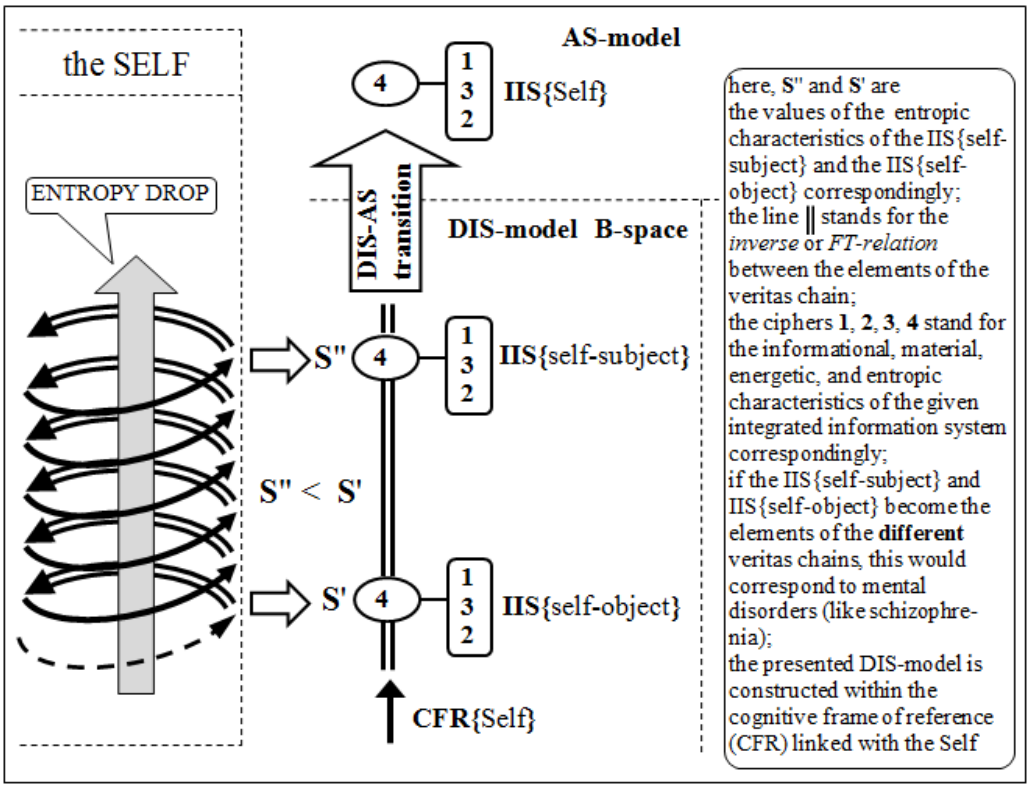

Figure 4. The IIS-modeling of the Self.

In Figure 4 one can see the moment of transition from depicting the scheme of the process of cognition to applying the IIS-modeling.

3.2.5 Formalization of the process of thinking; main types of inter-model transitions

Now, let us try to formalize the process of thinking. A *thought*, as a form of intellectual product, appears when some element of knowledge re-processes at the beginning of a new **-P-C-P-** cognitive loop, and is a result of *analysis* (or solution to the problem) of the relations that appear between the two (or more) already available elements of knowledge. And, in this a thought differs from a single element of knowledge. Let us formalize a thought as the IIS{thought} and consider it to be the element of certain DIS-model (see Figure 5).

A *torrent of thoughts*, which appears when, say, the subject of cognition tries to solve a certain problem, may be formalized as a veritas chain constructed within the CFR linked with subject of cognition as the author of these thoughts, and which consists of the following elements: the IIS{thought'}, the IIS{thought"}, the IIS{thought'"}, *etc*. – they all are the elements of the same DIS-model. Then, if the veritas chain is constructed expediently full, the DIS-AS transition takes place, and the IIS{solution to the problem} appears as the element of AS-model.

Let us show now that a thought is always a whole complex system, and that it is useful to formalize it as the IIS{thought}.[34] I hold that the subject of cognition always thinks in wholes, but, when expressing the thought (say, by putting it into words), the IIS{thought'"} *collapses* (the DIS-DEC transition takes place; see Figure 5) and transforms into information system (or data complex, or phenomenological observation) with words as its discrete elements – it is the third (or second, or first) form of information organization. That is why, after expressing the thought in the form of words, there will always remain some *ineffable residue* in the description of the thought, and this is true not only for thoughts, but also for any other forms of intellectual product, like dreams, feelings, premonitions, *etc*.

As I know for sure, there can even be such thoughts and feelings, that they can by no means be expressed in words. Therefore, the formalization of a thought as some integrated information system is justified by the very fact that we cannot represent a thought in full like an (ordinary) information system, to wit, the one consisting of discrete elements (like words) – we cannot have expediently full information about that object of study, and that is why we apply the method of IIS. For example, since we cannot fully express in words what *love* is, we may formalize that feeling as the IIS{love}.

The lovers interact as wholes – the elements of the same DIS-model with IIS{love} as the element of AS-model (see Patlavskiy, 1999, Figure 11e). When the lovers start paying attention to peculiarities of each other, the IIS{love} collapses, and the lovers become the elements of DEC-model. That is why from love to hatred there is only one step, or, better say, one DIS-DEC transition.

If we assume that an organism thinks in wholes, then the *binding problem* would seem to be non-existent, since there would be no need to bind separate things together. A thought (or, a concept) if exists, it is already a whole system – it simply cannot be not a whole system. The concept "separate thing" is already a whole system. So, here, we do not have a

transition from parts to whole (or binding the parts into the whole), but a transition from one concept to another concept, or from one whole to another whole.

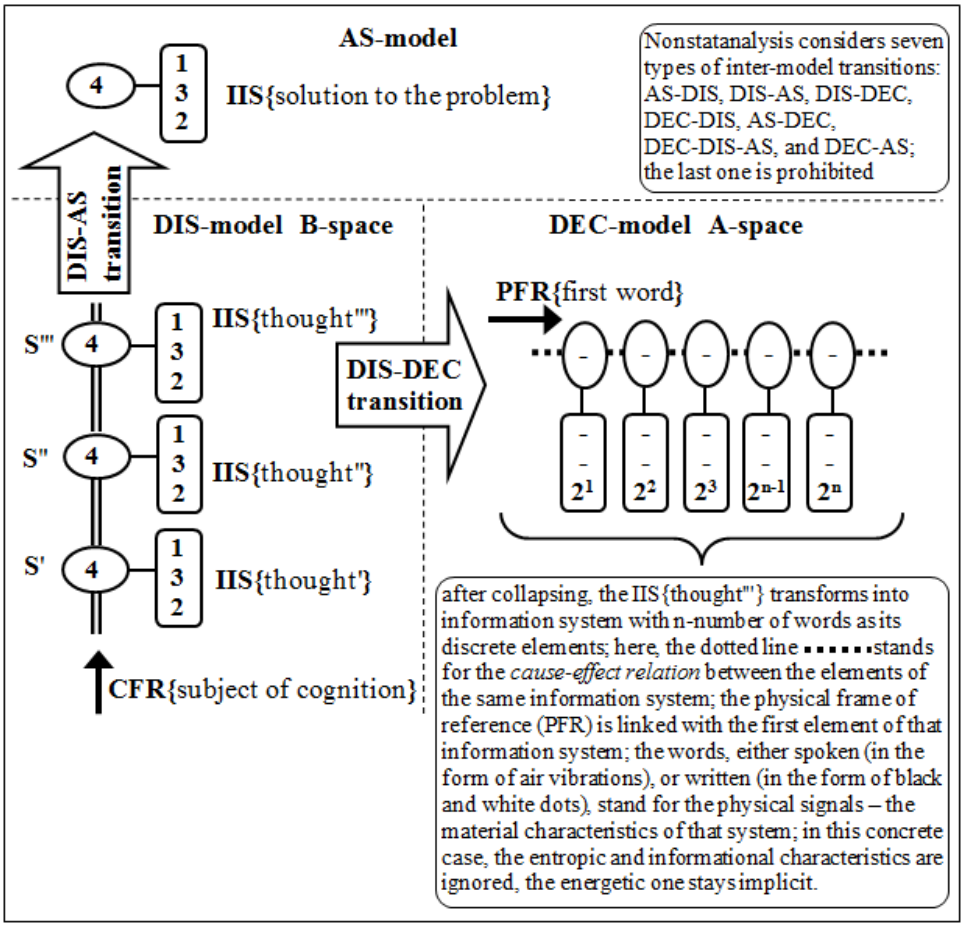

Figure 5. The IIS-modeling of the torrent of thoughts; the collapse of IIS{thought} (for the types of inter-model transitions, see Patlavskiy, 2005, Figure 1).

It should be admitted that the (ordinary) information system (or the collapsed IIS) can be described by:

(1) informational characteristic only;
(2) material characteristic only (as shown in Figure 5 above);
(3) energetic characteristic only;
(4) material and energetic characteristics only;
(5) informational and material characteristics only;
(6) informational and energetic characteristics only; and
(7) by an inexpedient (or disintegrated) set of informational, material, and energetic characteristics.

For example, I consider the seventh case of description when the collapse of IIS{organism} results in such or other kind of disease.

If in Figure 5 we replace the elements of DIS-model with the following ones – the IIS{paintings by Michelangelo}, the IIS{paintings by Titian}, ..., the IIS{paintings by Vincent van Gogh}, then we receive a new veritas chain with IIS{fine art} as an element of AS-model. Then, if any of the elements of that chain collapse, and if we receive an (ordinary) information system with its informational characteristic ignored and only a material one explicit, then, when a person who has never heard about fine art (the correspondent element of knowledge is absent) is presented with a painting by Michelangelo, she, at best, will use it to repair the roof of her lodging.

From the above follows that a masterpiece can exist only as being formalizable as some integrated information system within a CFR linked with a *connoisseur* as a subject of cognition. Having collapsed, it transforms into a colorfully blotted piece of paper which is nothing but an ordinary information system with only material characteristic explicit (or having such and such physical features, like area, mass, or waterproofness).

Based on Figure 5, we may consider the peculiarities of the process of properties ascription. I accept that during the process of cognition the subject of cognition enframes some cognitively independent entity, ascribes certain properties to it, thereby transforming it into the object of cognition. Let us split this process into stages. First there is enframing: here we take the IIS{entity} as the element of AS-model. But, the element of AS-model cannot be cognized yet (no subject-object complex is possible in this case). Therefore, to be transformed into the object of cognition, the element of AS-model has to be transformed either into the element of DEC-model, or into the element of DIS-model – only in these models we may have both the subject of cognition and the object of cognition as constituting the subject-object complex.

However, as was mentioned in Section 2.7, the elements of DIS- and DEC-models possess sharply different properties. So, having made the AS-DIS transition, the subject of cognition transforms the element of AS-model into the object of cognition which will have *dissociational properties*; but, having made the AS-DEC transition, the subject of cognition transforms the element of AS-model into the object of cognition which will have *decompositional properties*.

From the above follows that for a colorfully blotted piece of paper to become a masterpiece, there must be some subject of cognition who would ascribe to it dissociational properties, or will consider it as one in a row of other masterpieces. But, in case the decompositional properties are ascribed, then we will receive not a masterpiece, but a set of disintegrated dots of different colors.

3.2.6 On free will, intuition, attention, and the effect of verbal overshadowing

The IIS-modeling of the torrent of thoughts give me a possibility to address some effects that appear when the process of cognition is in operation. First is the phenomenon of free will. I assume that during the process of cognition the subject of cognition is always able **to choose freely** which type of inter-model transition to perform (either AS-DIS or AS-DEC), and, this ability I call *free will*. So, free will is a conscious act that is present at the very

beginning of the process of cognition, and is, in this sense, a *pre-cognitive act*.[35] This act becomes possible due to existence of unlike opportunities, and the AS-DIS and AS-DEC transitions are such unlike opportunities. So, the existence of unlike opportunities is a necessary condition for there to be a freedom of choice, and free will as such.

In fact, we should consider here a system which includes three components: choice; free/good will, and responsibility/repercussions. For example, we drive a car and approach a furcation (so, we have a choice to turn either left or right). Then we turn left (it was our free will to do this), and within five minutes we drop down to the river from the broken bridge (it is our responsibility for decision we have made).

So, **a causal chain of events can be always found so that the free will were an element of that chain**. And this speaks not in favor of determinism.

The second effect to be considered here is the phenomenon of intuition. A notable fact is that most of its life-time the organism produces a torrent of thoughts which, to be constructed, requires the *weak veritas transitions*, by which I mean that the value of entropic characteristic of the IIS{thought"} does not differ much from the value of entropic characteristic of the IIS{thought'}. In such a case we may ignore the veritas chain, and consider an (ordinary) information system which consists of two decomposed elements: thought' and thought". In this case we may talk about the cause-effect relation between the initial and subsequent thought, and, consequently, about the *logical thinking*, or logical link between these elements.

But, in the case of a *strong veritas transition*, i.e., when the values of entropic characteristics of the IIS{thought"} and IIS{thought'} differ sharply, we cannot already ignore the veritas chain, and the logical links between the initial thought and subsequent thought cannot be established any longer.[36] In such a case we should already talk about *intuitive thinking*, or the phenomenon of *intuition*. The logical thinking can be treated as a special case of intuitive thinking when the state of mind remains quasi-unchanged. That is why logic is replete with aporiae.

Everybody knows that there are as good so bad ideas. The good ones are good because, if we have them, our state becomes better, or, at least, does not become worse while our ambience or situation we reside in becomes worse. Now then, I hold that in case the idea is of intuitive origin, it can only be good, or the one that turns to be good sooner or later.

Another important point that has to be addressed in this section is the problem of attention. I define *attention* as an ability of the subject of cognitive activity to fix the value of entropic characteristic of some integrated information system (say, the IIS{object of interest}), and then to form a veritas chain within own CFR with that IIS as its starting nexus. The formation of the veritas chain within the subject's own CFR means that the given object is only of that subject's interest, and that the changes of the value of entropic characteristic of the IIS{object of interest} are meaningful only to that subject of cognition.

In the moment of fixing the value of entropic characteristic of the IIS{object of interest} the attention *focuses*; in the moment of collapsing of a certain IIS of that veritas chain (this IIS, thereby, will be the last nexus of that chain), the attention *ends*; if that last IIS becomes the starting nexus of another veritas chain within the same CFR, then the attention *switches*. But, attention can also split. To demonstrate this, let us consider a question of how to calculate the number of integrated information systems that constitute a veritas chain used to formalize a torrent of thoughts.

To do this, we will have to use a simple device. First, we have to start "Calculator" program on our computer (or mobile device). Then, we type the symbols "1", "+", and keep our finger over the key "Enter" on the keyboard. Then, we close the eyes, and start clicking the key "Enter" and simultaneously counting to ourselves: "two", "three", "four", and so on in a middle tempo. (Before performing this experiment we have to check whether the number of clicks of the key "Enter" is displayed correctly in the calculator's window, and matches our counting.)

Then, at some moment of time, when the number of pressings becomes, say, 35, we let ourselves switch our attention to some other object of interest while continuing to press the key "Enter" with our finger (this would mean starting a new veritas chain). Then, at some moment of time, we switch our attention back to the process of pressing and counting – we will find ourselves continuing to count: say, "eighty two", "eighty three".

At this moment, we open our eyes and compare the number 82 with the number displayed on the calculator's screen. If the two numbers coincide, we record this datum, and perform simple subtraction: 82-35=47. Here, the number 47 will stand for the longevity of the veritas chain which consists of the following elements: the IIS{thirty five}, the IIS{thirty six}, ... , and so on up to the IIS{eighty two}. It should be mentioned here that the fact that the new veritas chain starts without ending the former veritas chain would exactly mean that our attention *splits*.[37]

And, finally. The IIS-modeling of the torrent of thoughts enables me to explain the effect of *verbal overshadowing*. As Martinez-Manrique and Vicente (2010) describe it:

> "... in a classical experimental setting, all subjects watch a video about a certain salient individual that they will have to identify afterwards. After watching the film and before testing their identification capacity, some subjects had to describe verbally the target individual while others had to read an unrelated text for the same amount of time. The results showed that the subsequent performance in recognizing the individual (*e.g.*, picking him/her out of a line-up) was poorer for those subjects that had been asked to describe the individual" (Martínez-Manrique and Vicente, 2010, p. 157).

My explanation of the described effect is as follows. After watching a film, all the subjects receive the same new element of experience – the IIS{target individual}, which, by definition, includes expediently full information about the target individual as of the object of study. Then, for the group of subjects that were asked to describe verbally the target individual, the IIS{target individual} collapses, and they instead receive an ordinary information system with verbal descriptions as the decomposed elements of that system

(see Figure 5, DEC-model). At the same time, for the group of subjects who had to read the unrelated text, the IIS{target individual} preserves.

Then, in the moment of recognizing, the subjects from the first group, during the observation of real individuals, receive the new element of experience formalized as the IIS{possible target individual}, and compare it with their already available **collapsed** IIS{target individual} received after describing it verbally, whereas the subjects from the second group compare the actually observing possible target individual with their already available **non-collapsed** IIS{target individual} received right after watching the film.

A comparison of one collapsed experience with one whole experience is less effective than the comparison of two whole (or, non-collapsed) experiences. In the second case, the two whole experiences, formalized as the integrated information systems, may sooner become the elements of the same veritas chain (see Figure 5, DIS-model) with appearing of the result of recognition as the element of AS-model (we deal here with direct DIS-AS transition). But, in the first case, to receive the result of recognition as the element of AS-model, the collapsed IIS{target individual} has yet to be re-integrated (i.e., the DEC-DIS transition has yet to be made) for the required veritas chain to be formed (this is because a direct DEC-AS transition is prohibited; see Figure 5 for upper cloud explanation).

In other words, in the first case, to receive the results of recognition, the DEC-DIS-AS transition is required. The DEC-DIS-AS transition is always less effective than the DIS-AS transition, and this fact, in final analysis, enables the subjects from the second group to show better statistically significant recognition results.

3.2.7 On implicit and explicit self-reference

When talking about self-reference, I make a distinction between *implicit self-reference*, and *explicit self-reference*. For a Self (a person, a subject of cognition) to have explicit self-reference means that its self-subject can assess in which it differs from the self-object (see Figure 3). Here, the ability of assessment depends as on the value of the difference between the values of entropic characteristics of the IIS{self-subject} and the IIS{self-object} correspondingly, so on the absolute value of entropic characteristic of the IIS{self-subject}.

The entropic characteristic of the IIS{self-subject} depends on how much its informational characteristic changes, or, depends on cognitive activity of the Self. So, I treat logical thinking (or ordinary thinking) and intuitive thinking as belonging to explicit self-reference. At the same time, the cognitive activity which requires controlling the organism's basic physiologic functions, so most of the instincts and cases of automatic behavior fall into category of implicit self-reference.

In fact, I use the term implicit self-reference instead of the terms *un-conscious*, *sub-conscious*, or *non-conscious*, since these latter terms very often mean being *devoid of consciousness*. But, as I have shown in Section 3.1.4, the organism possesses consciousness in virtue of being alive, and there can be no living organism devoid of consciousness.[38]

I treat all possible values of the informational characteristic of the IIS{organism} as being divided into four zones which I call the *fields of mental states* (or *FMS* for short; see Patlavskiy, 1999, Figure 13).

Thus, *FMS-1* corresponds to changes of informational characteristic of the IIS{non-living complex system}; *FMS-2* corresponds to changes of informational characteristic of the IIS{alive complex system} which includes also some basic physiology controlling, reflexive and instinctual activity. *FMS-3* corresponds to intuitive thinking and some cases of extrasensory perception, or anomalous information acquisition; *FMS-4* corresponds to most of the physiology controlling, reflexive and instinctual activity, and to what is called *altered states of consciousness*.[39] Ironically, what was previously treated as sub- or un-conscious, is, in fact, very much conscious.

When the values of informational characteristic which correspond to controlling the basic physiological processes and/or the reflexive and instinctual activity migrate up to *FMS-4* from the beginning of *FMS-2* (or in reverse direction), they necessarily pass through the rest of the *FMS-2* and *FMS-3* zones, and, at that very moment, they may be experienced explicitly (that is why some persons can consciously control their physiologic parameters). So, the implicit self-reference is divided into two parts: the first part ends at the beginning of *FMS-2*, and the second part starts at the end of *FMS-3*.

It should be also admitted that the organism is in its *normal thought-productive state* (or has explicit self-reference) when the values of informational characteristic of the IIS{organism} fall into *FMS-2* and *FMS-3* zones. Hence the Principle of Cognitive Indeterminacy follows (it was discussed in Section 3.2.2): while studying our own exemplar of consciousness, we may rely only on the results received when we are in our normal thought-productive state; being at the beginning of *FMS-2* (and lower), or at the end of *FMS-3* (and higher), we lose the ability for normal thinking, and for reliable data producing *introspection*.

3.2.8 On the mechanisms of memorization

From the definition of the phenomenon of memorization given in Section 3.2.3 follows that *memory* has always some material substratum.[40] The peculiarities of memorization (for example, its quality, quantity, longevity, *etc*.) are much dependent on the behavior of energetic characteristic of the IIS{new denotatum-notion complex}.

For example, if, due to the change of informational characteristic, material characteristic changes, but the energetic one stays unchanged (or, to be more specific, it stays changing optimally; see Note 22), in such a case we will have what can be termed as *normal memorization*. However, if the energetic characteristic changes considerably (or no longer changes optimally), then we will have notable refinement or impairment of the process of memorization. Also possible are many other combinations of behavior of systemic characteristics which memorization can be dependent on (see Section 2.7.4 for a partial law).

Next. In the moment of conceptualization the IIS{new denotatum-notion complex} acquires certain value of its entropic characteristic and then becomes the element of the veritas chain constituting with the IIS{denotatum-notion complex 1}, the IIS{denotatum-notion complex 2}, ..., the IIS{new denotatum-notion complex} as the elements of DIS-model, and with the IIS{totality of subject's knowledge} as the element of AS-model. The IIS{new denotatum-notion complex} **cannot leave** that chain. This means that, being once memorized, this denotatum-notion complex becomes forever the element of the totality of subject's knowledge. Simply speaking, if we have memorized something, this will stay with us forever, and could be recalled from memory in such or another way (even if to do this would require application of the technique of regressive hypnosis).

The English word *remembering* is not good for using here, since it is polysemantic. It is, in fact, a conflation of two different cases: *memorization* and *recalling from memory*. The remembering (in sense of recalling from memory) presumes re-processing of some already available (or earlier memorized) element of our experience. By the way, every time we recall some element of experience from our memory, we add new trait(s) to this element of experience. Therefore, the recalled element of experience is always a new element of experience. The difference between the available and the new element of experience gives us the increment of information. Therefore, recalling from memory is always informing ourselves.

When considering the problem of memorization it is pertinent to mention another distinction between computers and self-organizing complex systems. The case is that a computer can be formalized as a system with only material systemic characteristic explicit, and it is only the material characteristic that is being changed, and thereby, memorized (that is why the computer's memory may be called *physical memory*). But, in a living organism, it is the value of entropic characteristic of the newly created denotatum-notion complex that is being memorized, since in this case not only the material, but also other two systemic characteristics change. Therefore, in this case, I talk about *entropic memory*.

So, for the self-organizing complex system, the procedure of recalling from memory presumes searching mainly for the entropic characteristics of the correspondent denotatum-notion complexes. If such an entropic characteristic is recalled (or, is found on a veritas chain as instantiated above), then the whole denotatum-notion complex (namely, the whole IIS{denotatum-notion complex} with all its three systemic characteristics) appears in the result.

For a computer, the search in memory means performing the step-by-step actions of eliciting the bits of physically recorded signals. Here, one step means eliciting one portion of signals. But, for the self-organizing complex system, one step means eliciting one integrated information system which already contains an **enormous amount** of information, and, what is important, that information is already somehow organized. In the simplest terms, in computer we have the *bit-by-bit actions*, while in organism we have the *IIS-by-IIS actions*.

It is worth noting that in case the mechanism of recalling presumes searching for the entropic characteristic, then memorization requires much less amount of material substratum, and the substance of that substratum becomes much more diversified than in the case of recording a material characteristic on magnetic material in computers. It means that any physical object, and even empty space, may serve as material substratum during memorization.

Consequently, all these distinctions make the search in memory in the self-organizing complex systems quicker and more effective than in computers. By the way, the effectiveness may range from very low values to extreme values, and I talk here about *floating efficiency*. This means that, in some cases, the speed of working with memory in living organisms may be much less than in computers, whereas in other cases this speed may be several orders of magnitude greater.

3.2.9 On the problem of communication

Can human communicate with plant? If we will try to address this question within the A-space, then we will have to consider such decompositional parts of human's body as larynx (as element of anatomic apparatus responsible for vocal speech), and Broca's convolution in the brain (which is treated as being responsible for language abilities). Since there is nothing like larynx and brain in plants, we conclude that no communication between human and plant is possible in principle.

Let us now address that same question, but already within the B-space. First, from the Law of Conservation of Consciousness follows that all the living organisms possess equally expedient (i.e., functioning sufficiently well in all organisms) means required to realize their communicative needs, and the inability of animals to speak human language is not a sign of the absence of consciousness. Here, by *communication* I mean an ability of one IIS to change the value of informational characteristic of some other IIS. This can take place when the two integrated information systems (say, the IIS{human} and the IIS{plant}) become the elements of the same DIS-model, and which enables the inter-system interaction between them (see Section 2.7.1).

Then, since, according to the Law of IIS development, the informational characteristic of some IIS can be changed even without changing the material characteristic (to wit, by changing only its energetic characteristic), therefore the organism's communicative needs can be satisfied even in the absence of larynxes and brains. From this also follows that the various species-specific anatomic apparatuses (including sense organs) are not the causes of communicative abilities, but just modifications of the material characteristics of the correspondent integrated information systems used to formalize the representatives of these species.

Second. There is always some algorithm, whereby the modification of informational characteristic is being performed while one IIS modifies (changes the value of) informational characteristic of another IIS. This algorithm is quasi-persistent in time and specific for the given set of integrated information systems as the elements of the given

DIS-model. Such an algorithm I call *language*. For a group of organisms to be able to communicate, the IIS{organism 1}, the IIS{organism 2}, ..., the IIS{organism N} must become the elements of the same DIS-model, which would presume using the same algorithm of modification of their informational characteristics.[41]

Depending on the variants of changing of the value of informational characteristic of the IIS{organism} during the inter-system interaction, there will be different levels of communication between these systems. Now then,

(1) if the informational characteristic of the IIS{organism} changes, but its material characteristic changes in a **vanishingly small rate**, then we receive the most basic level of communication, which includes various cases of anomalous information acquisition, like telepathy, the phenomenon of being starred at, the anomalous link between mother and her newborn baby, *etc*. – in this case, the communication does not require making the DIS-DEC transitions with producing physically perceptible sounds or signals (see Figure 5, and consider the DIS-model only);

(2) if the informational characteristic of the IIS{organism} changes, and, as this takes place, its material characteristic **changes slightly**, then we receive the level of communication which is present, say, in a group of people who constitute a highly trained team (they understand each other without words), in the group of hunters (like the pack of wolves) in the moment of hunting, and the like (to this level we may assign also a communication through singing, various examples of communication in the animal kingdom, and also a communication between the self-subject and self-object as during the *night-dreaming*[42]) – in this case, the communication requires making the DIS-DEC transitions (see Figure 5, and consider as the DIS-model, so the DEC-model) and producing some very subtle/refined physically perceptible sounds and other signals;

(3) if the informational characteristic of the IIS{organism} changes, and, as this takes place, its material characteristic **changes sufficiently**, then we receive the level of communication which corresponds to normal communication by using such physical means as spoken words and written symbols, signs and gestures (the bees' dancing may also be assigned to this level) – in this case, the communication requires making the DIS-DEC transitions (see Figure 5) and producing various physically perceptible sounds and/or signals;

(4) if the informational characteristic of the IIS{organism} changes, and, as this takes place, its material characteristic **changes considerably**, then we receive the level of communication, of which example could be the loud shouting, also sporting competitions, street fighting, miscellaneous mass actions of disobedience, and even wars (I treat a war as a communication of a certain level, when the canons speak and the diplomats stay silent) – the upper limit of this level corresponds to the cases when no elements of the DIS-model are available anymore; in other words, the society of organisms becomes fully decomposed

and everyone communicates in its own language (see Figure 5 and consider the DEC-model only).

As one can see, the levels of communication range between purely dissociational (when understanding achieves without producing words or other physical signals), to purely decompositional (when there are not even two those who would understand each other).

So, if explaining the behavior of quasi-identical twins, we should consider the first level of communication; while explaining the cases of simultaneous changing of the flight direction of the whole big flock of birds, we may consider partially as the first, so the second level of communication.

It is important to note that to avoid making my explanation too involved, I do not consider here the particularities of changing the energetic characteristic of the IIS{organism}, but we would have to do this when trying to explain, say, the phenomenon of xenoglossia (it is a case when a person, all of a sudden, starts to speak in language previously unknown to her).

It is standing to reason that the inter-species language must be enough simple to enable the understandable reaction from both sides. The level of communication – it is always an achievement of both communicating sides as the averaged value of their intellectual efforts applied. In doing so, the simplicity of communication does not talk about the lack of intellect of the participants of communication.

3.2.10 Concluding remarks

For not becoming too involved, I did not mention many problems that the applied theory of consciousness could actually address. Summing up the key ideas expressed in Section 3.2, I would like to admit that the appearance of entropy drop makes it possible for the complex system to reduce its entropy through the first way of entropy reduction (as was discussed in Section 3.1.1), namely, through processing the physical (sensory) signals and, in the moment of conceptualization and via the increments of information, transforming them into the new elements of subjective experience. And this means that the given complex system **possesses consciousness**.

It is important to stress that the outlined applied theory pertains only to that version of consciousness that follows from my own definition of consciousness. This means that where the other theorist will define consciousness differently, then this would require a different version of the theory of consciousness. But, for his version to be comparable with my version (that uses different definition of the object of study), they both must possess the same feature – they both must be rational, consistent, *etc*.; in other words, they both must obey the same criteria of formal correctness (see Section 2.2).

When suggesting the filtering of cognitive activity (given in the form of the criteria of formal correctness), I by no means put in question the other theorist's right to determine the object of study as is convenient for him/her, or to formulate the laws and postulates he/she wishes to formulate, or his/her right to select the phenomena he/she wishes to explain.

Figuratively speaking, I do not criticize the recipe or taste of the dish the other theorist is going to cook. I just try to unify the general principles of cooking, such as using an oven, stainless kitchen appliances, food processors, fresh ingredients, *etc*., and making the resulting dish eatable. I mean that whatever dish anybody is going to cook, it must be eatable, and this is a common feature of all possible dishes.

Also, as directly follows from the applied ADC theory, whatever applied theory of consciousness we take, it will depend on the meta-theory which is being used by its author as the epistemological framework for such an applied theory.[43]

The important conclusion also is that the suggested applied theory of consciousness accounts for all consciousness-related phenomena known for me by this moment. Therefore, I am very skeptical concerning the idea that the different aspects of consciousness (or the different consciousness-related phenomena) should be addressed by the different theories.[44] I do not agree that, say, there must be a theory of telepathy, a theory of intuition, a theory of memorization, *etc*., and that the required theory of consciousness should be the unification (or, theoretical synthesis) of these partial theories. Instead of that, I consider only one theory of consciousness that accounts for all pertaining phenomena, and even talk about the possibility to come to a comprehensive theory of consciousness.

But, why I think that a comprehensive theory of consciousness is possible? First, I hold that all the subjects of cognitive activity possess the exemplars of consciousness which are of the same nature, and share common mechanisms of functioning (see Section 2.4, Assertion 2). Second. The theory of consciousness is an intellectual product constructed due to possessing consciousness, and consequently, the very construction of any possible intellectual product must reflect (or bear the imprint of) these universal mechanisms of functioning of consciousness. Third. As follows from the applied ADC theory, the versions of the theory of consciousness constructed in obedience to the same criteria of formal correctness will, in final analysis, become comparable and compatible with each other.

The suggested system of arguments misses only one element, namely the sufficient number of the versions of the theory of consciousness constructed by other theorists. But I hope to find, at least, several such versions someday. This would let me to solve the problem of intersubjectivity and to legitimize the science of consciousness.

As I have mentioned in Section 2.3, the theory of emergence of life and consciousness, the theory of consciousness, and the theory of evolution can exist as theories only if they constitute a trilateral union; being parted, they can exist only as hypotheses (this is one reason why in Section 3.1.4 I have called hypothesis the Darwinian "theory" of evolution). Therefore, let us now formulate the main assertions that have to be put into the basement of the applied theory of evolution.

3.3 The applied theory of evolution of the complex self-organizing systems

3.3.1 On unicenosis and evolution of consciousness

As was mentioned in Section 2.5, the MT-aim incorporates existential condition. This fact caused me to suggest an applied theory of the origin of life and consciousness. Then, the attempts to detail the mechanisms of the first way of entropy reduction (all three ways were considered in Section 3.1.1 as the elements of existential condition) have led to the applied theory of consciousness. But, the MT-aim incorporates also developmental condition. Therefore, to keep the explanatory framework consistent and full, the two above-mentioned applied theories have to be augmented by a theory that addresses the questions of development of the complex self-organizing systems.

Let me start with recalling that the third assertion of the Law of Conservation of Consciousness (see Section 2.4) states that the total number of all the exemplars of consciousness in the Universe is limited and conserves. But what does this third assertion follow from?

Let me first introduce a new term. While by the term *biocenosis* we mean an association of different organisms forming a closely integrated community (say, on the planet Earth), by the term *unicenosis* I suggest to mean the totality of the complex self-organizing systems in the Universe. To formalize this totality, we have to construct a big-but-finite veritas chain consisting of the IIS{organism 1}, the IIS{organism 2}, ..., the IIS{organism N} as the elements of the same DIS-model, and the IIS{unicenosis} as the element of the AS-model (see Patlavskiy, 2005, Figure 6).

Since any veritas chain is finite by definition, therefore I am forced to accept that the total number of all the organisms in the Universe is limited. Then, since, according to the first assertion of the Law of Conservation of Consciousness, one complex self-organizing system possesses only one exemplar of consciousness, therefore the total number of all the exemplars of consciousness in the Universe is **limited** too.

Correspondingly, for the IIS{unicenosis} to remain the element of AS-model (which appears in the result of DIS-AS transition), the number of elements of correspondent DIS-model must strictly **conserve**, otherwise the required AS-DIS transition would be impossible to make. From this follows that where some organism (or some species) becomes extinct in a certain part of the Universe, it must appear in its other part. It also foolows that two identical species[45] cannot appear in the different parts of the Universe simultaneously. What is more, once having appeared and become extinct, the same species cannot appear again as an element of the same biocenosis, because its place on the veritas chain become occupied by another species.

Next. Since every planet in the Universe that possesses certain forms of life has its own biocenosis, therefore we may also construct a big-but-finite veritas chain consisting of the IIS{biocenosis 1}, the IIS{ biocenosis 2}, ..., the IIS{ biocenosis N} as the elements of the same DIS-model, and the IIS{unicenosis} as the element of AS-model. Therefore, when

talking about evolution of species we, first of all, have to talk about the evolution of biocenoses. I mean that the mechanisms of evolution cannot be apprehended if we restrict ourselves by considering the development of species on our planet only.

From the above it follows that the given species as an element of a certain biocenosis is such as it is not because of its individual evolution within that biocenosis, but, in the first hand, because of the place the IIS{given species} occupies in the veritas chain of the totality of integrated information systems used to formalize all other organisms in the Universe.

If the given Earth's species, formalized as the IIS{species}, is an element of the veritas chain which results in the IIS{unicenosis} as the element of AS-model, then it cannot leave its place in that chain, or change its entropic characteristic without there being an influence upon the whole chain. That is why all the species of the given biocenosis are forced to keep their biological identity intact.

The belonging of Earth's species, formalized as the IISs{species}, to the veritas chain which results in the IIS{unicenosis} also explains why it is so hard to find transitional links between the species within the same biocenosis. These missing links may well be the elements of biocenoses of other life-hospitable planets.

Also, for there to be the IIS{biocenosis} as the element of AS-model, there must be a veritas chain consisting of simultaneously present integrated information systems used to formalize the various living organisms. That is why we observe *simultaneous existence* (or, coexistence) of unicellular and multicellular forms of organisms. Moreover, all the existing organisms are equally expediently evolved to stay existent and coexistent, and such ones that require no more evolution.

To the point, I define *adaptation* as a transition between the different *levels of coexistence*. I presume that in case an organism is being put into new environment, we should take into account not only the influence of the environment upon the organism, but also the influence of the organism upon the environment. So, adaptation is always mutual, and results in achieving some new level of coexistence. If the organism is adapted, it means that it can live itself (it possesses functional design and behavior expedient in the given environmental conditions), and permits the environment to live too. If adaptation is not mutual, it results in *extermination* of either organism or environment, and we cannot talk about achieving a new level of coexistence in such a case.

Next. Since, as follows from Assertion 2 of the Law of Conservation of Consciousness (see Section 2.4), all exemplars of consciousness are expediently potent in all complex self-organizing systems (otherwise these systems would not be alive), therefore we cannot talk about the evolution of consciousness. This, for example, makes me conclude that our ancient forbears were no less clever than we are now. Yes, some of us become more informed, more experienced, more educated, more skilled, but, in doing this, our consciousness as a natural ability to deal with physical (sensory) signals does not evolve in the sense of becoming transformed into some other natural ability.

From that Law also follows that consciousness is present in all living organisms in its universal full version, but is used by the concrete organism to such or other extent depending on its way of life, or its current needs. When performing mental self-cultivation, we do not refine our consciousness – we just improve the practice of accessing the hidden universal potentialities of our exemplar of consciousness, or increase the percentage of usage of its potentiality.

3.3.2 The questions of ontogenesis

Let us now touch the question of the organism's mental development starting from its embryo state. Here I hold that an embryo, in virtue of being alive, is consciousness-possessing, is self-referential, is present with a split between its self-subject and its self-object, and is solving the problem of its inner intersubjectivity. The birth of an organism is not a birth of the new exemplar of consciousness – the newborn organism already possesses the certain time old exemplar of consciousness. Let us consider an embryo being taken right after the moment of insemination. Then, its mental activity will follow these steps:

(1) the very first element of experience appears as a result of conceptualization after processing the very first physical signal;
(2) the second element of experience appears as a result of conceptualization either:
    a) after processing some second physical signal; or
    b) after re-processing the first experience;
(3) the difference between the first and second elements of experience becomes processed and conceptualized as the third element of experience, or information.

It would be pertinent to mention that information does not come into the mind from external sources – information always appears as a difference between the two elements of experience that the given subject of cognition already possesses. So, Step 3 corresponds to the moment of appearance of the Self. Here, the third element of experience stands for the self-subject, while the first and second elements of experience stand for the self-object.

When applying the IIS-modeling to formalize the individual development of an organism, then, starting from the moment of impregnation, we have to consider the IIS{embryo} and the IIS{female} as the elements of the same DIS-model. For such elements, the standard inter-system interaction of integrated information systems takes place. But, in reality, the embryo is interacting not only with its mother, but, literally, with all consciousness-possessing creatures which its mother meets, or is surrounded by.

The embryo is also dependent on the places its mother visits, on the books she reads, on the music she listens to, on the house she dwells in, on the work she performs physically (like playing piano, *etc*.). In moment of conception the embryo is also dependent on the place the Moon, the Earth, and other planets occupy in the Solar System, and the Solar System occupies in the Galaxy.

Since we cannot list all the factors the embryo can be interacting with or dependent on, therefore we apply the method of IIS and formalize all other possible factors as the

IIS{other factors}. Then, to formalize the embryo's ontogenesis, we have to construct a big-but-finite veritas chain with the IIS{embrio}, the IIS{female}, the IIS{other factors} as the elements of that chain, and the IIS{new-born organism} as the element of AS-model which results from the DIS-AS transition in the moment of birth.

I would also like to attract attention to the existence of cooperative mental work that the embryo and the female perform. I hold that it is the embryo's intensive and extremely exquisite mental activity that, being coupled with physiologic factors, enables the pregnant female to live till the moment of parturition and endure it.

Moreover, the cooperative mental work results in what is mistakenly treated as *innate*, *instinctual*, *inherent*, *imprinted*, *genetic*, *embodied knowledge or experience*. In fact, nothing like that can exist, and in the moment of insemination the new organism (while in spore, seed, roe, egg, or womb) is, so to say, knowledge-free, since it can acquire knowledge only due to changing the informational characteristic of the IIS{new organism}. Accordingly, all its knowledge is of post-fecundate period.

The ability of a baby to learn the languages "on the fly" is only the *impoverished remnant* of baby's mental abilities while in its embryo stage. Sometimes, the remnant is not so impoverished, and we receive a *man of genius*. Also, the attempts to achieve the state of nirvana (the goal of the Buddhist's path) seem for me as being the attempts to achieve the quality of the mental activity of the embryo.

But, what is the cause of such a mental activity of the embryo? The case is that while being an embryo, its fields of mental states (see Section 3.2.7) are not split yet – such zones as *FMS-2*, *FMS-3*, and *FMS-4* constitute one single zone. In the moment of birth, these zones start to split. The malfunction of the process of splitting may result in various mental disorders, including that of *autism*.

3.3.3 Formalization of life-death relationship

Let us now see how the theoretical model of IIS can be applied when formalizing the relation between life and death. First, when we apply the method of IIS and enframe some entity (to wit, represent it) as the IIS{organism}, this system includes all expedient knowledge or information (available for us) about that entity. Having made such a formalization, the IIS{organism} becomes an element of AS-model (see Figure 5 above). In the theory of consciousness, the moment of enframing corresponds to the moment of conceptualization, or, in our case, to the moment of formation of the concept "organism". Then, as we know, the element of AS-model can either dissociate into wholes, or decompose into parts, and we have to consider both the DIS- and DEC-models.

Second. In the moment of impregnation, a new entity appears that can be formalized as the IIS{organism-1} (or the IIS{embrio}). It describes by all characteristics, possesses all properties, and obeys to the same law of development as any other integrated information system. When formalizing the stages of organism's development the following chain of integrated information systems can be formed: the IIS{organism-1}; the IIS{organism-2},

..., the IIS{organism-10}, ... the IIS{organism-D}; where, say, the IIS{organism-2} is a two-hours old organism, the IIS{organism-10} is, say, a ten-years old organism, and so on up to the IIS{organism-D}. All these integrated information systems are the elements of the same DIS-model, and each of them stands for the whole, alive, healthy, and evolving organism being considered (or enframed) in the correspondent moments of its life.

Next. In the moment the chain reaches the element IIS{organism-D}, a collapse of IIS takes place that results in DIS-DEC transition, and the integrated information system transforms into the (ordinary) information system that consist of "water", "carbon-based compounds", and other "complex chemicals" as the discrete elements of the same DEC-model. I should admit that since an organism is an element of Reality, therefore, in an ideal case, the IIS{organism} should not collapse before the IIS{Reality} collapses. I mean that, at least theoretically, nothing precludes an organism to exist much longer than it, in fact, does.

Now then, the (ordinary) information system characterizes by explicit material and energetic characteristics (say, the remains are of the same mass as alive organism, and, after being burned, release the same amount of heat). However, the remains lack the information-processing abilities, or, in other words, cannot be characterized by informational characteristic as was the case for the IIS{organism}. But, as follows from the definition of life given in Section 3.1.4, the information-processing abilities must necessarily be present for a complex system to be alive. So, the collapse of IIS{organism} (when it reaches the IIS{organism-D}) means that the organism dies.

It should be also admitted that in case the DIS-DEC transition has taken place, then there is no ways whatsoever to return back to the IIS{organism} as the element of AS-model. It is because the direct DEC-AS transition is prohibited (see Figure 5, the upper cloud explanation). To the point, some cases being treated as a clinical death may not be, in real, the fully performed DIS-DEC transitions yet. The resuscitation through performing the DEC-DIS-AS transition is allowed and theoretically possible, but the IIS{organism} we receive will necessary differ from the original IIS{organism} as mentally, so physiologically.

This same system of AS-DIS-DEC models can be applied when we consider any possible entity enframed as an integrated information system (to wit, not only an organism). Say, we may start with enframing some entity as the IIS{remains} as an element of AS-model, and then to proceed the same line of reasoning as in the above-mentioned case. The only difference is that in the moment of reaching of a certain element of the correspondent veritas chain, the IIS{remains} not can be said dies, but just decomposes with formation of a system of elements such as complex organic compounds, humus, and the like. By this I mean that, being formalized as an integrated information system, the IIS{remains} behaves the same as the IIS{organism}, despite of the fact that the remains are definitely not the same thing as an alive organism.

3.3.4 On the left-right functional asymmetry of the elements of organism's body

When addressing the problem of existence of the left-hand and right-hand functional asymmetry of the living organisms I will have to make use of the theoretical model of ramifications of the veritas chain (see Patlavskiy, 1999, Figure 12 for the DIS-model of the third order of complexity). In Figure 6 we can see the IIS matrix of a certain kind for formation of the organism's (here, mammal's) body (I mean that the IIS matrix for formation of the insect's body (or a plant) will be a bit different).

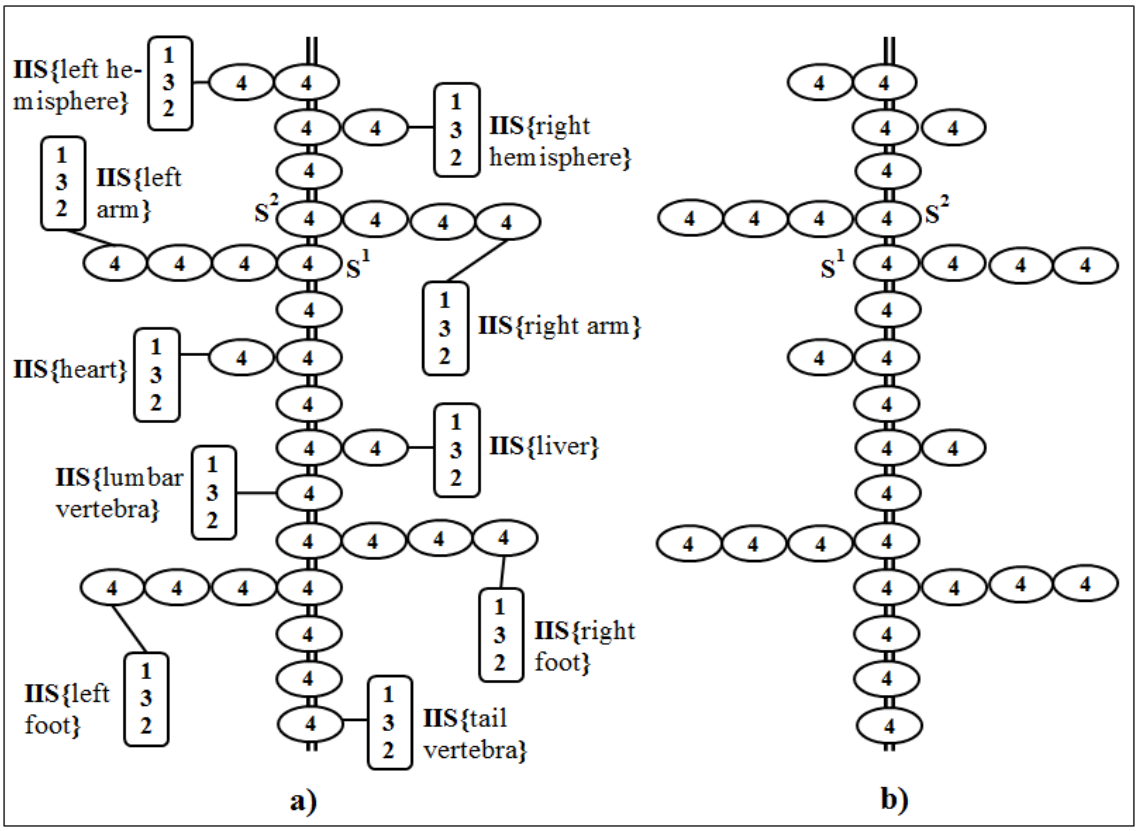

Figure 6. The left-handed (a) and right-handed (b) matrices for formation of an organism.

In the figure, the value of entropic characteristic of the integrated information system located on the main chain that spawns the IIS{right arm} is lower than that of the IIS{left arm}. This causes the organism to be right-handed. Also, the value of entropic characteristic of the integrated information system located on the main chain that spawns the IIS{left hemisphere} is lower than that of the IIS{right hemisphere}. That is why the left brain's hemisphere is responsible for the right part of the organism's body, and the right one is responsible for its left part. The IIS-model also makes us possible to formalize the case when, say, a heart is localized to the right of the spinal column.

3.3.5 On the driving force of biological evolution

When I consider the IIS{species}, I assume it includes all possible individual organisms capable of successful interbreeding. So, in Figure 7 we see not the geographic area where the individuals of single species can be met, but the IIS{species} that comprises all possible related organisms despite of their geographic localization, and whose entropic states as complex systems are of necessarily close values.

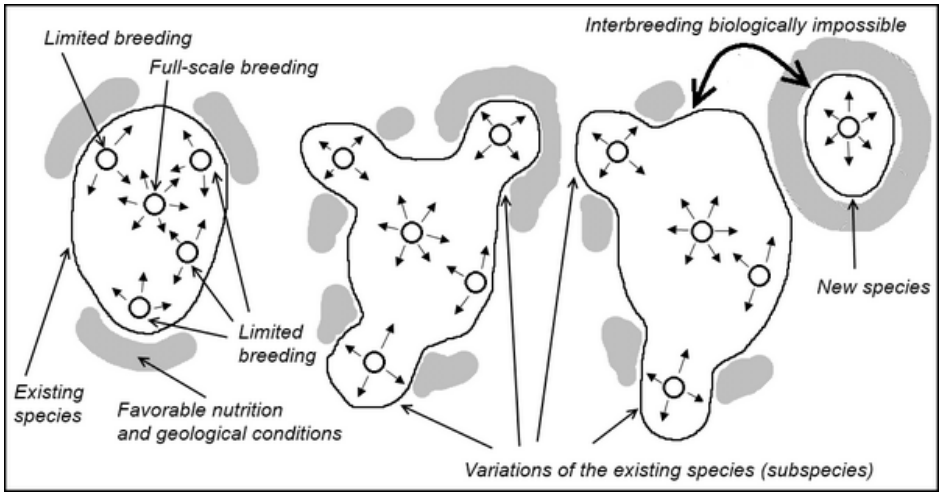

Figure 7. The mechanism of formation of the new species through limited breeding.

So, the individual in the centre can mate and breed in full-scale, while those at the borders have limited possibilities for breeding. Since the *breeding force* of all the individuals is approximately equal, those individuals at the borders start bending the borders of the given IIS in trying to achieve full breeding and mating possibilities. If the geographic and nutrition conditions are favourable in the point of bending, the sleeves of subspecies form.

Given favourite conditions and enough time, the IIS{species} as a whole complex system can dissociate into other whole complex system(s). If dissociation has taken place, it means that the IIS{existing species} and IIS{new species} start to differ considerably by the values of their entropic characteristics, and this makes the interbreeding between the members of these two different species unsuccessful, and even impossible.

Therefore I hold that the individual that belongs to the given species is forced to evolve not by outer circumstances, but by the inner need to make its breeding force to work with all its force.

3.3.6 Degradation as a possible outcome of evolution

I assume that, for an organism, the *aim of evolution* is to live in obedience to the basic laws of Reality. Let us now compose the following completed group of intellectual products:

the D-level assertion: my neighbor's daughter was forced by her parents to have an abortion at the age of fourteen;
the GS-level assertion: the ever-growing number of school age children practice early and indiscriminate sexual relations; a great number of adults practice unnatural sexual relations (which include as homosexuality, so the sexual relations that are not directed at giving birth to next generation); many countries officially tolerate unnatural sexual relations, legalize prostitution and narcotics consumption; maybe, the hidden aim is to put up with evolution of human species;
the AT-level assertion: the official cultivation (through legislature and mass-media) of unnatural sexual relations coupled with widespread narcotics consumption lead to (mental and physical) *degradation* of human species;
the MT-level assertion: the unnatural sexual relations and narcotics consumption violate the basic laws of Reality.

From the above I conclude that the people who wish to live in obedience to the basic laws of Reality are brought into minority in the modern society, and they urgently require their human rights to be protected.

3.3.7 On evolution of society

In Section 3.2.4, we considered the entropy drop which had resulted in splitting of the Self into self-subject and self-object. It was mentioned therein that the entropy of self-subject was lower than that of self-object. This much the same takes place when we consider a communication between generations. Say, when the adults earn money (by working at an office or by running a private business), they usually act and behave not in enough plausible way, but when returning to their families, they try to demonstrate decency when communicating with their children.

But, the adults rarely behave themselves as they urge their children to behave. Say, the adults forbid their children to drink alcohol and to smoke, and, at the same time, when communicating with other adults, they drink and smoke themselves. Therefore, a healthy society always urges the adults do not demonstrate misconduct or wrongdoing before the children; the TV companies are prohibited to demonstrate the adult programs at the improper time of the day, and so on.

So, as the elements of the same system{family}, the element{children} turns to be of lower entropy than the element{adults}, and the entropy drop appears. To be more specific, we have to construct a veritas chain of the IIS{children} and the IIS{adults} as the elements of the same DIS-model, and the IIS{family} as the element of AS-model (for comparison, see the case illustrated in Figure 4). In the case under consideration, the value of entropic characteristic of the IIS{children} will be less than that of the IIS{adults}, and we have a kind of evolution (a refinement) through interaction with other persons. Sometimes, to enable better existence (or lower entropy) of their children, the adults must work hard, thereby enhancing their entropy (they become emaciated and sick).

Something like that also happens when we consider a system{society}. Say, sometimes, to act efficiently, the politicians have to act dishonestly and violently, but, when making official statements on TV, or during the election campaigns, they behave as the role models for other citizens. So, as the elements of the same system{society}, the element{citizens} turns to be of lower entropy than the element{politicians}, and the entropy drop appears too. Here, and in the case considered above, the Self (or, a person), a family, a society, a world community are some complex self-organizing systems which permanently undergo certain kind of evolution.

Now then, we may construct the veritas chain which consist of the IIS{entropy drop in the Self}, the IIS{entropy drop in the family}, the IIS{entropy drop in the society}, the IIS{entropy drop in international relations} as the elements of the same DIS-model, and the IIS{evolution of the complex self-organizing systems} as the element of AS-model.[46] From this follows that the entropy drop is the main cause of evolution of the complex self-organizing systems. In this the suggested applied theory differs from the Darwinian hypothesis of evolution that treats a survival of the fittest as a main cause of biological evolution.

3.4 Interdisciplinary Investigations as a new scientific discipline

Summing up, I would like to mention that the applied ADC theory, the applied theory of the origin of life and consciousness, the applied theory of consciousness, the applied theory of evolution of the complex self-organizing systems, as well as the not detailed here applied theory of Artificial Intelligence[47] and the applied theory of somatic and mental diseases are just a few applied theories of Nonstatanalysis which together constitute a new scientific discipline – *Interdisciplinary Investigations*.

But, why the new discipline has such a name? As was mentioned in Section 2.5, in Nonstatanalysis, the phenomenon is being classified after the method that is being used to study the phenomenon most effectively, and that there can be many phenomena that, being traditionally classified as belonging to different existing disciplines like Physics, Psychology, Sociology, *etc*., all the same, to be explained, require application of the non-statistical method. Therefore, the method of IIS may be referred to not only as non-statistical, but also as interdisciplinary. That is why the discipline, that makes use of interdisciplinary method, was named Interdisciplinary Investigations.

When talking about Interdisciplinary Investigations as of the new discipline, I initiate a movement which may be akin the fighting for independence. But, here, I do not mean the independence **from** Science, but independence **within** Science. I mean that the consciousness-studying cognitive environment would not be treated as "sordid philosophers" or "ragtag dregs of scientific society" only in case we have our own independent "state": with borders (the suggested explanatory framework is limited by a certain canon); legislature (here I mean the formulated criteria of formal correctness); methods of ruling (say, application of the method of IIS and systemic modeling); and the other "attributes of power". Only then the field of consciousness study will be treated properly and respectfully by the rest of scientific community.

4 The reassessment of some traditional views

4.1 On the problem of mind-matter interaction

4.1.1 Two different groups of experiments that involve consciousness factor

By now, there are a lot of papers reporting about the experiments that deal with such factors as the focused attention of participants toward experimental installation. As a case in point, in Radin *at al*. (2012) we read:

> "A double-slit optical system was used to test the possible role of consciousness in the collapse of the quantum wavefunction. The ratio of the interference pattern's double-slit spectral power to its single-slit spectral power was predicted to decrease when attention was focused toward the double slit as compared to away from it. Each test session consisted of 40 counterbalanced attention-toward and attention-away epochs, where each epoch lasted between 15 and 30 s. Data contributed by 137 people in six experiments, involving a total of 250 test sessions, indicate that on average the spectral ratio decreased as predicted..." (Radin *at al*., 2012, p. 157).

So, how to assess these results? Firstly, I do not understand what the authors mean by focusing attention toward the double-slit optical system. In which way the participant must influence the laser beam? Do the authors mean that the participant must imagine itself as a tiny dwarf that puts a monkey-wrench into a slit when the beam passes through it? The irony is that the quantum effects are not imaginable (in contrary to the most of macro effects). For example, it will be wrong to imagine an electron as a ball moving around the nucleus. Also, how a wave can be imagined? How the quantum wavefunction can be imagined? And so on.

Second, I hold that all the experiments that involve consciousness-possessing factors may be divided into two major groups: **the ones that aim to prove the existence of the phenomenon of mind-matter interaction, and the ones that aim to construct a theory of the mind-matter interaction**. Radin *at al*.'s paper clearly belongs to the first group, since the authors do not even try to formulate a hypothesis on the mechanisms of mind-matter interaction.

Let us now consider the following two definitions. I call *simple* the phenomenon when during the experiment we receive a set of data of the same kind, say, data-X. Then, having conducted sufficient number of experiments, we receive a real/valid chance to construct a theory that would account for that phenomenon, say, Theory-X. In doing so, we have no need to prove the existence of the very phenomenon, because this fact is self-evident.

Next, I call *complex* the phenomenon when during the experiment we receive a set of data of different kinds, or mixture of data, say, data-X, data-Y, data-Z, etc. Then, despite of having conducted a big number of high quality experiments, we, all the same, would have no chance to construct Theory-X, because we have no ways to discern between the different kinds of data. In other words, our receiving a mixture of data does not depend on the

quality of the experiments conducted, and all that we can aim is just proving the very existence of the phenomenon.

When studying a simple phenomenon, we start from description, then come to generalization and systematization of received data and formulate a hypothesis. Then, if our hypothesis turns to be true, we receive an intellectual product with sufficient explanatory and predictive power, and call it a theory (see Section 2.1.1). However, all consciousness-related phenomena are complex phenomena, and partly because of the Principle of Cognitive Indeterminacy (see Section 3.2.2), and partly because of the unparalleled complexity of the object of study, the mentioned above standard procedure is not applicable in the field of consciousness studies.

Another problem is the problem of standardization. In Physics, there is a principle that when we have an experimental instalment, and, at least, one device is not (properly) standardized, then the results of the experiment are considered to be doubtful. So, how can we standardize the influence produced by the focused attention of participants? How and in which units shall we measure that influence? This problem seems to be insuperable.

Therefore, I suggest a specific way out. Namely, I propose to come to a required theory (of the mind-matter interaction) by moving not in a traditional way (namely, starting from description), but from constructing an appropriate meta-theory. On a meta-theoretical level we talk about the principles of formation of concepts, about the general method, about the system of models, about the system of proofs, etc. Then, we construct an applied theory within the limits of that meta-theory. We may compare the meta-theory with computer operational system (that controls computer hardware and enables machine-user interaction), and the applied theory with computer program or application. We can run the given program only within certain operational environment. Similarly, the given applied theory will work only within the limits of correspondent meta-theory.

When we apply the method and system of models elaborated on meta-theoretical level (see Section 2.7), we will, at least, know what we are looking for. For example, we will look for data that obey the requirements of standard inter-system interaction of the integrated information systems (as some theoretical models elaborated on the meta-theoretical level; see Section 2.7.1), and ignore the other kinds of data that do not obey these requirements.

In general, my aim is in constructing a theory that would account for the complex phenomena (here, the consciousness-related phenomena like mind-matter influences), and in the next section I will discuss how such a theory can be constructed. But, why we need such a theory? The case is that, as I am confident, the mainstream science will never accept the existence of mind-matter interaction unless a sound/rational theory of such an interaction is elaborated and accepted. The data gained in the experiments that presume using such factors as the focused attention of participants should be assessed only depending on whether they prove or disprove the suggested theory of the mind-matter interaction. The experimentation without a theory is like a blind-walking in the unknown town, and this maxim especially pertains to the field of consciousness studies.

4.1.2 *On the mechanisms of mind-matter interaction and the "hard problem" of consciousness*

When constructing epistemological framework, I have formulated a meta-theoretical assertion that information (or consciousness as an ability to transform physical signals into information) is one of three equally important fundamental factors (together with matter and energy) that influence the existence and development of our Reality. So, I formalize any existent entity as some system that is described simultaneously by informational, material and energetic characteristics. Accordingly, nor informational, nor material, nor energetic is something real – these are just the characteristics of some theoretical model called the integrated information system (see Section 2.7.1 for the Postulate of IIS).

The evolution of views on the mind-matter problematic is shown in Figure 8. As it can be seen, there is no explanatory gap to the right side of the figure.

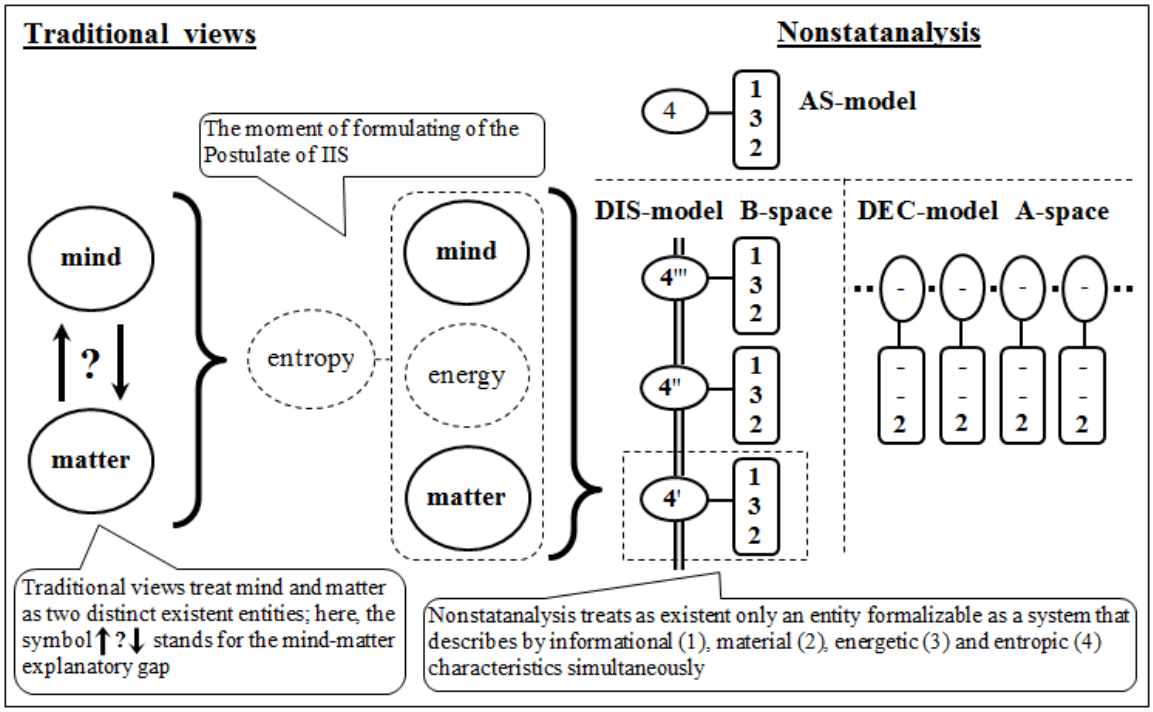

Figure 8. Transformation of traditional views on the problem of mind-matter interaction into the one suggested by Nonstatanalysis.

Yes, the IIS model is specific enough. For instance, I presume that for an entity to be treated as existent, it must be formalizable as the IIS{entity} which is described simultaneously by the above-mentioned three characteristics. From this immediately follows that nothing existent can be purely informational, or purely material, or purely energetic. Then, since the purely informational and purely material entities are nonexistent, therefore the problem of explaining the relation between the nonexistent entities is itself nonexistent. That is why I state that my approach eliminates the *mind-matter explanatory gap* from the very beginning.

The mechanism I suggest for mind-matter interaction[48] follows directly from the formulated in Section 2.4 existential condition. But, first, I would like to make a difference between the cases of *mind-matter* and *matter-mind* interactions. There is also a difference between such interactions within the same complex system, and such interactions between the two or more complex systems. I must admit that in all cases, the task boils down to explaining how the change of one systemic characteristic of the IIS{complex system} (say, its informational characteristic) brings about the change of its another systemic characteristic (say, its material characteristic), or any of the systemic characteristics of the IIS{another complex system}.

In its most simplified form the mechanism of transformation of the physical (sensory) signal into the element of subjective experience is as follows. If there is a physical (sensory) signal, this may cause the material characteristic of the IIS{subject of cognition} to change. If, herewith, the energetic characteristic stays optimal (see Note 22), the change of material characteristic brings about the change of entropic characteristic of the whole system. But, if the energetic characteristic does not stay optimal, the entropic characteristic of the whole system may not change at all (these are the cases when the organism does not react on exogenous irritants).

So, if the entropic characteristic changes, this means that the IIS{subject of cognition} becomes turned into unstable state – the new value of its entropic characteristic mismatches the values allowed by the veritas chain of which the given IIS is an element. Therefore, to achieve a new stable state, the informational characteristic of the IIS{subject of cognition} has to change too. If this takes place, a new increment of information (which is the difference between the new and former values of informational characteristic) in the form of a new element of subjective experience appears. This corresponds to the moments of conceptualization and memorization (see Sections 3.2.3 and 3.2.8).

I must admit that the suggested mechanism of the matter-mind and mind-matter interactions, in the final analysis, enables to explain where experience comes from, or, to solve the popularly known *hard problem of consciousness*, and also to explain how a thought (or mental intention) "transforms" into the muscle movements, speech, and behavior.[49]

4.2 Reality, as represented in Nonstatanalysis; the Second and Third basic ideas of Nonstatanalysis

The MT-aim, formulated when constructing a canon for Nonstatanalysis, presumes that there is only one Reality we live in, which means that there are no parallel realities, and no multiple dimensions. When talking about Reality, I make a distinction between *Noumenal Reality* and *Phenomenal Reality* (see Figure 2 above). As was mentioned in Section 3.2.5, I accept that during the process of cognition the subject of cognition enframes some cognitively independent entity, ascribes certain properties to it, thereby transforming it into the object of cognition (say, some phenomenon).

So, I postulate the existence of Noumenal Reality which exists independently of the process of cognition, and formulate the following five principles:

(1) the cognition of Noumenal Reality is not possible;
(2) the cognitively independent entity (as an element of Noumenal Reality) does not possess immanent properties;
(3) during the process of cognition, the subject of cognition enframes that entity, ascribes certain properties to it, thereby transforming it into the object of cognition (as an element of Phenomenal Reality).
(4) the process of cognition presumes there to be a split into the subject of cognition and object of cognition with subsequent formation of the subject-object complex – without such a split, no cognition is possible at all;
(5) the subject of cognition is able to conduct the process of cognition of Reality because as Reality so the very process of cognition (namely, its mechanisms) obey the same general natural law.

I must admit that the fifth principle stands for the *Second basic idea* of Nonstatanalysis. So, if there is a process of cognition as such, it is always a formation of some Phenomenal Reality which is being formed just as a model of Noumenal Reality, and the task of science is to make Phenomenal Reality as close to Noumenal Reality as possible.

Having applied the IIS-modeling when formalizing the various phenomena and processes I have come to conclusion that the IIS-model of Reality (namely, the IIS{Reality} as the element of AS-model) is in *one-to-one correspondence* with Noumenal Reality.[50] I call the expressed idea a *Third basic idea* of Nonstatanalysis. In Patlavskiy (1999, Figures 11a-g), I consider many cases of application of the system of AS-DIS-DEC models which are indicative of the presence of similarity between the IIS-model of real things and processes, and the very real things and processes.

For example, a system of AS-DIS models used to formalize the hutch of ducklings and their duck-mother looks like a real hutch of ducklings headed by their duck-mother. Here, the real hutch of ducklings corresponds with veritas chain consisting of the IIS{duckling1}, the IIS{duckling2}, ..., the IIS{ducklingN} as the elements of DIS-model, and the real duck-mother corresponds with IIS{duck-mother} as the element of AS-model. By the way, according to popularly known experimental results, if we replace the real duck-mother with a moving ball, then the ducklings will continue to follow it. This is because such a replacement does not change the appearance of a system of AS-DIS models, since now the IIS{ball} stands for the element of AS-model.

If the IIS{leader} as the element of AS-model becomes spontaneously replaced by, say, the IIS{flying airplane}, then the school of sea animals (like dolphins, whales, or seals) may find itself on a sea-shore. To the point, if the element of AS-model (either the IIS{duck-mother}, or the IIS{ball}) are totally removed, then the DIS-DEC transition takes place, and the real hutch of ducklings moving in line in the same direction transforms into a group of ducklings each moving in different directions.

In Figure 9 one can see another example of one-to-one correspondence, here, between the IIS-model of the mammal's body and the real mammal's body (this figure is a continuation of Figure 6a presented in Section 3.3.4 above).[51] So, the real life turns to be "sensitive" to changes which correspond to changes in the IIS-model of the real life.

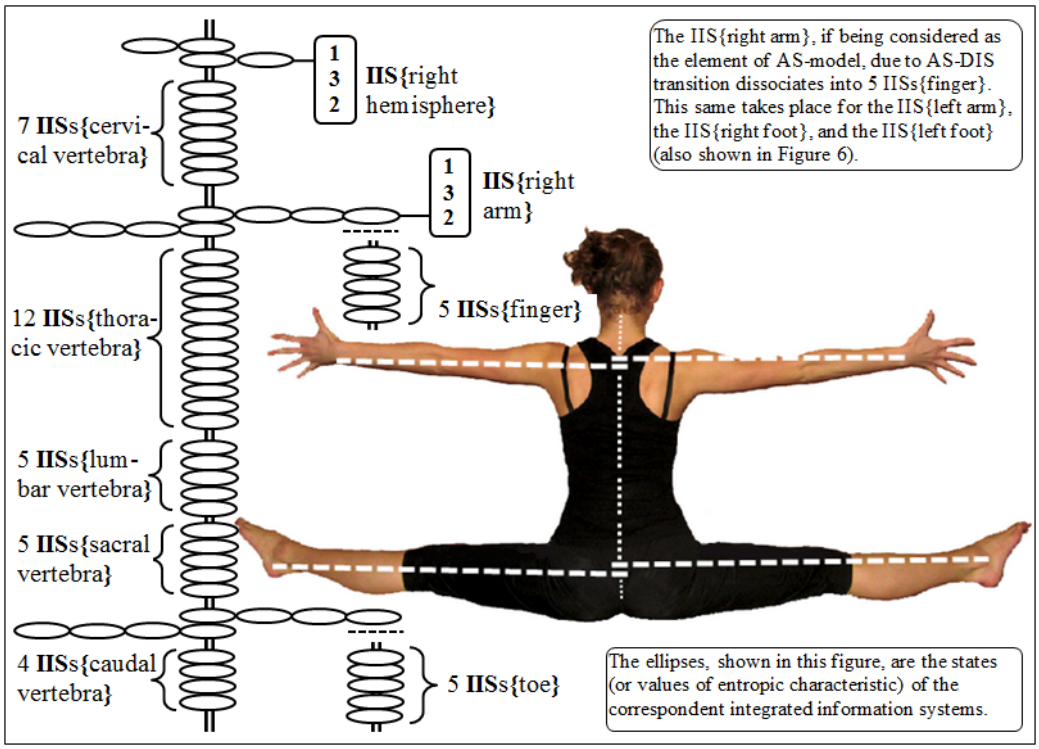

Figure 9. The one-to-one correspondence between the IIS model of the body and the real body.

The one-to-one correspondence between the IIS-model and the modeled object has even more important consequence. As was shown in Section 3.2.5, while thinking, a torrent of thoughts is being formed as a veritas chain of the elements of the same DIS-model, and with IIS{solution to the problem} as the element of AS-model (see Figure 5 above). In case with ducklings we draw the IIS-model on a paper, but the IIS-model of the torrent of thoughts is held in our mind, and the mentioned torrent of thoughts is simultaneously a real torrent of thoughts which is held in our mind too. In other words, the changes we (mentally) produce in the IIS-model of the torrent of thoughts **cause immediate changes** into the real torrent of thoughts.

This all makes me to formulate even a more general supposition: if we (mentally) construct the IIS-model of some real object (or process), then, by producing (mentally) a change to that model, we can, thereby, produce a physical influence upon that real object (or process), and nor the size of the object, nor the distance to it matters here.

It is pertinent to note that the Third basic idea was formulated in obedience to my sixth criterion of approach (see Section 2.5), and testing of its verity requires application of the special system of proofs (see Section 2.7.3). This idea is very important since it dissolves

the traditional borders between *theory* and *practice*, by which I mean that the very process of theorization (or model construction) may produce an immediate and extremely powerful physical influence upon the object of study, despite of the size of the object and distance to it. Moreover, this idea enables me to explain the various anomalous phenomena like poltergeist and many psychokinetic effects.

It is also worth noting that my statement that the IIS-model of Reality is in one-to-one correspondence with Noumenal Reality looks like a paradox from the point of view of the modern science (or, the A-space), since it is generally accepted that no model can possess such a property; however, this statement does not look like a paradox from the point of view of B-space. The case is that the IIS-modeling was designed to formalize the entities which cannot be described in words, imagined, or represented using other kinds of models. In other words, these entities cannot be formalized as (ordinary) information systems consisting with discrete elements, and such are the entities that are the elements of Noumenal Reality, namely, the noumena.

The incognizable entity termed "noumenon" is (or is in one-to-one correspondence with) the IIS{noumenon} as the element of AS-model, that results from DIS-AS transition after the following veritas chain is being constructed: the IIS{phenomenon^1}, the IIS{phenomenon^2}, ..., the IIS{phenomenon^n} as the elements of Phenomenal Reality. In the general case, Reality is in one-to-one correspondence with IIS{Reality} as its special theoretical model. So, having used this theoretical model, we can construct the *non-agnostic* (or all-explaining) conceptual framework, since, according to Postulate of IIS, the IIS{Noumenal Reality} includes everything which pertains to Noumenal Reality.

4.3 Nonstatanalysis and the Gödel second incompleteness theorem

According to Gödel (1986), if a system is consistent, then the sentence which expresses the consistency of the system cannot be proven within this system. Or, in more plain words: the fullness (completeness) of a formal conceptual framework, to be proved, requires there to be some external and more general conceptual framework. Now then, since my meta-theory meets the requirement of having the level-by-level structure (in obedience to the fourth criterion of approach; see Section 2.5), therefore, for my meta-theory, the more general conceptual framework will be *that same* meta-theory but on the *next level* of its evolvement (the phrase "that same" means that it is built using the same three basic ideas).

As was mentioned above, the applied ADC theory treats Nonstatanalysis as its object of study, formalizes it using the method of IIS, and positions the resulting integrated information system as the element of DIS-model. So, the big-but-finite veritas chain can be formed with the following elements: the IIS{Nonstatanalysis^1}, the IIS{Nonstatanalysis^2}, ..., the IIS{Nonstatanalysis^n} (see Figure 10). In this figure, the IIS{Nonstatanalysis^2} is a more general conceptual framework for the IIS{Nonstatanalysis^1} (let me recollect that, in the general case, the IIS{object} is a limit of knowledge about the object on a given stable level **S**).

Now then, for me, to build a General Theory does not mean building the whole skyscraper at once, but just building a lift able to move up and improve itself while moving. In this analogy, the DIS-model (or, the whole veritas chain; see Figure 10) stands for the skyscraper, the IIS{Nonstatanalysis} stands for the lift cabin with three basic ideas as a carcass of that cabin, and the Law of IIS development stands for the engine that makes the lift to move up.

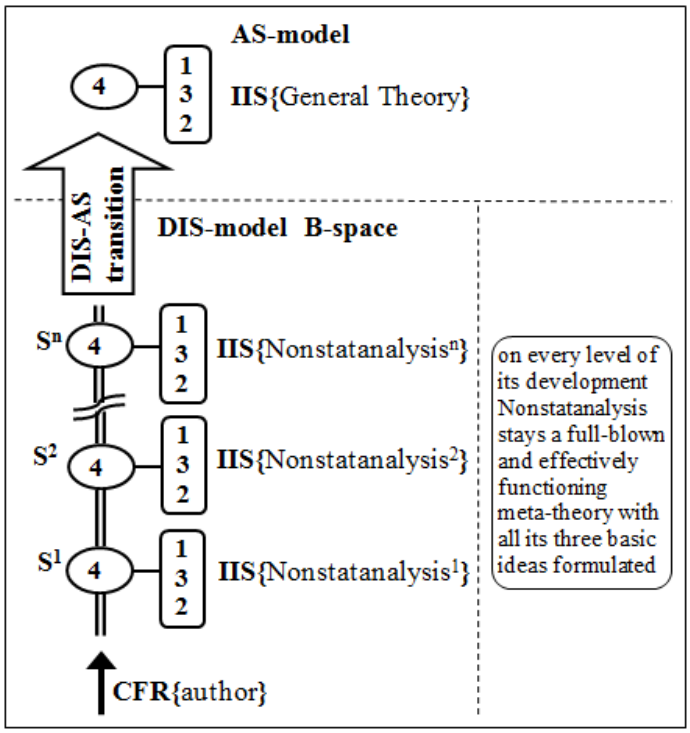

Figure 10. The level-by-level structure of Nonstatanalysis.

So, by formulating the MT-canon (namely, the MT-aim and criteria of approach), I finish the first level of development of my meta-theory, and formalize that level as the IIS{Nonstatanalysis^1}. In doing so, I permit myself to treat the MT-canon as that tiny seed from which the big-but-finite tree of meta-theory grows; here, both a seed and a tree are equally organizationally full on their correspondent levels of evolvement.

Also, having used the applied ADC theory, we can formalize Nonstatanalysis and the meta-theories of other authors as the IIS{Nonstatanalysis}, the IIS{other meta-theory^2}, the IIS{other meta-theory^3}, *etc*., and treat them as the elements of the same DIS-model (see Figure 10; in the figure one would have to replace the IIS{Nonstatanalysis^2} with the IIS{other meta-theory^2}, and so on). Then, if all these meta-theories would obey the universal criteria of formal correctness, the DIS-AS transition could be performed, and we could come to the IIS{Comprehensive General Theory} as an element of AS-model, and achieve a General Theory which would satisfy the highest scientific standards.

4.4 Assessing the perspectives of some other theories of consciousness

Of interest also may be how my approach corresponds with Quantum Theory of Consciousness, and the theory of the neural correlates of consciousness (or, the NCC theory). As a case in point, in public discussion with Stuart Hameroff[52] I suggest agreeing that science is there where we apply a suitable method for studying the phenomenon. Therefore, when trying to account for consciousness within the limits of quantum theory we are not doing science, but just trying to broaden the field of application of quantum theory. However, such a broadening is artificial and violating the criteria of formal correctness (see Section 2.2 above).

Yes, in virtue of its construction, the vacuum cleaner can be used to pick mushrooms, but this device was originally designed to clean carpets. Similarly, the quantum theory was originally designed to calculate probabilities. Moreover, it is positioned as an applied theory being constructed within the conceptual limits of the purely materialistic meta-theory which, as is known, does not regard information as a factor that should necessarily be taken into account when explaining Reality. Thereby, it is only the framework based on the idea of integrated information system (whether this idea is itself good or not) that was originally designed to deal with phenomena which change their entropic states during the experiment due to the changes of both informational, material, and/or energetic factors.

The analysis of the perspectives of the NCC-like theories leads me to the following idea: if we have two enough big systems of elements, and we are going to establish a uniquely determined (or, unambiguously interpreted) correlation between the elements of these systems, then, where at least one undetermined element of either systems does not, in fact, belong to that system, then the uniquely determined correlation between the elements of these two systems is impossible to ever be established.

I refer to that idea as the *Principle of Correlational Unrealizability*. As I suppose, there may be not only one, but, at once, several measured physical events that correlate with processes in the brain which **do not pertain** to functioning of consciousness, and this makes the perspectives of NCC-like theories very phantasmal.[53]

4.5 Nonstatanalysis and Ludwig von Bertalanffy's General System Theory

As emphasized in Section 2.2, to be of a necessary intellectual purity, my approach has not to rest upon, nor to be a continuation of the ideas of others. This is important for not to repeat the (possible) mistakes of others. At the same time, some of my ideas can be found compatible with ideas expressed by other authors at different times. So, it would be demonstrative to investigate Nonstatanalysis for compatibility with Bertalanffy's General System Theory (or GST for short).

For example, the GST states that "...laws and schemes would be of little help if the world (i.e. the totality of observable events) was not such that they could be applied to it" (Bertalanffy, 1950, p.138). This idea is compatible with Second basic idea of Nonstatanalysis (see Section 4.2). Also, the GST holds that "...the whole is more than the

sum of its parts..." (*ibid.*, p.142). This idea is compatible with one of the properties of the elements of DIS-model, namely, that these elements do not possess the property of entropy additivity (see Section 2.7.2).

However, there are also cardinal differences in our approaches. For example, let us try to answer a question what makes a system a system. My view is that the mere calling of something as being a system gives us no insight into how to handle with systems as the objects of study. To study systems, we should apply some objective approach. So, I suggest a method of IIS as a theoretical tool of dealing with entities which, to be studied and explained, necessary require being treated as wholes. According to the Postulate on existence of the integrated information system (see Section 2.7.1), whatever IIS we take, it describes by the same characteristics, possesses the same universal properties, and obeys the same universal law of development.

When applying the method of IIS, I deal not with object as such, but with IIS{object}. Consequently, I consider not a stone and an organism, but their formalizations. I must admit that while there is a difference between a stone and an organism as physical objects, there is no difference between the IIS{stone} and the IIS{organism} in the sense that these two are the integrated information systems that describe by the same characteristics, possess the same properties, and obey the same law. In the result, the application of the method of IIS makes it possible for us to establish *isomorphism* between the phenomena of the different kinds.[54]

Bertalanffy defines system as a complex of interacting elements, while I call a system any existent entity. The case is that, according to existential condition (see Section 2.4), if anything is existent, it must necessary be the result of interrelation of three factors: informational, material, and energetic. In the general case, if there is some existent object, then such an explanatory framework can be always found that would treat that object as a system. In partial case, I define system as anything that can be formalized using the theoretical model of the integrated information system (as an element of some explanatory framework), since the latter, by design, describes by informational, material, and energetic systemic characteristics.

As follows from my approach, the ability of being formalizable as the IIS{object} makes this object a system. As one can see, for me, when talking about systems, it is much more important to suggest in the first place some explanatory framework that would be able to deal with systems as the objects of study. Yes, the GST also holds that all possible systems obey the same principles. Bertalanffy even insists that "[t]here exist ... general system laws which apply to any system of a certain type, irrespective of the particular properties of the system or the elements involved" (*ibid.*, p.138), and in this his idea is compatible with Postulate of IIS mentioned in Section 2.7.1. But, the GST is unable to answer the question what makes a system a system, and to suggest some methodology for establishing isomorphism between the phenomena of the different kinds.

Next. Bertalanffy treats GST as "an important regulative device in science" which serves to control and instigate "the transfer of principles from one field to another" (*ibid.*, p.142), and

which may lead to unification of science by bringing together the existing disciplines. In my view, such is the old paradigm of Interdisciplinary Investigation – a search for a "marriage" between the existing disciplines.

In contrary, what I suggest is a new paradigm of Interdisciplinary Investigation. Namely, I talk about Interdisciplinary Investigations as of a new all-sufficient scientific discipline which has to be concerned with entities formalized as systems. This discipline uses its own specific method of study and applies it to a certain class of the objects of study (see Section 2.1.3 and Section 3.4). This means that I leave the existing disciplines intact, and do not urge them to extend their methods on inappropriate fields of study.

And, a final point. To realize the idea of a marriage between Physics and other disciplines (like Biology, Psychology, Sociology, *etc.*), Bertalanffy suggests that "all seemingly non-physical concepts, for instance specifically biological notions such as 'species', 'organism', 'fertilisation', and so forth, are defined by means of certain perceptible criteria, i.e. qualitative determinations capable of being physicalised. The physical language is therefore the universal language of science" (*ibid.*, p.164). Here, Bertalanffy's idea of physicalization of concepts clearly contradicts the suggested criteria of formal correctness (see Section 2.2, item 2), and will necessary bring about the notion-metaphor transmutations.

As I am deeply convinced, a scientific theory cannot be built with metaphors. On my part, I state that Interdisciplinary Investigations must have a base of original concepts strictly defined according to the universal principles of cognitive sense setting (see Appendix 2).

4.6 On the model of atom and wave-particle dualism

In Section 2.3.6, it was stated that the existence of unlike opportunities was a necessary condition for there to be a freedom of choice, and free will as such. For example, when pondering about the possible model of an atom, a physicist is free to transform the IIS{atom} as an element of AS-model into the elements of DEC-model and treat an atom as decomposable into protons, neutrons, electrons, and other particles. But, there is also an unlike opportunity, namely, to transform the IIS{atom} into the elements of DIS-model and treat the atom as dissociable into other wholes like the IIS{proton}, the IIS{neutron}, the IIS{electron}, the IIS{neutrino}, etc. with formation of the big-but-finite veritas chain.

It should be admitted that the results of the process of cognition will differ considerably depending on which opportunity the physicist chooses. A demonstrative example here would be the interpretation of the results of the famous 1916 year Millikan's experiment on measuring the energy of electrons given off by a metal surface being exposed to light of a certain frequency and intensity. Since the electrons are being knocked out, the physicists make a conclusion that it takes place because the light consists of particles of light called photons, and a photon interacts with an electron as two particles.

The involvement of purely mechanical *particle-particle interaction* when explaining the results of Millikan's experiments has led the physicists to the idea of wave-particle duality of light (and later electrons as well). However, the alternative possibility here would be

considering a *system-system interaction*, and assuming that the system{light} just delivers a certain command to the system{atom}, which, if applying the IIS formalism, means that the IIS{light} alters the informational characteristic of the IIS{atom}.

It is important to point out that the change of informational characteristic of the IIS{atom} does not lead to immediate change of its material characteristic. This is because the energetic characteristic of the IIS{atom} starts to change synchronously with its informational characteristic. If a correlation of informational and energetic characteristics reaches certain values, the rapid change of material characteristic takes place, which means that the IIS{atom} dissociates into two elements: the IIS{atom^{+1}} and the IIS{electron}.

In doing so, the energy of the emitted electron will correspond to the change of energetic characteristic of the IIS{atom}. This is because the inter-system interaction of the elements of the same DIS-model (in our case, the IIS{light} and the IIS{atom}) does not presume energy transfer. I mean that the source of the energy of the electron emitted from the atom resides in the very atom. So, it is not the light that knocks the electrons out of the metal, nor passes its energy to these electrons. Therefore, there is no need for the idea of wave-particle dualism when explaining the results of Millikan's experiments.

4.7 Time as a derivative of information

I hold that the idea of time (or, the concept of time) appears just in the course of gaining information. Information – it is a difference, established by a certain subject of cognitive activity, between what WAS essential for him and what IS essential for him. Since it is "a difference between", therefore I talk about "an increment". For convenience sake, the words "WAS" and "IS" are sometimes substituted by the word "time". Therefore, "time" does not exist as some independent entity. It is purely subjective construct used to substitute for the words "WAS" and "IS". The increment of information depends on time in direct ratio:

$$\boldsymbol{i = st = s(e^2 - e^1)}$$

where symbol $\boldsymbol{i}$ stands for the increment of information; and symbol $\boldsymbol{s}$ stands for some characteristic of subjectivity; symbol $\boldsymbol{e^1}$ stands for the (memorized) element of experience of what WAS essential; symbol $\boldsymbol{e^2}$ stands for the (memorized) element of experience of what IS essential. The difference between these two elements of experience gives us the *experience of time* (or the experience of time flow). In other words, by symbol $\boldsymbol{t}$ I mean exactly the "experience of time", but not just "time" in a sense as it is used in Physics.

Factor $\boldsymbol{s}$ exclusively depends on whether the given subject of cognitive activity takes an interest in what is happening (or, on whether he memorizes "what WAS" and "what IS"). For example, if he takes no interest in football (which means that $\boldsymbol{s = 0}$), the fact that some team has won the match will give him no increment of information:

$$\boldsymbol{i = st;} \text{ if } \boldsymbol{s = 0} \text{ then } \boldsymbol{i = 0}$$

Another example: in case we have not been attending our garden for a month (the factor ***t*** is enough big), we will be impressed by the size of vegetables (the factor ***i*** will be big as well). Here I presume that the factor ***s*** does not equal zero. If ***s* = 0**, this will mean that the state of affairs in our garden is of no our interest, and whatever big the factor ***t*** might be, the factor ***i*** will be equal zero too.

4.8 On the nature of belief systems

I strongly oppose the view that by *belief system* we should necessarily mean a *religious belief system*. I state that a human must or needs to believe to stay a human, and it does not matter what is the object of believing. What matters is the very fact/process of believing. To have such or other belief system (as some meta-theory) is natural for any sentient creature, since it is a natural and inevitable consequence of any cognitive activity. It would be unnatural to urge the belief system disappear. What can be urged is just to replace one belief system by the other.

As a case in point, the belief system (a meta-theory) currently accepted by mainstream science presumes that Reality is purely materialistic and that all the phenomena and processes (including the consciousness-related ones) can/must be explained being based on the laws of Physics. As was mentioned in Section 2.1.1, such a belief system is called "The Modern Materialistic Picture of the World".

In current paper, I hold that to explain Reality in all its complexity (and to make room for consciousness-possessing subjects), we should treat Reality as being simultaneously informational, material, and energetic. So, I have elaborated new belief system (new meta-theory) and suggested using it to replace the existing one. By the way, the new belief system allows us returning back to purely materialistic approach in case we can safely ignore the informational factor of the investigating natural phenomenon, and/or when the state of that phenomenon is not changing considerably during its experimental study.

* * *

There are many other traditional views that can be reassessed within the limits of Nonstatanalysis (see, for example, Patlavskiy, 2005, Section 3.5 for the *Applied Theory of Telekinesis and Teleportation*).

5 More on Canons

5.1 The examples of D-, GS-, and AT-canons

As was mentioned in Section 2.5, the applied ADC theory considers the MT-canon, the AT-canon, the GS-canon, and the D-canon. In the mentioned section the MT-canon, used to construct a certain meta-theory, was exemplified. Let us now consider the rest of canons.

The D-canon
the *D-aim* is to show that a certain, partially taken phenomenon exists which is observable and describable (at least, through comparison with something already known);
the *criteria of approach* presume:

(1) distinguishing one phenomenon from another;
(2) accurate data recording;
(3) using the every-day terminology for naming the results of description;
(4) making use of natural sense organs and simple artificial devices (sticks, *etc*.);

The GS-canon
the *GS-aim* is to show that either some phenomenon is recurrent and changing its features during observation, or the different observable phenomena possess some common features, which makes it possible to classify these phenomena by their features and the methods of observation;
the *criteria of approach* presume:

(1) planning the experiment;
(2) elaboration of the system of classification of receiving data;
(3) creation of the artificial means of cognition, and making use of indirect observations by studying the charts, diagrams and reading the indications of devices;
(4) performing as the series of observations of the naturally appearing phenomena, so the bench-studying with putting the object of study into special conditions;
(5) standardization of the experimental conditions (including devices, specimens, *etc*.) to ensure the reproducibility and reliability of receiving data, thereby realizing the principle of making the other things equal; *etc*.

The AT-canon
the *AT-aim* is to show that:

(1) there is a certain class of directly and indirectly observed phenomena there that obey some common law(s) of their behavior;
(2) the development of all the phenomena that belong to that class can be predicted;

the *criteria of approach* presume:

(1) determination of the field of application of a certain theory;
(2) elaboration of the special terminology in certain research fields;
(3) elaboration of the theoretical base and methodology of investigation of certain narrow classes of phenomena;
(4) considering the reliable experimental and observational results which belong to certain research fields;

(5) solving the problem of adequacy of the theory and Reality; *etc*.

(The suggested canons may be modified and improved). Let us now see how to apply the idea of canons when analysing the intellectual products. For instance, if to take an intellectual product named "Darwinian theory of evolution", it can be seen that it fits the GS-canon only, and this is the second reason why, in Section 3.1.4, I have called it a hypothesis, but not a theory (the first reason was formulated in Section 3.2.10).

Let us now take an intellectual product denominated as *Baroque*. The *aim* may be determined here as a need of making architecture a means of propagating faith in the church and in the state, displaying the power and order of the state, heightening immediacy and sensual delight, *etc*. At the same time, the *criteria of approach* presume:

(1) integrating architecture, painting, and sculpture into decorative ensembles;
(2) being concerned with dramatic and the illusory, vivid colours, hidden light sources, luxurious materials, and elaborate, contrasting surface textures;
(3) being concerned with directionality and movement of space, with dominating the environment, and with positive molding; *etc*.[55]

So, we may treat Baroque already as some canon (say, a canon in Western Art). As one can see, its aim contains general assertions about the role of art in propagating some values, therefore we should treat Baroque as MT-canon. If some sculpture, painting or building, as certain intellectual product, fits that canon, we conclude that its style is Baroque.

In general, most of the pieces of art are the MT-level intellectual products, since their authors express personal belief systems (not necessary religious), personal views upon Reality, and achieve their aims by modifying material substrata (creating sculptures, paintings, musical compositions, poems, *etc*.). Any pottery is an intellectual product too, and the unearthed piece of broken crockery speaks about the presence of some subject of cognitive activity in ancient times.

5.2 On canons formulated by other theorists

Below are given several examples of canons which I managed to elicit from the works of other authors. First is the GS-canon of Dean Radin's intellectual product which may be referred to as "Integrative review, or meta-analysis". It has the following aim and criteria of approach:

the *GS-aim* is to show how a certain effect was performed "... in general across many experiments" (Radin, 1997, p.53);
the *criteria of approach* presume:

(1) to analyze a complete body of experiments;
(2) to take the results of independent studies as the units of analysis;
(3) to combine data from a group of similar experiments; to recast originally reported results into statistics that are amenable to making a grand combination;
(4) "... coding and quantifying the experimental procedures, including factors such as the type of controls, where and when the reports were published, the number

of tests participants, and so on" (*ibid*., pp.53-54);
(5) "... to see if there are any clear patterns among the studies" (*ibid*., p.54);
(6) to "... use all the relevant studies in the analysis rather than just the "good" studies, ..." (*ibid*., p.54, quotes in original);
(7) to take into account the file-drawer problem.

Next. The AT-canon of Henry Stapp's intellectual product, which may be referred to as "Pragmatic Theory of the Mind-Brain", has the following aim and criteria of approach:

the *AT-aim* is to show that such a theory can be constructed which "... provides a rational understanding of how such a mind could be causally enmeshed with brain processes" (Stapp, 1999, p. 160);
the *criteria of approach* presume:
(1) to consider two kinds of data, ".. namely the experience of the subject, as he describes these experiences to himself and his colleagues, and the experiences of the observers of that subject, as they describe their experiences to themselves and their colleagues"(*ibid*.);
(2) ".. never consider the question of non-human minds..."(*ibid*.);
(3) to ".. provide a satisfactory basis for a rational science of the human mind-brain"(ibid.);
(4) to encompass the ".. reduction events not associated with human knowings" (*ibid*.);
(5) to allow human's "... thoughts to be causally efficacious yet not controlled by local-mechanistic laws combined with random chance" (*ibid*.).

And, finally, the MT-canon of Evan Harris Walker's intellectual product, which may be referred to as "Quantum-mechanics Theory of Consciousness", has the following aim and criteria of approach:

the *MT-aim* is to show that
(1) "… there must exist a supreme Consciousness out of which everything else springs" (Walker, 2000, p. 334);
(2) "… the equations of quantum mechanics will describe all the patterns in nature" (*ibid.,* p. 68);
(3) "Consciousness is real and nonphysical" (*ibid.,* p. 182);
(4) "Physical reality is connected to consciousness by means of a single physically fundamental quality" (*ibid.,* p. 183);
(5) "… the consciousness of the observer exists as a legitimate subject for scientific scrutiny…" (*ibid.,* p. 178);
the *criteria of approach* include:
(1) [determination of some canon]: "Whatever remains, however impossible, must be the truth" (*ibid.,* p. 194);
(2) [formation of the base of notions]: "… consciousness ... must be included in … its own terms" (*ibid.,* p. 176);
(3) [elaboration of a theoretical base]: a) to formulate a postulate about consciousness to "…have a foothold" (*ibid.,* p. 186); b) "…we must eliminate the impossible" (*ibid.*);

(4) "…[to] find out what the basic pieces of matter are…" , "…enumerate the basic pieces of matter,..", "…write down the forces acting on [the basic pieces of nature]" (*ibid.,* p. 68);
(5) "Find the connection between consciousness and the rest of our body of scientific knowledge" (*ibid.,* p. 183);
(6) "…to look into the machinery of the key component of the brain computer;.." (*ibid.,* p. 194);
(7) "We have examined the world, the physics of particles, the nature of mind and will, and the things that tie it all together" (*ibid.,* p. 329);
(8) to create "larger conception of nature that embraces consciousness" (*ibid.,* p. 180).

From the above one can readily see that every theorist, as a subject of cognitive activity, formulates own aim and criteria of approach. From this follows that both the aim and criteria of approach are **subjective**. I must admit that the problem of subjectivity can be solved, however, for the aim and for the criteria of approach that problem will have different solutions.

5.3 On the ways of making the canon objective

So, the *problem of subjectivity of the aim* (this aim we formulate when constructing the explanatory framework) can be solved if there were sufficient number of phenomena that could be explained using that explanatory framework. However, to solve the *problem of subjectivity of the criteria of approach*, we have to compare (or, investigate for compatibility) the criteria of approach formulated by different theorists (see Appendix 1, Assertions 27 and 36).

As a case in point, one may look at the first three criteria of approach formulated by Evan Harris Walker and ascertain that they are compatible with my own criteria of approach (formulated in Section 2.5). In that case, my correspondent criteria are given in square brackets right before Walker's criteria. These criteria are compatible in a sense that, first, they are present, and, second, that they are provided by their author in such a sequence. So, for establishing the fact of compatibility, it is the *presence and sequence* of the criteria of approach that is important, but not the concrete formulations of these criteria.

Similarly, the investigation for compatibility through analyzing the aims and criteria of approach formulated by different artists when creating their paintings as some intellectual products enables them to conclude that their canons are compatible and constitute a comprehensive canon which they call, say, *impressionism*, allowing that the depicting scenes of their paintings may differ much.

In general case, the applied ADC theory states that if we know the canon, we may **predict** how the constructing intellectual product will look like. So, the MT-canon is like a biometric passport, and if there is no such a passport, there can be no General Theory as some MT-level intellectual product.

6 Basic conclusions

6.1 On the problem of construction

In the course of a long search for a scientifically correct theory of consciousness I finally recognized that it is not possible to construct such an explanatory framework that would explain consciousness only. In real, the only possible way is to construct an explanatory framework that would be common simultaneously as for consciousness (being understood as natural ability to transform physical signals into information), so for matter, and energy.[56]

However, the realization of this idea, in its turn, is possible only if we construct that explanatory framework within the epistemological limits of some new meta-theory which would treat informational, material, and energetic factors as equally legitimate and important.[57] So, we receive a possibility of explaining consciousness necessarily together with a possibility of explaining Reality in all its complexity, whether we like it or not. It is as if we are allowed to buy and possess the given make of a car only when we simultaneously buy a whole plant that produces all possible cars.

Now then, in the paper, I have discussed the most important moments which have to be taken into account when constructing a General Theory as an MT-level intellectual product. Among them is a need to form a base of notions, to develop a theoretical base (including the method of study, the effective modelling, and system of proofs), and to solve other important problems.[58]

Also, I pointed out the need to legitimize the very talking about theories and meta-theories (this was not done for the last 350 years of the modern period of development of science). With this end in view I have constructed the applied ADC theory which, by design, is able to take any intellectual product as its object of study. The existence of such a theory enables me to say that studying consciousness, first of all, presumes studying the intellectual products created by consciousness. Here, I also presume that the principles of construction of intellectual products and relations between them reflect (if not to say are identical with) the principles which are at the basis of the mechanisms of consciousness.

The next important moment when constructing a General Theory is realization of its level-by-level structuring. For example, as described in Section 2.1, the applied ADC theory was on its initial level; as presented in Section 2.5 (namely, when I talk about the MT-canon), this theory is on its second level; as presented in Section 4.3 (when the DIS-model is used to formalize the meta-theories; see Figure 10), the applied ADC theory already is on its third level. In Section 5.1, when considering other kinds of canons, I bring the applied ADC theory to a new level again, and only in Appendix 1 it can be seen in full.

At the same time, the applied theory of the origin of life and consciousness, the applied theory of consciousness, and the applied theory of evolution of the complex self-organizing systems (see Section 3) are presented only on their initial levels. The same is done with B-space's theoretical base: the law of IIS development is formulated on its initial or

introductory level, whereas the properties of the integrated information system (as well as the cognitive paradoxes) were only mentioned.

However, the most important moment when constructing a General Theory is a requirement that for a conceptual framework to be able to explain the phenomena which exhibit FT-relations (such as, for example, consciousness-related phenomena), this framework itself has to be constructed using the FT-relations. From this it is inferred that where somebody presents a theory of consciousness, which, as it then turns out, is not built on the FT-relations, then that theory **would be not** a theory of consciousness. The case is that whatever a theory of consciousness might be, it, by default, must take consciousness as its object of study. But, as was shown in Section 3.2.2, when we try to formalize consciousness as an object of study, the relation of functional tautology necessarily emerges.

6.2 On the problem of assessment

In my paper I have also attracted attention to the problem of the quality of intellectual products. Let us now touch the question of how to assess the quality of intellectual activity in practice. In Section 2.2, I have suggested several requirements that, as I believe, any scientific paper must obey. So, the editors of scientific journals may use the suggested criteria of formal correctness as supplemental guideline in deciding on acceptation or rejection of the submitted manuscripts that express complex and innovative ideas.[59]

Obeying the requirements of the criteria of formal correctness is especially important for the papers on experimental and theoretical research works conducted in the complex domains with their comprehensive paradigms not established yet. Moreover, when assessing such papers, I suggest counting not only the number of citations, but the *number of commentaries* on these papers. To the point, for an author who presents certain new ideas, it is always better to be criticized than ignored, as the feedback he receives helps improving his ideas. But, the fact is that the great deal of articles published in the peer-reviewed journals remains totally ignored by the commentators. Moreover, only a small number of authors are themselves interested in public discussion of their papers after publication.[60]

As to my current paper, I quite realize that it may become a true disillusionment for those readers who believe that there can be simple answers to simply put questions (like "What is consciousness?"). I state that the baffling complexity of conceptual framework required to explain the complex phenomena is that factor because of which these phenomena stayed so long out of reach of objective science.

I also hold that the mere fact of possessing consciousness is not sufficient for constructing personal version of the theory of consciousness, or even for understanding the theory of consciousness constructed by other theorist. I mean that the conceptual framework presented in current paper, even to be read and understood, requires a reader to exert serious mental efforts, to have personal experience of the discussed complex phenomena

(see, for example, the experiment, described in Section 3.2.6 on calculating the longevity of veritas chain), and to be able to learn and imbibe new knowledge.[61]

6.3 On the problem of presentation

From a theory-engineering point of view, a paper, which deals with wholes as complex systems, should itself be composed as something whole – like an organism. This means that any attempt to abridge this paper would immediately cause the loss of its consistency (as well as cutting an organism into pieces would cause its death), and this factor makes its publication in a scientific journal with limited space very problematic.

Here, being "something whole" means that the paper will preserve its consistency only in case it is presented as a system which includes all the necessary elements (see an example of a system considered in Note 19). "To be parted" means that the elements of the paper are treated as the elements of DEC-model. For example, the applied ADC theory as an element of this paper, being published apart, will lose its consistency forthwith, since there would be no possibility to show its role in establishing the FT-relation, which, in its tern, becomes understandable only when we consider the applied theory of consciousness (see Section 3.2.2).[62] Moreover, for the term "applied" to be understandable, the applied theory should be considered together with fundamentals of its parental meta-theory.

In the general case, whatever presentation is suggested, for it to be understood, it must be whole and consistent. Yes, the basic ideas required to be listed when presenting a General Theory, being the first in a row of the whole and consistent presentations, may require some five to seven journal pages. The second in a row of the whole and consistent presentations (as the current one that includes the necessary minimum of applied theories) requires up to seventy pages. But the next one whole and consistent presentation (which would include the unfolded theoretical base, all the necessary figures and diagrams, together with all the applied theories) would require from five to seven hundreds of pages.

Such a power dependent increase of volume is objective, and presents a serious problem in itself. Say, if a journal requires the size of the manuscripts should not exceed 20 pages, then the seven-page presentation would be three times less than the required size, while the seventy-page one would exceed it considerably.

It is also important to note that the problems of construction of meta-theories and applied theories are being discussed here: <http://tech.groups.yahoo.com/group/general_theory>. Therefore, a reader, by participating in this online forum, can ask any question, and even suggest for discuss own alternative solutions.

7 Nonstatanalysis and Philosophy (by way of epilogue)

In Section 3.2.2, when formulating a definition of consciousness, I indicated that consciousness is used to construct intellectual products of all possible levels, forms and types. So, let us now consider the main *types of intellectual products*. These types will depend on *cognitive conditions* which, in their turn, depend on which characteristic(s) of the IIS{Reality} we take or not take into account. So, if during the process of cognition we:

(1) take into account only the informational characteristic of the IIS{Reality}, we arrive at *idealism* as a fixed form of monism (*e.g.*, everything is an idea);
(2) take into account only the material characteristic of the IIS{Reality}, we arrive at *materialism* as a fixed form of monism (*e.g.*, everything is matter);
(3) take into account only the energetic characteristic of the IIS{Reality}, we arrive at *energetism* as a fixed form of monism (*e.g.*, everything is energy);
(4) take into account the informational and material characteristics of the IIS{Reality}, we arrive at *dualism*;
(5) take into account the material and energetic characteristics of the IIS{Reality}, we arrive at *positivism*;
(6) take into account the informational and energetic characteristics of the IIS{Reality}, we arrive at *mysticism*;
(7) take into account the arbitrary set of three systemic characteristics of the IIS{Reality}, we arrive at an *arbitrary trialism* (for example, this takes place when we have assembled a system according to our subjective understanding, but it is still nor workable);
(8) take into account the expedient set of three systemic characteristics of the IIS{Reality}, we arrive at an *expedient trialism* (this takes place when we deal with one workable whole system, but do not take into account its entropic characteristic which is responsible for the evolvement of a system);
(9) take into account only the entropic characteristic of the IIS{Reality} (correspondingly, its three systemic characteristics stay implicit, and out of our immediate interest), we arrive at *informationism* as a developing form of monism (it is called "monism" because we consider only one explicit characteristic – the entropic characteristic; it is called "developing" because this system starts obeying the Law of IIS development).[63]

This list may be continued in such a way:

(2a) materialism begets *determinism*, materialistic *reductionism*, *etc*.;
(4a) dualism begets psycho-physiological *parallelism*, psycho-physical *interactionism*, reductive *physicalism*, *emergentism*, Walker's *dualistic idealism* (in Walker, 2000, on p. 309 we read: "…reality is the observer observing. …Our observation creates matter…"), *etc*.;
(7a) arbitrary trialism begets Popper&Eccles' (1974) *trialistic interactionism*, *etc*.

As to my informationism as a developing form of monism, I cannot help but quote Radin's (1997) prophetic idea that "... a new "complementary monism" may evolve. This would

allow mind and matter to arise out of a common ground, enjoy intimate interactions with each other, and retain a certain autonomy as well" (Radin, 1997, p. 291, quotes in original).

As I have just shown, Nonstatanalysis hosts all possible types of intellectual products, and its applied ADC theory allows us **to predict** which type of intellectual products will be created under the certain cognitive conditions. So, unlike Philosophy which is obsessed with personalities, Nonstatanalysis is concerned about the natural reasons why a person is able to construct the intellectual products of different types and levels. Therefore, with possible acceptance of Nonstatanalysis and its applied ADC theory as the elements of a new scientific paradigm, the position of traditional Philosophy may become shaky.

The case is that when constructing a meta-theory, I have formulated all the necessary assertions concerning Reality, life, and consciousness. For centuries, the problem of constructing a meta-theory was a sacred and exclusive domain of Philosophy; however, as I have tried to show in this paper, the meta-theory in whole can be constructed by applying objective principles as well. In other words, the task of constructing a General Theory, traditionally being an object of opaque philosophical cogitations, transforms now into the object of a strict scientific analysis. Therefore, the conflict of interests between Nonstatanalysis and Philosophy objectively emerges, and only time will put everything it its proper place.

Appendix 1

The applied ADC theory consists of thirty eight assertions organized into three parts: on appearance, on development, and on compatibility of intellectual products.

PART 1: APPEARANCE

1. Reality is such that makes cognitive activity possible.
2. The feature of Reality that makes cognitive activity possible is its cleavability into Noumenal Reality and Phenomenal Reality.
3. The process of splitting Reality into Noumenal and Phenomenal exists, and is called the *process of cognition*.
4. The *scheme* of the process of cognition includes as the *elements* of Noumenal Reality, so the elements of Phenomenal Reality.
5. All the elements of the scheme of the process of cognition are in mutual *relation.*
6. The relation of the given element with another element is its *sense* in reference to that other element; the element of the scheme of the process of cognition has no sense beyond that scheme.
7. Every element of the scheme of the process of cognition occupies its correspondent *place* in that scheme, and its place predetermines the *role* the element plays during the process of cognition.
8. The process of cognition presumes moving from previous element to subsequent element of the scheme of the process of cognition, so that these elements *alternate each other in a circular manner*.

9. If there is some functioning process, and for it to be functioning, all its elements have to alternate each other in a circular manner, then whatever element of that process we take, it can be defined as having its sense only as an element of that process, and *requires no more definition*.
10. The element of the scheme of the process of cognition exists for which the splitting of Reality into Noumenal and Phenomenal makes sense, and is called the *subject of cognition*.
11. During the process of cognition, the subject of cognition enframes some cognitively independent entity as an element of Noumenal Reality, ascribes certain properties to it, thereby transforming it into the *object of cognition* as an element of Phenomenal Reality.
12. The *means of cognition* exists, which, as the element of the scheme of the process of cognition, has its sense as a mediator between the subject of cognition and the object of cognition, and requires no more definition.
13. The *intellectual product* exists, which, as the element of the scheme of the process of cognition, has its sense by following the subject of cognition and preceding the means of cognition, and requires no more definition.
14. The *interface* between Phenomenal Reality and Noumenal Reality exists, which, as the element of the scheme of the process of cognition, has its sense by following the means of cognition and preceding Noumenal Reality, and requires no more definition.
15. The *physical (sensory) signal* exists, which, as the element of the scheme of the process of cognition, has its sense by following the means of cognition and preceding the subject of cognition, and requires no more definition.
16. The subject of cognition constructs an intellectual product with the *aim* of influencing the interface between Phenomenal Reality and Noumenal Reality through the means of cognition and receiving the objects of cognition in the form of *reflected phenomena of Reality* as the elements of Phenomenal Reality.
17. When constructing any intellectual product, the subject of cognition constrains itself by a certain *approach* which consists of the aim and also by certain *criteria of approach*; the criteria of approach are the set of consecutive steps that have to be performed to achieve the formulated aim.
18. All assertions, as the intellectual products, that correspond to the given aim and the given criteria of approach are *expedient*, and form the field of expedient assertions, or the *field of expediency*; in that, both the aim and criteria of approach are the *limits* of the field of expediency, or constitute a *canon*.
19. If the aim and the criteria of approach that constitute the given canon, *correspond to each other*, then the resulting intellectual product will be *rational*; if the aim and criteria of approach, that constitute the given canon, *do not correspond to each other*, then the resulting intellectual product will be *irrational*.

PART 2: DEVELOPMENT

20. The four distinct levels of intellectual products exist which are called:
    (1) the level of description (the D-level);
    (2) the level of generalization and systematization (the GS-level);
    (3) the level of applied theory (the AT-level);

(4) the level of meta-theory (the MT-level).

21. The *D-canon*, the *GS-canon*, the *AT-canon* and the *MT-canon* exist as being correspondent to the four levels of intellectual products; consequently, there are the *D-aim*, the *GS-aim*, the *AT-aim*, and the *MT-aim* as the elements of the correspondent canons.
22. The level of intellectual product can be determined objectively by examining the aim and criteria of approach formulated when constructing the intellectual product; if the aim and criteria of approach constitute the D-canon, then the resulting intellectual product will be of the D-level; if the aim and criteria of approach constitute the GS-canon, then the resulting intellectual product will be of the GS-level; if the aim and criteria of approach constitute the AT-canon, then the resulting intellectual product will be of the AT-level; if the aim and criteria of approach constitute the MT-canon, then the resulting intellectual product will be of the MT-level.
23. Of whatever level the given intellectual product might be, there is always such a *completed group* of intellectual products that the given intellectual product is an element of that group; for a group of intellectual products to be called completed, it must consist of the intellectual products of all four levels, and such that correspond to each other.
24. No AT-level intellectual product can have simultaneously two (or several) different correspondent MT-level intellectual products.
25. Every MT-level intellectual product can have simultaneously two (or several) different AT-level intellectual products constructed within its limits.
26. An ensemble (or, a set) of the AT-level intellectual products, constructed within the limits of the same MT-level intellectual product, constitutes a *discipline*.
27. The MT-level intellectual product, being a subjective construct of a certain subject of cognition, is true to the extent that the AT-level intellectual products constructed within its limits are true; the greater the number of such AT-level intellectual products is true (or, the more phenomena become explained), the greater will be the extent of solving the *problem of subjectivity of the MT-aim*.
28. If the MT-level intellectual product consists of assertions that all fit its MT-canon, and if both the problem of subjectivity of the aim and the problem of subjectivity of the criteria of approach (see Assertion 36 below) that constitute that canon are solved, then every assertion of the given MT-level intellectual product is true, and *requires no proofs*.
29. When the AT-level intellectual product and the MT-level intellectual product are the elements of the same completed group of intellectual products, and the AT-level intellectual product is used to formalize the MT-level intellectual product, then such intellectual products are in the *relation of functional tautology*.
30. Whatever subject of cognitive activity we take, it constructs the intellectual products of all four levels on a periodic basis; for instance, a person constructs preferably the D-, GS-, and AT-level intellectual products on weekdays, and the MT-level intellectual products on weekends (say, when taking part in ritual actions), or when celebrating various season festivals, birthdays, *etc*.
31. Whatever subject of cognitive activity we take, it constructs preferably:
    (1) the D-level intellectual products in its infancy;
    (2) the GS-level intellectual products in its pre-puberty period;

(3) the AT-level intellectual products in its adulthood; and
(4) the MT-level intellectual products in its gerontic period.

32. Whatever society of the subjects of cognitive activity we take, it necessary splits into the members who construct preferably the D-level intellectual products, who construct preferably the GS-level intellectual products, who construct preferably the AT-level intellectual products, and who construct preferably the MT-level intellectual products; this predisposes the role the given member plays in a given society.

PART 3: COMPATIBILITY

33. The MT-level intellectual product of one author (as a subject of cognition) cannot be criticized, nor disproved from the standpoint of the MT-level intellectual product of another author.
34. The MT-level intellectual product constructed by one author can only be investigated for compatibility with MT-level intellectual product constructed by another author; the *investigation for compatibility* presumes comparing the canons formulated by these authors when constructing their intellectual products.
35. If two (or several) authors have constructed their intellectual products (*e.g.*, the theories of consciousness, *etc*.) by formulating compatible canons, then all these theories will be compatible despite of the fact that their authors might have used the unlike structural elements of their theories (*e.g.*, the unlike terminology and definitions, the unlike methods, systems of proofs, ways of empirical verification, *etc*.).
36. The greater the number of authors of the MT-level intellectual products whose criteria of approach are compatible will be there, the greater will be the extent of solving the *problem of subjectivity of the criteria of approach*.
37. All the MT-level intellectual products of different authors are mutually compatible if the problems of subjectivity of their MT-aims (see Assertion 27) and the problems of subjectivity of their criteria of approach (see Assertion 36) are solved.
38. All the mutually compatible MT-level intellectual products of different authors form a chain that, being sufficiently large, may result in the *comprehensive MT-level intellectual product*.

Appendix 2

At this writing, I consider twelve principles of cognitive sense setting:

1. **New content:** we use the existing term, define it anew (this means that we suggest a specific understanding of some denotatum), and, in the result, receive new concept.
2. **Enframing:** we enframe two (or more) terms, and treat them as standing for a single concept; *e.g.*, the terms <very>, <big>, <but>, <necessarily>, and <finite> are treated as a single term <very big but necessarily finite> (or, <big-but-finite>) that stands for a new concept denoting some specific quantity (from here on, I will use angle brackets to enframe one or more terms).
3. **Definition of the element of the model:** if there is a functioning process, and for it, to be functioning, all its elements alternate each other in a circular manner, then whatever

element of that process we take, it defines as having its sense only as an element of that process (see Assertion 9 in Appendix 1).

4. **Analogy:** a concept from one scientific (and not scientific) field is used in another scientific field; *e.g.*, the concept <power of imagination> used in Psychology defines by analogy with the concept <power> used in Physics.
5. **Opposition:** a new concept acquires its sense in opposition to the sense of some existing concept; *e.g.*, a new concept <enframing> introduces by opposition to the existing concept <collapse>.
6. **Association:** in case the two (or more) existing concepts denote objects which are in certain interaction, then the result of such an interaction can be a new concept; *e.g.*, the interaction of the objects denoted as the existing concepts like <man>, <woman>, and <child> creates the object which denotes as a new concept <family>.
7. **Dissociation:** the existing concept remains intact, but the dissociated elements are not in mutual antagonism; *e.g.*, the existing concept <epistemology> remains intact, but the new three concepts appear to denote the new three dissociated elements, here the <A-type of cognitive space>, the <B-type of cognitive space>, and the <algorithms of inter-spatial transition>; also, the concept <NaCl> dissociates into concepts <ion Na^+ >, and <ion Cl^- >; it is important to indicate that the new dissociated concepts can associate back into the initial concept, likewise the Whole, being dissociated into other Wholes, can restore its initial wholeness.
8. **Decomposition:** the existing concept disappears, but the decomposed elements are in mutual antagonism; *e.g.*, the initial concept <apple> disappears after the object is decomposed into two parts denoted as new concepts <first half-apple> and <second half-apple>; if we put the two half-apples together, this will never give us the apple as it was initially; other examples: the concept <Soviet Union> decomposes into the new concepts like <Ukraine>, <Russia>, <Georgia>, *etc*.; also, the concept <Hindustan> decomposes into new concepts like <India> and <Pakistan>; in both examples, the new concepts are in antagonism one with another; also, the initial concept disappears since the entity it denotes cannot be restored by mechanically putting together the entities that appeared in the result of decomposition of the initial entity.
9. **Transformation of concepts at interspatial transitions:** *e.g.***,** the existing concept <physical frame of reference (PFR)> transforms into new concept <cognitive frame of reference (CFR)> in the result of DEC-DIS transition.
10. **Definition of the phenomenon:** the observed phenomenon requires being somehow defined; *e.g.*, the concept <sunrise> stands for the commonly observed physical phenomenon of the rising of the sun; here, the phenomenon is primary, and the new concept is secondary, which means that the existence of the phenomenon does not depend on how it is defined.
11. **Definition of the group of phenomena:** the new concept stands for the different phenomena which possess common features; *e.g.*, the new concept <R-fact> stands for all the phenomena that are reliable, well documented, but unexplainable.
12. **Definition of the phenomenological process:** the observable phenomenological process (*i.e.*, a process when the phenomenon changes, or succeeds by other phenomena during observation) requires being somehow denoted; here, the phenomenological process is primary, and the new concept is secondary; *e.g.*, a concept <torrent of thoughts> stands for some phenomenological process.

Appendix 3

In total, I consider seven cognitive paradoxes. By the A-space assertions I mean the ones that follow from the current theoretical base and means of cognition. The B-space assertions belong to the newly constructed theoretical base and means of cognition, required for explaining the complex phenomena and processes, including the consciousness-related ones.

First Cognitive Paradox:
the A-space assertion: to cognize (study, investigate) the object, it must be divided into constituent parts;
the B-space assertion: the cognitively independent entity (which after enframing transforms into the object of cognition) cannot be divided into parts; it is the subject-object complex (consisting of the subject of cognitive activity and the object of cognition) that should be considered as existing in discrete states.

Hereinafter, the B-space assertion looks like a paradox from the point of view of the A-space.

Second Cognitive Paradox:
the A-space assertion: the subject's knowledge of Reality is limited; other variants: every object has its place; "who was born to creep cannot fly";
the B-space assertion: the subject of cognition can get any possible knowledge (information) about Reality within his cognitive frame of reference (CFR).

This takes place because the IIS{subject of cognition} can evolve, acquiring any allowed values of its entropic characteristic. Other variants: there is no such information which the subject of cognition could not receive; or "every baker can become a king"; etc.

Third Cognitive Paradox:
the A-space assertion: quot homines, tot sententiae (Lat.: how many people, so many thoughts); other variants: my thought is my thought, your thought is your thought; our thoughts are incompatible; thoughts differ; etc.;
the B-space assertion: if one subject of cognition creates his intellectual product in his own cognitive frame of reference (say, CFR-1), and the second (third, and so on) subject of cognition creates his intellectual product in his own cognitive frame of reference (say, CFR-2), then there is always such a universal CFR which is compatible with both the CFR-1 and the CFR-2.

Alternative formulation: all thoughts are compatible. One more example: such a cognitive frame of reference can be always found so that any possible set of notes (sounds) will be regarded as a beautiful (talented, outstanding, etc.) musical composition from the point of view of that GFR.

Forth Cognitive Paradox:
the A-space assertion: any pre-planned action may be realized (having enough time and resources); or, there are no objective reasons for any pre-planned actions to be not realized;
the B-space assertion: for the pre-planned action to be realized, the expediency of such an action must be formulated.

The A-space assertion means that when we need to solve a certain problem that requires making a transition from our higher to lower entropic states, then it is impossible to formulate such a problem (which, to be solved, requires making such a transition) in such a way that, after making a transition, the other problems (which were not pre-planned) would not be solved. For example, we can solve the problem of paying $100 of debt by getting the lucky lottery numbers after going into some altered state of our consciousness. But, having got the lucky lottery numbers we would be able not only to pay $100 of our debt, but also to buy a new flat, a new car, and solve many other problems which we did not even plan to solve before.

The B-space assertion means that there can be such a problem that solves without concomitant solving the other problems when making a transition from the state with higher to the state with lower entropy values. As an example of such a problem is the one being solved by Nature when creating the living form of matter from inanimate form(s) of matter.

Here, we can also formulate a *methodological rule* for making the inter-state transitions: to make a transition from the entropy state S_1 to S_2, the equation of expediency must be solved for the fourth cognitive paradox, so that the state S_2 were a solution of that equation (for equation of expediency see Section 2.4).

Fifth Cognitive Paradox:
the A-space assertion: the more knowledge (information) we have, the better; we are free to acquire any amount and kind of information;
the B-space assertion: having made the transition from the entropy state S_1 to the entropy state S_2 (or to a state with lower entropy value), one is only permitted to take the expedient information.

Another variant: while being in the entropy state S_1, and, on condition that to acquire some information we must make a transition to entropy state S_2, we should not plan to acquire some information from the entropy state S_2 until we actually reach that state. After achieving that state we will see what information we can take, and which one to leave intact. For example: we cannot plan to investigate a certain island's volcano if the problem of reaching that island was not previously solved (or, cannot be solved in principle). In other words, the Fifth cognitive paradox puts restraining conditions on the process of cognition.

Sixth Cognitive Paradox:
the A-space assertion: the theoretical base developed to account for physical phenomena and processes cannot be used in other scientific fields;
the B-space assertion: in case the theoretical base of the process of cognition has been constructed using the Postulate of IIS, then such a theoretical base can be used in any possible field of study.

This paradox means that, for example, when constructing the Applied Theory of Deceases we face some intractable difficulties, we are free to apply solutions found during the construction of, say, the Applied Theory of Consciousness. Such an exchange of solutions would be correct methodological action because to construct those applied theories we use the same B-space's theoretical base (or construct these applied theories within the limits of the same meta-theory). The Sixth cognitive paradox also means that application of the B-space's theoretical base may further the development of the existing disciplines (like Physics), and may help to account for certain complex physical phenomena and processes.

Seventh Cognitive Paradox:
the A-space assertion: any thought (intellectual product) has its localization as in place, so in time; every idea (whatever it seems comprehensive) was once issued by the concrete author;
the B-space assertion: every intellectual product was preceded by the former history of development of the intellectual activity, and this product will have an influence upon its further development.

Alternative formulation: whatever two intellectual products constructed by the different authors in different times we take, such a cognitive frame of reference can be always found so that these two intellectual products were mutually compatible. According to the Applied ADC Theory, the veritas chain of the mutually compatible MT-level intellectual products may be formed, and, consequently, the problem of subjectivity of the criteria of approach may be solved.

Acknowledgements

The author is greatly indebted to Boris Artemenko, Jonathan Edwards, Chris Clarke, Charles Whitehead, John Mikes, Chris Nunn, Imants Barušs, Stephen Goldberg, Zvi Lothane, Glenn Wood, Joseph McCard, Randi Gerl, Robert Bainbridge, Philip Benjamin, Jelke Wispelwey, Steve Jarosek, Christopher Holvenstot, Fred Abraham, Robert Karl Stonjek, Roland Cichowski, Dean Radin, Richard Wilson, and to many others for helpful discussion of the ideas presented in this paper. A special gratitude should be also directed to my friends' daughter Solomiya for her gymnastic skills and kind assistance when preparing Figure 9.

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Notes

1. By *enframing* I mean a cognitive act of isolating, selecting, choosing, singling out, or inclosing within an imaginary frame or sphere some entity (or a collection of entities) as an object(s) of our interest; by *imaginary frame* or *sphere* I mean the limits of some theoretical model, as will be discussed below.
2. The question of an appropriate epistemology for consciousness research has also been explored earlier by other scholars too; see for example (Harman, 1994) for a synthesis of such explorations.
3. The term *meta-theory* is used here to denote the intellectual products of the fourth level. It should not be confused with the term *metatheory* (without a hyphen) used by the German mathematician David Hilbert to denote a theory that studies mathematics and mathematical proofs, and which is now commonly understood as denoting a theory the subject matter of which is another theory. In my case, a theory the subject matter of which is another theory is the applied ADC theory. So, Hilbert's *metatheory* corresponds with my applied ADC theory – they both are the AT-level intellectual products, whereas my *meta-theory* stands for a conceptual (or epistemological) framework used to construct applied theories. So, it is the MT-level intellectual product.
4. Any applied theory, to be scientific, must, first of all, occupy its proper place among other intellectual products, and be linked with them. Its localization gives us the most basic understanding of what it should look like, and what it should do. As Coward and Sun (2007) insist, "[a] scientific theory of consciousness must be based on an understanding of what a scientific theory should be like and what it actually delivers." (Coward and Sun, 2007, p. 953).
5. Forth criterion talks about the formal correctness of a definition, but not about its being an objective (absolute) truth. Consider the following two definitions. First definition: "Camel is a fish frequently met in southern seas"; second definition: "Camel is a large ruminating hoofed mammal frequently met in arid regions of Africa and Asia". Since we know what is *fish*, *south*, *sea*, *mammal*, *arid*, *Africa*, etc., therefore both definitions are formally correct (here, the unknown defines through the known). However, only the second definition is true. A formal non-self-contradiction (seventh criterion) means that, say, in case the author defines *camel* as a kind of fish, then he must refer to camel as some fish throughout his whole paper, and this has to be praised despite of the fact that others may have unlike definitions of that physical object. Also, one author's statement should not contradict other his statement(s), and this has to be praised despite the others may dislike these statements.
6. Such a requirement (coupled with the one discussed further) eliminates the need to solve a problem of the degree of certitude concerning the introspective data. As Barušs (2001) indicates: "[w]ith no one to scrutinize a researcher's inner investigations, the soundness of here results rests on her integrity as an investigator. Indeed, the certitude of knowledge obtained by someone for whom certain events have occurred is likely to be different from that of someone for whom the same events have not occurred" (Barušs, 2001, p. 62).
7. Since my approach makes use of enough complex graphic modeling which is too big to be presented here, therefore, from hereon, while stating my ideas, I will refer to some important figures, diagrams and tables available in my previous publication; that paper was published more than a decade ago, so some formulations and notations may differ from the ones used in current paper.
8. When developing a worldview as an alternative to reductionism, Gershenson (2011) assumes that considering information alone would be enough to describe the whole Reality. He states: "Matter and energy cannot be used to describe all perceived phenomena, but information can

be used ...". In Gershenson (2010) he explains: "If atoms, molecules and cells are described as information, there is no need of a qualitative shift (from non-living to living matter) while describing the origin and evolution of life: this is translated into a quantitative shift (from less complex to more complex information). ... If we see matter and energy as particular, simple cases of information, the dualist trap is avoided by following a continuum in the evolution of the universe. ... entropy can also be described as information ... living and non-living systems are information."

9. The system{entity} – it is an example of a special notation I use throughout my paper to show that some entity (here, an *organism*) is enframed (here, is treated as a *system*). It seems to be standing to reason that application of the non-Shannonian concept of information requires elaboration of specific kind of formalism. In Section 2.7.1, I will suggest to formalize the organism as an integrated information system, thus coming from the system{organism} to the IIS{organism}. However, Gershenson (2010) insists that "there is no need to develop a new formalism, since information theory is well established. I borrow this formalism and interpret it in a new way."
10. As will be detailed in Section 3.2.2, by consciousness I mean a natural ability of some complex system to deal with physical signals and transform them into information for this complex system. So, information is a result of functioning of consciousness, and the Law of Conservation of Consciousness describes the most general conditions of information creation. Being based on Shannonian concept of information, Gershenson (2010) suggests several partial laws of information in elaboration of the existing information theory. In doing this, he assumes that "[i]nformation is not necessarily conserved, i.e. it can be created, destroyed, or transformed." (Gershenson, 2010).
11. Using the term *exemplar of consciousness* instead of *consciousness*, I, thereby, indicate what will be taken as an object of study when constructing a theory. Since an object of study is always something concrete, therefore the concept *exemplar of consciousness* seems to me as being more concrete (or subject-linked), than the concept *consciousness* (which may seem to exist on its own). Also, the definition to *self-organization* will be given in Section 3.1.1.
12. See http://tech.groups.yahoo.com/group/jcs-online/message/5739 or http://tech.groups.yahoo.com/group/jcs-online/message/6159 for the relevant discussions. The idea that when talking about consciousness we should consider the whole organism becomes more and more popular. Say, Fuchs (2011) states: "It is only the living being or the person as a whole that is conscious, perceives and acts" (Fuchs, 2011, p. 217).
13. Barušs (2001) also expresses doubts whether materialism is a "correct theory of reality" which is sufficient "to present the data concerning altered states of consciousness". As I think, he correctly indicates that the "problem is that materialism is still the baseline worldview accepted by many scientists, so that a balanced presentation of information concerning altered state can be rejected out of hand as unscientific by the scientific community" (Barušs, 2001, p. 57). But, instead of suggesting some cardinally new and more appropriate meta-theory, Barušs believes that, to encompass the consciousness-related phenomena, it is sufficient for scientists just to expand their personal psychic abilities and skills (even through the use of psychedelic drugs), thereby transforming the traditional Science into a kind of Art. In suggesting this, he points out that "the introduction of introspection in science represents an extension and not a replacement for methodologies that are currently in use" (*ibid.*, p. 63). Even when stating that "[i]t is time to release materialism, clearing the way for the development of transcendent theories of consciousness" (in Barušs, 2010, p. 227), Barušs, as it seems for me, does not presume replacing the dominating materialistic meta-theory by the new one (which I would recommend

Barušs to call *Transcendentalism*; don't confuse this term with idealistic philosophical and social movement that developed in New England around 1836 in reaction to rationalism).

14. As Coward and Sun (2007) indicate, "[a]n indispensable part of a scientific theory is the ability to map between different levels of description, including rules to indicate when a transition to a deeper (lower) level is required to achieve a desired degree of accuracy." (Coward and Sun, 2007, p. 948).
15. Barušs (2010) holds that "[transcendent theories of consciousness] should minimally meet the following criteria: they should be based on all of the usual empirical data concerning consciousness, including altered states of consciousness; they should take into account data about anomalous phenomena and transcendent states of consciousness; they should address the issues of existential meaning and provide soteriological guidance; and they should be consistent with the most accurate theories of physical manifestation" (Barušs, 2010, p. 227). If to treat Barušs' "transcendent theories of consciousness" as being constructed within the limits of some new hypothetical meta-theory (suggested to as Transcendentalism; see Note 13), then I may suppose that the listed four criteria may also be used when constructing that new meta-theory as epistemological framework for "transcendent theories of consciousness". By the way, as one can see, Barušs' first and second criteria correspond with my fifth criterion.
16. This term was coined yet in the year of 1999 (see Patlavskiy, 1999). This one has not to be confused with similar terms coined by other authors. For example, according to Marcus (2009), "Integrated information systems (IISs) are defined to be those computer-based systems for information processing that semi-automatically organize the contents being displayed on interactive screens; provide navigation through that organization as well as contents; determine appropriate verbal, typographic, graphic, and sonic formats; and display them in an interactive system that allows users to adjust what they see, hear, or touch" (Marcus, (2009, p. 2). Also, in Bleiholder and Naumann (2006) we read: "Integrated (relational) information systems provide users with a unified view of heterogeneous data sources. The tasks of querying the underlying data sources, combining the results, and presenting them to the user are performed by the integration system".
17. Velmans (1995) suggests that both "... a wave and a particle description are required for a complete understanding of photons. Likewise, both a (third-person) neural/physical and a (first-person) phenomenal description are required for a complete psychological understanding of subjects' representations" (Velmans, 1995, p. 263; parentheses in original). He refers to this idea as *Psychological Complementarity Principle*. Velmans (2002) also explains: "From a first-person perspective conscious experiences appear causally effective. From a third-person perspective the same causal sequences can be explained in neural terms. It is not the case that the view from one perspective is right and the other wrong. These perspectives are complementary (Velmans, 2002, p. 7).
18. If the elements of one system are in inverse relation (or, demonstrate a *reciprocal relationship*), then it is incorrect to ask which element is primary, or more important, and which one is secondary, or less important. Both these elements are equally important and have no sense one without the other. For example, knowledge (as the element of the theoretical base of the process of cognition) how to use a computer has no sense if we do not have a computer (as a certain means of cognition); and *vice versa*: there is no sense in a computer in case we do not know how to use it. That is why I say that the structural elements of cognitive space, namely, the theoretical base of the process of cognition and the means of cognition (see Section 2.6), are in inverse relation, or tied by inverse link.
19. Let us consider the arbitrary collection (system) of elements: system{A, B, C, D, ...}. If A, B, C, D, ... are treated as the elements of the DEC-model, then A is followed by B, B is followed

by C, and so on, with cause-effect relation between the former and the later element. If we consider the DIS-model, then the system^{1}{A^{1},B^{1},C^{1},D^{1},...} is followed by the system^{2}{A^{2},B^{2},C^{2},D^{2},...}, the latter one is followed by the system^{3}{A^{3},B^{3},C^{3},D^{3},...}, and so on up to the system^{n}{A^{n},B^{n},C^{n},D^{n},...}, with inverse relation between the systems 1 to n.

20. The Special Theory of Relativity talks about the limitation of communication via the velocity of light. However, as I am convinced, it is incorrect to take the speed of light for the speed of information propagation. I mean that the instant inter-system interaction enables the instant exchange of information, or instant distance-independent communication. Also, when considering his Law of Information Propagation, Gershenson (2010) states that "*Information* propagates *as fast as possible*." (italics in original).
21. Cf.: in Physics, it is impossible to prove whether the physical body moves because of its inertial or gravitational mass. The inertial mass and gravitational mass are considered equivalent.
22. The concept of *optimal change*, to become clear, requires introducing the concept of *bio-mental norm*, but it would go beyond the scope of this paper. The all that can be said here is that epy optimal change is such a kind of change of energetic characteristic of the IIS{organism} that is not being detected (not being experienced) by the very organism. It is only the non-optimal change of energetic characteristic that the organism treats as a kind of "distress signal". This ignoring of (or objective impossibility to experience) the phenomenon of optimal change of energetic characteristic has led many thinkers of the past to postulate the existence of a pure mind-matter relationship, which is, in all respects, a wrong idea. For full formulation of partial laws, see Patlavskiy (2005).
23. In Physics, the natural phenomenon of self-organization appears for a fraction of a second as an effect of *self-induction*.
24. According to the Second Law of Thermodynamics, no closed system can reduce its entropy (or literally: the total entropy of a system and its surroundings always increases in a spontaneous reaction); therefore, it would seem for me logical to call *anomalous* those parts of water which are characterized by low and further decreasing entropy.
25. Ludwig von Bertalanffy (1950) characterizes what I call here the second and third ways of entropy reduction thus: "In an open system, and especially in a living organism, there is not only a production of entropy due to irreversible processes, but the organism 'feeds', to use an expression of Schrödinger's, 'from negative entropy'. It imports complex organic molecules, uses their energy, and renders back the simpler end-products to the environment. Therefore the total change of entropy can be negative as well as positive" (Bertalanffy, 1950, p.161, inverted commas in original).
26. In fact, I talk here about the *objective evidence for consciousness*; namely, I hold that the presence of life talks unambiguously about the presence of consciousness (see http://tech.groups.yahoo.com/group/jcs-online/message/8220). The idea of inseparability of life and consciousness is being accepted, albeit on intuitive level, by many researchers. For example, Fuchs (2011) states: "Of course this is not to say that mind is something external to life; rather, it is a manifestation of the life process itself" (Fuchs, 2011, p. 218).
27. When elaborating the idea of a need for conceptual reorientation for exploring consciousness on its own terms, Holvenstot (2010) postulates that "***consciousness is a world-modeling function for all biological systems***" (Holvenstot, 2010, p. 203; bold and italics in original).
28. From here on, for the idea to be better understood, I recommend to imagine Figures 1, 2, 3, and 4 as if being arranged in a horizontal row; this is important since each next figure is a detailing of some element from the previous figure.

29. As Coward and Sun (2007) point out, "[t]he critical point is that some degree of inaccuracy will be inherent in the higher levels of descriptions of consciousness, but this is not necessarily a failure of the science. For one thing, it is present also in the physical sciences." (Coward and Sun, 2007, p. 951).
30. The literature on the link between memorization (learning, practicing, *etc*.) and microstructural physiological changes in the brain is vast. For example, having considered the mechanisms through which learning can produce changes in nerve cells, Kandel and Hawkins (1992) suggest that "the cortical connections in the somatosensory system are constantly being modified and updated on the basis of correlated activity, using a mechanism that appears similar to that which generates LTP [long-term potentiation − S.P.]" (Kandel and Hawkins, 1992, p. 60). Next. Having conducted the studies among London taxi drivers, Maguire *at al*. (1999) conclude: "Our results suggest that the "mental map" of the city is stored in the posterior hippocampus and is accommodated by an increase in tissue volume." As to more recent studies, Gaser and Schlaug (2003), by using a voxel-by-voxel morphometric technique, found grey matter volume differences in motor, auditory, and visual-spatial brain regions when comparing professional musicians (keyboard players) with a matched group of amateur musicians and non-musicians.
31. By *Self* I mean the performer of the process of cognition only. Meanwhile, Johnstone (2011) treats the Self more vast. He states: "The basic self that one is at any particular moment is consequently not only a conscious and cognizant being but a striving, affectively engaged lived body" (Johnstone, 2011, p. 182).
32. The FT-relation means here that the Self formalizes its self-object through its self-subject; for example, for an organism to realize that "I am", its self-subject must enframe and formalize (or, create a concept of) its self-object as "I".
33. http://tech.groups.yahoo.com/group/jcs-online/message/8812
34. As Fuchs (2011) puts the idea, "... the mind was not just an improved reaction to stimuli, but *gestalt formation*, i.e. the grasping of complex units, perceptual objects and situations as a whole. ... The mind is directed towards wholes or units, such as ‘cats’ or ‘trees’, ‘lived body’, ‘feeling’, ‘self’, or concepts" (Fuchs, 2011, p. 212; italics in original).
35. The fact that free will is a pre-cognitive act allows me to disagree with interpretation of the results of famous Libet's (1985) experiments that treats the performed voluntary actions as preceding the patient's will to perform these actions.
36. All the elements of DIS-model are equally important (they all are needed) for the resulting element of AS-model to appear; therefore, the elements of DIS-model are considered as being linked by inverse relation, in contradistinction to the elements of DEC-model that are considered as being linked by cause-effect relation.
37. To formalize the phenomenon of splitting of attention, we would have to consider more complex systemic modeling than the one presented in Figure 5, namely, the DIS-models of the third order of complexity (see Patlavskiy, 1999, Figure 12).
38. It is a main reason why I treat the medical term *to lose/restore consciousness* as incorrect and misleading. That is also why I sharply disagree with definition of consciousness suggested by Seth (2009). He writes: "Consciousness is that which is lost when we fall into a dreamless sleep and returns when we wake up again" (Seth, 2009, p.51).
39. Among such states are the experience of oneness with another person, the out-of-body experience (or, OBE for short), the near-death experience (or, NDE for short), the fugue phenomenon which results in acquiring new identity, and many others. Corazza (2010) provides detailed reports by the persons who experienced the phenomenon of OBE resulting

from either natural reasons (such as a cardiac arrest or childbirth), or induced by ketamine anaesthesia.

40. Even being in a state of out-of-body experience, the material characteristic of the IIS{patient} changes in a vanishingly small rate; that is why the person, after recovering from the state of OBE, can recall the details of being in that state.
41. That is why the effectiveness of learning foreign language is higher in the person who lives among the bearers of that language.
42. Since the material characteristic changes slightly, therefore the night dreams are easily forgotten after waking up.
43. Having analyzed 29 definitions of consciousness in the Oxford English Dictionary, Barušs identified four main categories of meaning of consciousness which he designated as "consciousness$_1$, behavioural consciousness$_2$, subjective consciousness$_2$, and consciousness$_3$" (Barušs, 2008, p. 278). He also shows that "notions of consciousness... are inherently intertwined with beliefs about reality" (*ibid.*, p. 282).
44. Pereira *at al.* (2010) states: "It would be fair to conclude that a science of consciousness may need a complex of theories to address different contributing factors requiring independent explanation. Further progress would then depend on an effective theoretical synthesis (as opposed to a conflict or competition) of theories that contribute to explain different aspects of studied phenomena" (Pereira *at al.*, 2010, p. 218).
45. Here, by identical species I mean the case when the IIS{species 1} and the IIS{species 2}, being the elements of the same veritas chain, would have the entropic characteristics of the same value (which is, in real, prohibited by the Law of IIS development).
46. From this veritas chain a specific form of the popularly known *anthropic principle* can be inferred, namely, that the evolution of the family and society is a projection of the evolution of the individual.
47. I start from the idea that the problem of AI will never be solved unless it stems from the effective theory of consciousness. Then I proceed with stating that we may come to solution of the problem of AI only in case we define consciousness not as a phenomenon which appears solely in the result of the activity of the living organism, but as an organism's ability to use some already existing (or naturally afforded) and universally accessible possibility (here, a possibility of reducing one's entropy through dealing with physical signals). Consequently, the proposed understanding of consciousness (see Section 3.2.2) makes it not impossible for us to engineer the complex systems of a non-organic nature that would use the same naturally afforded possibility as the organic-based complex systems.
48. Similar problem has been addressed by many other researchers too. For example, to find a mechanism for the direct effects of intention on, as he says, "physical manifestation", Barušs (2009) finds it necessary to bring together simultaneously four ideas, namely, the primacy of consciousness, the activity of a quantum field, the notion of a flicker universe, and the significance of morphic fields.
49. Chalmers (1995) states: "The really hard problem of consciousness is the problem of *experience*". He continues: "It is widely agreed that experience arises from a physical basis, but we have no good explanation of why and how it so arises. Why should physical processing give rise to a rich inner life at all?" (Chalmers, 1995, p. 203, italics in original). Velmans (2002) states the fact that "there is no accepted theory of mind/body interaction and this has had a detrimental effect on the acceptance of mental causation in science, philosophy and in many areas of clinical practice" (Velmans, 2002, p.3).
50. The existing theories that deal with the problem of correlation between Reality and the model of Reality (e.g., the physical similarity theory, the physical analogy theory, the theory of the

systems of isomorphism and homomorphism, *etc*.) work fine mostly in the A-space. Science provides an objective description of Reality in a sense that this objectivity is on a level **sufficient** to solve certain applied problems. Therefore, scientific objectivity is not an absolute objectivity, but, rather, *expedient objectivity*; similarly, scientific truth is not an absolute truth, but *expedient truth*. We can talk about *absolute truth* only when we apply the IIS-modeling and formalize noumenon as the IIS{noumenon}, thereby making the given noumenon to correspond *in one-to-one* (or absolutely) with its theoretical model.

51. After analyzing a lot of similar examples I came to conclusion that all the behavior of the living objects is subjected to (or, is an immediate consequence of) the properties of the elements of DIS-, and/or DEC-models (see Section 2.7.2).
52. <http://www.consciousness.arizona.edu/hameroff>, <http://www.tech.groups.yahoo.com/group/jcs-online/message/8236>
53. The Principle of Correlational Unrealizability may have the same consequences for the NCC-like theories of consciousness as the Second Law of Thermodynamics has for the various sorts of perpetuum mobile. Arguing along similar lines, by formulating "the empirical equivalence problem", Molyneux (2010) states that "the search for the NCC faces a significant logical obstacle, for ... it is impossible to distinguish 'one true' NCC from closely associated phenomena. This is because any dissociative experiment, from the point of view of one of the theories tested, appears as a case where consciousness was stifled – i.e. unable to have the causal effects that produce memories and reports of it", and this problem, according to him, "puts indefinitely many candidate NCCs on an equal empirical footing" (Molyneux, 2010, p. 168).
54. So, the phenomena of the different kinds, being formalized as integrated information systems, and in case of these systems become the elements of the same DIS-model, may constitute a veritas chain, which, in its turn, may result in an element of AS-model after performing the DIS-AS transition (see Figure 5; unlike the DEC-AS transition, the DIS-AS one is not prohibited). In other words, the interaction (or co-operation) of the phenomena of different kinds may result in emergence of the phenomena of some new, or third kind. Thereby, Nonstatanalysis lends support for the popularly known *synergism hypothesis* on the existence of "fundamental characteristic of the material world", namely that "things in various combinations, sometimes with others of like kind and sometimes with very different kinds of things, are prodigious generators of novelty" (Corning, 1995, p. 91).
55. Encyclopædia Britannica 2009 Ultimate Reference Suite.
56. If we ignore the informational factor, we return back to the ordinary framework used by modern science to explain the physical phenomena being based exclusively on the behavior of matter and energy; but, if we do not ignore the informational factor, we may explain Reality in all its complexity. Using the very similar lines of reasoning, Gershenson (2010) concludes: "It would be redundant to describe particles as information if we are studying only particles. The suggested approach is meant only for the cases when the physical approach is not sufficient, i.e. across scales, constituting an alternative worth exploring to describe evolution."
57. In his book, Russell (2006) wrote: "I now believe that rather than trying to explain consciousness in terms of the material world, we should be developing a new worldview in which consciousness is a fundamental component of reality". However, the author believes that "[t]he key ingredients for this new metaparadigm are already in place. We need not wait for any new discoveries. All we need do is put various pieces of our existing knowledge together, and explore the new picture of reality that emerges". As I have shown in my paper, the problem of construction of a new metaparadigm (or a new meta-theory) is far from being just a matter of putting "various pieces of our existing knowledge together", or through

conversion of worldviews of science and spirit (see *ibid.*, Chapter 8), or through "Collective Awakening" (see *ibid.*, Chapter 9). The problem, in real, requires much more complex solutions.

58. In Patlavskiy (1999, Figure 15), the structure of General Theory is illustrated schematically by the example of the structure of Nonstatanalysis.
59. However, there is also another possibility of how to publish a paper that contains complex ideas. Say, the online service named "Open Journal Systems" <http://pkp.sfu.ca/ojs> provides a possibility for everybody to establish a personal journal and to become its chief editor. For example, after having read the manuscript by Huping Hu *at.al.*, I admitted in a private communication with authors that it would be very problematic to find a mainstream scientist who would agree to provide a peer review of their ideas. Apparently, my remark was taken seriously, because, a month later, the first issue of the Journal of Consciousness Exploration & Research <http://www.jcer.com> appeared online with Huping Hu as its Chief Editor, and with his at.al. paper "successfully" published therein. It is pertinent to note that in the mid of the year of 2011, the OJS service hosted more than 7.500 (seven thousands and half!) personal journals. Ironically, if a tendency for increasing the number of journals will persevere, there will soon be more journals than authors who would like to publish anything.
60. I know this from personal experience, since, for the last eight years, about fifty of my commentaries on the papers published in the Journal of Consciousness Studies were posted on the moderated jcs-online forum; see <http://tech.groups.yahoo.com/group/jcs-online>; many my commentaries are on the Karl Jaspers Forum too; see <http://www.kjf.ca>.
61. Barušs (2001) even suggests a requirement that the scientists who aim to investigate the altered states of consciousness "may need to undertake a process of self-examination to determine their personal beliefs and to learn how to set them aside in order to be free to examine the evidence". He also states that a "scientist who wishes to understand consciousness may need to develop appropriate introspective technologies that may take the same training and dedication as skills required in other areas of science" (Barušs, 2001, p. 66), with admitting that "introspection of one's own consciousness is not easy" (*ibid.*, p 61). Also, emphasizing the importance of the author-reader cooperation when examining the ideas presented in his "Critique of Pure Reason", Kant (1929) writes: "The reader, I should judge, will feel it to be no small inducement to yield his willing co-operation, when the author is thus endeavouring, according to the plan here proposed, to carry through a large and important work in a complete and lasting manner" (Kant, 1929, p. 13).
62. There is no such a problem in Physics where we can publish a theory of mechanical motion apart from, say, the molecular-kinetic theory without the risk of losing consistency by any of these theories.
63. As one can see, informationism does not presume reducing information to matter and energy. It does not presume expressing matter and energy as one type of information either. Instead, informationism considers information, matter, and energy as three equally important factors, and in this it differs, say, from *informism*. According to Gershenson (2011), "[t]he rejection of materialism as an appropriate ontology/epistemology invites us to explore informism as an alternative to describe our world. Thus, instead of attempting to reduce information and meaning to matter and energy, we can express matter and energy as one type of information. Informism is a monism where phenomena at all scales can be related using the same language and a single ontological/epistemological category ...".

NOTA BENE: since the work on constructing a theoretical framework continues, the current paper updates on a regular basis; for updated version see http://www.academia.edu/1373015/General_Theory_the_Problems_of_Construction